

## Abstract

# Affix ordering and templatic morphology in Mandan

Ryan M. Kasak

2019

Mandan [ISO: mhq] is a Siouan language traditionally spoken in northwestern North Dakota on the Fort Berthold Indian Reservation. The language no longer has any L1 speakers, and fewer than a dozen L2 speakers remain. This dissertation provides a description of the phonological and morphological systems of the language, as well as contextualizes these systems within a formal framework. The data come from an assembled corpus of over five hundred pages of transcribed traditional narratives and twenty hours of recordings of those narratives done in the 1970s, which is supplemented by data from more recent fieldwork done in the early 2010s and by the author. Mandan features a system of templatic morphology, whereby affixes are ordered according to a proscribed order and whose linear order does not align with the semantic scope of those affixes. This dissertation proposes a morphologically-motivated reason for how these affixes come to appear in the order they do.

Chapter 1 provides an introduction to the Mandan people and their language. The ethnographic content of this chapter shows the relationship between the Mandan people and the Upper Missouri region of the Great Plains, and the unfortunate decline in their population due to their status as organizers of one of the largest hubs of trade near the center of the North American continent and the successive waves of smallpox epidemics brought to their villages due to this trade. After discussing previous research on the Mandan languages, the chapter concludes by posing three questions regarding whether affix order in Mandan is truly unmotivated and if not, why affixes appear where they do within the verbal template. Chapter 2 gives an overview of the phonological inventory of Mandan, describing its consonants and vowels, as well as providing a look at phonetic characteristics of Mandan consonants. This overview includes an analysis of several phonological processes that are blocked by some non-featural element in the vicinity of preverbs, and the chapter concludes by ruling out phonology as a motivating factor for affix order.

Chapter 3 identifies and describes individual affixes and clitics found on Mandan verbs. This description of verbal morphology includes reanalysis of elements previously considered to be mark tense, but which actually mark aspect or evidentiality. Further analysis on postverbal elements reveals that Mandan has an extensive enclitic field rather than a large number of suffixes. Ordering of these enclitics can change depending on semantic scope, but the ordering of prefixes remains unchanged. The conclusion of this chapter states that a syntactic approach also cannot yield a convincing result for why the prefix field is ordered the way it is, so there must be a factor beyond phonology

or syntax that is regulating the ordering of prefixes. Chapter 4 argues that since the prefixes in Mandan are true prefixes, there must be a motivating factor for their organization within the template. Previous accounts of clitic order has had little controversy over ad hoc ordering of clitic fields, so the question is raised: why the controversy over affix ordering? If clitics are the morphology of the phrase level, then affixation is the morphology of the word level. The argumentation in this chapter holds that Mandan has a templatic morphology because of the diachronic reanalysis of preverbal elements as being integral parts of the verb rather than independent elements, causing an expansion of brackets around that material while maintaining the old bracketing of the head word. These composite constructions allow for multiple word edges within a single morphological word and, as such, affixes are able to target a specific edge within the composite word. This accounts for the linear order of prefixes in Mandan, as well as in other Siouan languages using an OT framework to align prefixes to their target word edges.

The dissertation concludes in Chapter 5 that templatic morphology in Mandan is definitely motivated by some principles, but those principles are purely morphological. By virtue of templatic morphology being motivated, we can then say that all language with affixal morphology has some kind of motivation for the order of affixes. We can extend this composite analysis to templatic morphology in general. By looking briefly at several languages from different families that have templatic morphology, revealing that languages with composite words are not uncommon, and that this composite structure may be the cause of unexpected phonological or morphological phenomena in languages around the world. As such, this dissertation serves not just as the first detailed account of the grammatical system of Mandan, but as an attempt to show the similarity between the behavior of clitics and affixes in that they both are able to target the edge of a specific domain: clitics target an edge within the domain of a phrase, while affixes target an edge within the domain of a word.

# **Affix ordering and templatic morphology in Mandan**

A Dissertation  
Presented to the Faculty of the Graduate School  
of  
Yale University  
in Candidacy for the Degree of  
Doctor of Philosophy

by  
Ryan M. Kasak

Dissertation Directors: Stephen Anderson & Claire Bowers

May 2019

Copyright © 2019 by Ryan M. Kasak

All rights reserved.

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Theoretical focus of dissertation and analytic framework	2
1.1.1	Theoretical assumptions	4
1.1.1.1	Inflection versus derivation	5
1.1.1.2	Wordhood	6
1.1.1.3	Templatic morphology	7
1.1.2	Templatic morphology in Mandan	7
1.1.3	Previous OT-based approaches and Realization OT	15
1.1.3.1	Previous OT-based approaches	15
1.1.3.2	Realization OT	17
1.2	Background on the Mandan people	22
1.2.1	Overview	22
1.2.2	900 CE to 1851 CE	25
1.2.3	1851 CE to present day	29
1.3	Genetic relationships	32
1.4	Previous research on the Mandan language	36
1.5	Personal fieldwork and sources of data	39
1.5.1	Personal fieldwork	39
1.5.2	Sources of data	40
1.6	Organization of dissertation	41

<b>2</b>	<b>Sound system of Mandan</b>	<b>43</b>
2.1	Consonants . . . . .	44
2.1.1	Consonant inventory . . . . .	44
2.1.2	Plosives . . . . .	45
2.1.2.1	Supralaryngeal stops . . . . .	45
2.1.2.2	Glottal stop . . . . .	49
2.1.3	Affricates . . . . .	51
2.1.4	Fricatives . . . . .	54
2.1.4.1	Supralaryngeal fricatives . . . . .	54
2.1.4.2	Glottal fricative . . . . .	56
2.1.5	Sonorants . . . . .	57
2.2	Vowels . . . . .	60
2.2.1	Monophthongs . . . . .	61
2.2.2	Diphthongs . . . . .	62
2.2.3	Dorsey's Law excrescent vowels . . . . .	62
2.3	Orthography . . . . .	65
2.4	Boundary-independent morpho-phonology . . . . .	66
2.4.1	Pseudo-geminate dissimilation . . . . .	67
2.4.2	Initial sonorant fortition . . . . .	70
2.4.3	Ablaut . . . . .	73
2.4.3.1	Morphologically-conditioned ablaut . . . . .	74
2.4.3.2	Syntactically-conditioned ablaut . . . . .	79
2.5	Boundary-dependent morpho-phonology . . . . .	82
2.5.1	Hiatus resolution processes . . . . .	82
2.5.1.1	Epenthetic [ʔ] . . . . .	83
2.5.1.2	Epenthetic [ɾ] . . . . .	86
2.5.1.3	Short vowel elision . . . . .	96
2.5.1.4	Summary of hiatus resolution processes . . . . .	101
2.5.2	Metathetical processes . . . . .	104
2.5.2.1	Glottal stop metathesis . . . . .	104

2.5.2.2	Velar-bilabial stop metathesis . . . . .	108
2.5.2.3	Summary of metathetical processes . . . . .	110
2.5.3	Nasal harmony . . . . .	110
2.5.4	Stress . . . . .	116
2.5.4.1	Previous descriptions of Mandan stress . . . . .	116
2.5.4.2	Default primary stress assignment . . . . .	120
2.5.4.3	Secondary stress assignment . . . . .	124
2.5.4.4	Unexpected stress assignment . . . . .	127
2.5.4.4.1	Stress assignment and Dorsey's Law vowels . . . . .	127
2.5.4.4.2	Stress assignment and pre- and post-verbal elements . . . . .	132
2.5.4.4.3	Stress assignment in fossilized compounds . . . . .	134
2.5.4.5	Summary of stress assignment . . . . .	137
2.6	Phonologically-conditioned affixation . . . . .	137
<b>3</b>	<b>Verbs and inflection in Mandan</b>	<b>143</b>
3.1	Prefix field . . . . .	143
3.1.1	Derivational prefixes . . . . .	144
3.1.1.1	Instrumental prefixes (Slot 1) . . . . .	144
3.1.1.1.1	'By force' instrumental: <i>ka-</i> . . . . .	145
3.1.1.1.2	'By pushing' instrumental: <i>pa-</i> . . . . .	146
3.1.1.1.3	'By foot' instrumental: <i>ra</i> <sub>-1</sub> . . . . .	147
3.1.1.1.4	'By mouth' instrumental: <i>ra</i> <sub>-2</sub> . . . . .	148
3.1.1.1.5	'By heat' instrumental: <i>ra'</i> - . . . . .	149
3.1.1.1.6	'By hand' instrumental: <i>ru-</i> . . . . .	150
3.1.1.1.7	'By piercing' instrumental: <i>wa'</i> - . . . . .	152
3.1.1.2	Aspectual prefixes (Slot 2) . . . . .	153
3.1.1.2.1	Iterative aspectual: <i>ki</i> <sub>-1</sub> . . . . .	154
3.1.1.2.2	Inceptive aspectual: <i>ka-</i> and <i>ki</i> <sub>-2</sub> . . . . .	155
3.1.1.3	Voice prefixes (Slot 3) . . . . .	157
3.1.1.3.1	Middle voice marker: <i>ki</i> <sub>-1</sub> . . . . .	157
3.1.1.3.2	<i>Suus</i> marker: <i>ki</i> <sub>-2</sub> . . . . .	160

3.1.1.3.3	Reflexive and reciprocal marker: <i>ki</i> <sub>-3</sub> . . . . .	161
3.1.1.3.4	Vertitive marker: <i>ki</i> <sub>-4</sub> . . . . .	163
3.1.1.4	Preverbal prefixes (Slots 7 and 8) . . . . .	167
3.1.1.4.1	Applicative preverbs (Slot 7) . . . . .	168
3.1.1.4.1.1	Transitivizer preverb: <i>aa</i> - . . . . .	169
3.1.1.4.1.2	Generic preverb: <i>e</i> - . . . . .	170
3.1.1.4.1.3	Directional preverb: <i>i</i> <sub>-1</sub> . . . . .	172
3.1.1.4.1.4	Instrumental preverb: <i>i</i> <sub>-2</sub> . . . . .	173
3.1.1.4.1.5	Ordinal preverb: <i>i</i> <sub>-3</sub> . . . . .	174
3.1.1.4.1.6	Possessive preverb: <i>i</i> <sub>-4</sub> . . . . .	175
3.1.1.4.1.7	Reflexivizer preverb: <i>i'</i> - . . . . .	177
3.1.1.4.1.8	Locative preverb: <i>o</i> <sub>-1</sub> . . . . .	179
3.1.1.4.2	Irrealis preverb (Slot 8): <i>o</i> <sub>-2</sub> . . . . .	180
3.1.2	Inflectional prefixes . . . . .	182
3.1.2.1	Second person prefix (Slot 4) . . . . .	184
3.1.2.1.1	Second person active prefix: <i>ra</i> - . . . . .	184
3.1.2.1.1.1	Allomorph /r <sup>ʰ</sup> -/ . . . . .	185
3.1.2.1.1.2	Allomorph /re-/ . . . . .	187
3.1.2.1.1.3	Allomorph /rã-/ . . . . .	187
3.1.2.1.2	Second person stative prefix: <i>ni</i> - . . . . .	188
3.1.2.1.2.1	Allomorph /r <sup>ʰ</sup> -/ . . . . .	189
3.1.2.1.2.2	Allomorph /rã-/ . . . . .	190
3.1.2.2	First person singular prefix (Slot 5) . . . . .	191
3.1.2.2.1	First person singular active prefix: <i>wa</i> - . . . . .	192
3.1.2.2.1.1	Allomorph /w <sup>ʰ</sup> -/ . . . . .	194
3.1.2.2.1.2	Allomorph /we-/ . . . . .	194
3.1.2.2.1.3	Allomorph /w-/ . . . . .	195
3.1.2.2.2	First person singular stative prefix: <i>ma</i> - . . . . .	196
3.1.2.2.2.1	Allomorph /w <sup>ʰ</sup> -/ . . . . .	197
3.1.2.2.2.2	Allomorph /w-/ . . . . .	198

3.1.2.2.2.3	Allomorph /w <sub>i</sub> -/ . . . . .	199
3.1.2.3	First person plural prefix (Slot 8) . . . . .	201
3.1.2.3.1	First person plural active prefix: <i>nu-</i> . . . . .	202
3.1.2.3.1.1	Allomorph /rV-/ . . . . .	204
3.1.2.3.1.2	Allomorph /r-/ . . . . .	205
3.1.2.3.2	First person plural stative prefix: <i>ro-</i> . . . . .	205
3.1.2.3.2.1	Allomorph /rV-/ . . . . .	206
3.1.2.3.2.2	Allomorph /r-/ . . . . .	207
3.1.2.3.2.3	Allomorph /r <sub>u</sub> -/ . . . . .	208
3.1.2.4	Unspecified argument prefix (Slot 9) . . . . .	209
3.1.2.4.1	Unspecified argument prefix: <i>wa-</i> . . . . .	210
3.1.2.4.1.1	Allomorph /w <sup>ʔ</sup> -/ . . . . .	212
3.1.2.4.1.2	Allomorph /w <sub>a</sub> -/ . . . . .	213
3.1.2.4.2	Nominalizer prefix: <i>waa</i> <sub>1</sub> . . . . .	214
3.1.2.4.3	Partitive prefix: <i>waa</i> <sub>2</sub> . . . . .	215
3.1.2.4.4	Indefinite subject <i>waa</i> <sub>3</sub> . . . . .	216
3.1.2.4.5	Summary of <i>wa-</i> and <i>waa-</i> prefixes . . . . .	218
3.1.2.5	Negative prefix (Slot 10) . . . . .	219
3.1.2.6	Relativized prefix (Slot 11) . . . . .	221
3.2	Suffix field . . . . .	226
3.2.1	Augmentative suffix . . . . .	228
3.2.2	Collective suffixes . . . . .	229
3.2.2.1	Collective 1: <i>-aaki</i> . . . . .	229
3.2.2.2	Collective 2: <i>-sha</i> . . . . .	230
3.2.3	Intensifier suffix . . . . .	232
3.2.4	Similitive suffixes . . . . .	233
3.2.4.1	Similitive 1: <i>-esh</i> . . . . .	233
3.2.4.2	Similitive 2: <i>-eshka</i> . . . . .	233
3.2.5	Summary of suffixes in Mandan . . . . .	234
3.3	Phrasal morphology . . . . .	234

3.3.1	Aspectual enclitics . . . . .	235
3.3.1.1	Retrospective aspectual enclitic: = <i>aahka</i> . . . . .	238
3.3.1.2	Continuative aspectual enclitics . . . . .	240
3.3.1.2.1	Continuative 1: = <i>qmi</i> . . . . .	240
3.3.1.2.2	Continuative 2: = $\emptyset$ . . . . .	242
3.3.1.2.3	Summary of continuatives . . . . .	245
3.3.1.3	Habitual aspectual enclitic: = <i>ka</i> . . . . .	245
3.3.1.4	Prospective aspectual enclitic: = <i>naate</i> . . . . .	247
3.3.1.5	Celerative aspectual enclitic: = <i>niite</i> . . . . .	248
3.3.1.6	Iterative aspectual enclitic: = <i>skee</i> . . . . .	249
3.3.2	Evidential and modal enclitics . . . . .	251
3.3.2.1	Dynamic modal enclitic: = <i>aahka</i> . . . . .	251
3.3.2.2	Possible modal enclitic: = <i>a'shka</i> . . . . .	253
3.3.2.3	Visual evidential enclitic: = <i>ishi</i> . . . . .	255
3.3.2.4	Quotative evidential enclitic: = <i>ka'ehe</i> . . . . .	256
3.3.2.5	Potential modal enclitic: = <i>kt</i> . . . . .	258
3.3.2.5.1	Allomorph /=t/ . . . . .	260
3.3.2.5.2	Allomorph /=kte/ . . . . .	261
3.3.2.5.3	Allomorph /=kti/ . . . . .	262
3.3.2.6	Indirect evidential enclitic: = <i>oote</i> . . . . .	263
3.3.2.7	Narrative evidential enclitic: = <i>oomak</i> . . . . .	264
3.3.2.8	Dubitative modal enclitic: = <i>o'xere</i> . . . . .	266
3.3.2.9	Attitudinal evidential enclitic: = <i>nash</i> . . . . .	267
3.3.2.10	Definite evidential enclitic: = <i>s</i> . . . . .	270
3.3.3	Number enclitics . . . . .	271
3.3.3.1	Second person plural: = <i>nit</i> . . . . .	272
3.3.3.2	Third person plural: = <i>kere</i> . . . . .	274
3.3.4	Negation enclitics . . . . .	276
3.3.4.1	Allomorph /=rix/ . . . . .	276
3.3.4.2	Allomorph /=xi/ . . . . .	277

3.3.5	Complementizer enclitics . . . . .	278
3.3.5.1	Allocutive agreement markers . . . . .	279
3.3.5.1.1	Female-addressee interrogative marker: = <i>o'na</i> . . . . .	280
3.3.5.1.2	Female-addressee indicative marker: = <i>o're</i> . . . . .	281
3.3.5.1.3	Male-addressee indicative marker: = <i>o'sh</i> . . . . .	282
3.3.5.1.4	Male-addressee interrogative marker: = <i>o'sha</i> . . . . .	283
3.3.5.1.5	Female-addressee imperative marker: = <i>na</i> . . . . .	284
3.3.5.1.6	Male-addressee imperative marker: = <i>ta</i> . . . . .	285
3.3.5.2	Switch-reference markers . . . . .	286
3.3.5.2.1	Different-subject switch-reference marker: = <i>ak</i> . . . . .	286
3.3.5.2.2	Same-subject switch-reference marker: = <i>ni</i> . . . . .	287
3.3.5.3	Hypothetical mood complementizer: = <i>q't</i> . . . . .	289
3.3.5.4	Stem vowel: = <i>e</i> . . . . .	291
3.3.5.5	Simultaneous aspectual complementizer: = <i>haa</i> . . . . .	293
3.3.5.6	Politeness marker: = <i>hak</i> . . . . .	294
3.3.5.7	Conditional complementizer: = <i>ki</i> . . . . .	295
3.3.5.8	Iterative aspectual complementizer: = <i>nik</i> . . . . .	296
3.3.5.9	Incredulative complementizer: = <i>nikuk</i> . . . . .	297
3.3.5.10	Disjunctive complementizer: = <i>shka'nik~skha</i> . . . . .	298
3.3.5.11	Intensive indicative complementizer: = <i>sih</i> . . . . .	299
3.3.5.12	Causational complementizer: = <i>so'nik</i> . . . . .	300
3.4	Syntactically-conditioned affixation . . . . .	301
3.4.1	Status of enclitics . . . . .	302
3.4.2	Ordering of enclitics . . . . .	306
3.4.3	Conclusion . . . . .	307
<b>4</b>	<b>Morphologically-motivated affix order</b> . . . . .	<b>309</b>
4.1	Issue of templatic morphology . . . . .	311
4.1.1	Previous analysis of the Siouan template . . . . .	311
4.1.2	Verbal template in Mandan . . . . .	312
4.2	Templatic morphology and Mandan preverbs . . . . .	313

4.2.1	Infixation is really prefixation . . . . .	313
4.3	Determining prefix order . . . . .	316
4.3.1	Preverbs and pronominals . . . . .	317
4.3.2	Status of preverbal morphology . . . . .	320
4.3.2.1	Pronominals as clitics . . . . .	321
4.3.2.2	Pronominals as affixes . . . . .	326
4.3.2.3	Word-internal structure and affixation . . . . .	327
4.3.2.3.1	Mandan preverbs create a word boundary . . . . .	328
4.3.2.3.2	Mandan preverbs have composite structures . . . . .	330
4.4	Problem of affix ordering . . . . .	332
4.4.1	Reconciling surface affix order with underlying structure . . . . .	333
4.4.2	Constraint-driven motivation for affix order . . . . .	336
4.5	Realization OT . . . . .	340
4.5.1	Morphological motivation for counter-Mirror Principle orderings . . . . .	341
4.5.2	Role of semantic scope in a constraint-based system . . . . .	342
4.6	Templatic morphology and Realizational OT . . . . .	343
4.6.1	Patterns in Mandan prefix order . . . . .	344
4.6.2	Realization constraints for Mandan prefixes . . . . .	345
4.6.3	Implications of internal word boundaries . . . . .	346
4.6.4	Revisiting a constraint-based account of affix order . . . . .	350
4.6.4.1	Reconciling Xu's (2007) Realization OT with Anderson's (2005) theory of clitics . . . . .	351
4.6.4.2	Revisiting Mandan prefix RCs . . . . .	353
4.6.5	Conclusion . . . . .	360
4.7	Templatic morphology across Siouan . . . . .	361
4.7.1	Missouri Valley Siouan: Hidatsa . . . . .	362
4.7.2	Mississippi Valley Siouan . . . . .	365
4.7.2.1	Chiwere-Hoocąk: Hoocąk . . . . .	366
4.7.2.2	Dakotan: Lakota . . . . .	368
4.7.2.3	Dhegihan: Osage . . . . .	371
4.7.3	Ohio Valley Siouan: Biloxi . . . . .	372

4.7.4	Catawban: Catawba	375
4.7.4.1	Summary of preverbal template in Siouan	378
<b>5</b>	<b>Conclusion</b>	<b>379</b>
5.1	Contributions	380
5.2	Status of templatic morphology	381
5.2.1	Templatic morphology is motivated	381
5.2.2	Templates in other languages	384
5.2.2.1	Composites in Caddo	384
5.2.2.2	Composites in Navajo	386
5.2.2.3	Composites in Arapaho	387
5.2.2.4	Summary	389
5.3	Avenues for future research	389

# List of Tables

1.1	Prefix field in Mandan . . . . .	8
2.1	Consonant inventory . . . . .	44
2.2	Proto-Siouan consonant inventory . . . . .	45
2.3	Measured means: VOT per Torres (2013a:29) . . . . .	46
2.4	Mean (ms) VOT for Lakota stops (Torres 2013b) . . . . .	46
2.5	Supralaryngeal stops . . . . .	48
2.6	Supralaryngeal fricatives . . . . .	54
2.7	Distribution of /w/ and /r/ . . . . .	60
2.8	Contrastive vowel qualities . . . . .	61
3.1	Prefix field in Mandan . . . . .	144
3.2	Verbs of motion in Assiniboine . . . . .	164
3.3	Verbs of motion in Mandan . . . . .	165
3.4	Conjugation of <i>éhe</i> ‘say’ . . . . .	170
3.5	Suffix field in Mandan . . . . .	228
3.6	Mandan allocutive agreement markers . . . . .	280
4.1	Prefix field in Mandan . . . . .	317
4.2	Prefix field in Hidatsa . . . . .	363
4.3	Prefix field in Hoocąk . . . . .	366
4.4	Prefix field in Lakota . . . . .	369
4.5	Prefix field in Osage . . . . .	371
4.6	Prefix field in Biloxi . . . . .	373

4.7 Prefix field in Catawba . . . . . 375

# List of Figures

1.1	Mandan migrations	26
1.2	Land under the Treaty of Fort Laramie and subsequent cessions	30
1.3	Fort Berthold Indian Reservation pre-1953	31
1.4	Fort Berthold Indian Reservation post-1953	32
1.5	Current consensus tree for Siouan Proper from Rankin (2010)	33
1.6	Siouan family tree from Kasak (2015a)	35
2.1	#t and _t_in <i>túroote</i> (MG)	47
2.2	t# in <i>íkimaapet</i> (MG)	47
2.3	/Ct/ cluster in <i>kúupatkush</i> (EB)	48
2.4	/tC/ cluster in <i>ptáahta</i> (EB)	48
2.5	Word-final /ʔ/ in <i>wará' oráakini</i> (AE)	50
2.6	Glottal stops in <i>ní'ro'sh</i> (OS)	50
2.7	Glottal stops in <i>rá'kakshe'sh</i> (OS)	51
2.8	#x in <i>xíko'sh</i> (OS)	55
2.9	x# in <i>miníx</i> (EB)	55
2.10	_x_in <i>íjxa</i> (EB)	55
2.11	/xC/ in <i>xtáqte</i> (AE)	56
2.12	/Cx/ in <i>íkxqhta</i> (EB)	56
2.13	Realization of h# in <i>míih</i> (OS)	57
2.14	Intervocalic /h/ voicing in <i>shehéks</i> (EB)	57
2.15	/h/ voicing in <i>míih éexixte'na</i> (OS)	57
2.16	/h/ voicing in <i>máatah íwokahqá</i> (OS)	57

2.17	Mandan oral vowels . . . . .	61
2.18	Mandan nasal vowels . . . . .	61
2.19	Diphthong /aʉ/ in <i>háu</i> (OS) . . . . .	62
2.20	<i>ishák</i> 3.PRO . . . . .	121
2.21	<i>tashká</i> ‘how’ . . . . .	121
2.22	<i>áakitaa</i> ‘above’ . . . . .	122
2.23	<i>ní’ni</i> ‘he climbed and...’ . . . . .	122
2.24	<i>patáqta</i> ‘push!’ . . . . .	122
2.25	<i>numá’k</i> ‘man, person’ . . . . .	122
2.26	<i>maná</i> ‘wood, tree’ . . . . .	129
2.27	<i>miní</i> ‘water, liquid’ . . . . .	129
2.28	<i>terékerek</i> ‘them being big around’ . . . . .	130
2.29	<i>xamáhe</i> ‘small’ . . . . .	130
2.30	<i>paxirúuke</i> ‘cornsilk’ . . . . .	131
3.1	Visual representation of Mandan motion verbs . . . . .	165

# List of Abbreviations

The glossing conventions employed here generally adhere to those used in the Leipzig Glossing Rules with the addition of some conventions found in Siouanist literature. An explicit list of abbreviations bellows below.

1	first person
2	second person
3	third person
A	active argument
AE	Annie Eagle
AL	alienable possession
ATT	attitudinal evidential enclitic
Ar	Arikara
Bil	Biloxi
Cat	Catawba
CAUS	causative
CLF	classifier
COND	conditional
Cro	Crow
DAT	dative
DEM	demonstrative
DIST	distal
DS	different-subject switch-reference marker
EB	Edwin Benson
Eng	English

EVI	epistemic modal
F	feminine
FIRE	'by fire' instrumental
Fr	French
FRCE	'by force' instrumental
HAND	'by hand' instrumental
Hid	Hidatsa
IMP	imperative force
INAN	inanimate
INCP	inceptive aspect
IND	indicative force
INDF	indefinite
INFR	inferential evidential
INS	instrumental
INT	interrogative force
IRR	irrealis mood
ITER	iterative aspect
Lak	Lakota
LOC	locative
LIE	lying positional
M	masculine
Man	Mandan
MG	Mattie Grinnell
MID	middle voice
MTH	'by mouth' instrumental
NARR	narrative evidential
NEG	negative
NMLZ	nominalizer
OS	Otter Sage
PAlg	Proto-Algonquian

PERF	perfect aspect
PERS	personal possessive
PRCE	'by piercing' instrumental
PL	plural
POSS	possessive
Pot	Potawatomi
POT	potential mood
PPSi	Pre-Proto-Siouan
PRO	pronoun
PROX	proximal
PSi	Proto-Siouan
PST	past tense
PSNL	positional
PUSH	'pushing' instrumental
PV	preverb
PRSP	prospective aspect
RECP	reciprocal
REL	relativizer
RFLX	reflexive
S	stative argument
SG	singular
SIM	simultaneous
SIT	sitting positional
SMLT	similitive
SS	same-subject switch-reference marker
STND	standing positional
SUUS	<i>suus</i> marker
SV	stem vowel
TOP	topic marker

TR	transitive
TYP	typifier
UNSP	unspecified argument
WF	Walter Face

# Acknowledgments

I can recall an occasion as a very young child when my grandmother was on the phone talking to one of her sisters about someone of whom she was not particularly fond. She switched over to Russian to keep me from understanding, but the fact it sounded so different from English made me remember it vividly. It was definitely not something that would be appropriate to repeat here, but it nonetheless piqued my curiosity and caused me to pester her to tell me how to say other things in Russian. My grandmother could not read Russian, so she was only able to tell me how to say things. I wanted to remember what she had said, which led me to being dropped off at the local library for much of junior high, where I would spend hours looking at an ancient copy of *The Berlitz Self-Teacher: Russian*, learning how to read and write, and then coming home to ask my grandmother if that is how she would say it. My desire to actively speak one of my heritage languages is ultimately what has compelled me to be so active in helping others do the same with their own heritage languages.

It goes without saying that, for me to get to this point, I needed a great deal of help from a large number of sources. First and foremost, my studies would not have been possible without the generous institutional support from Yale University, the A. Richard Diebold, Jr. Graduate Fellowship, the Frederick W. Hilles Memorial Scholarship Fellowship, and the University Dissertation Fellowship. In addition to this support from Yale University, I have been fortunate enough to receive the Phillips Fund for Native American Research Grant from the American Philosophical Society to aid in my travels and fieldwork in North Dakota. I must also thank the late Dr. Bernard J. Brommel for selecting me for the Dr. Bernard J. Brommel Doctoral Scholarship for graduates of Northeastern Illinois University. Between my mortgage in Chicago and my apartment in New Haven, doing fieldwork and visiting archives during my time away from classes and teaching would not have been feasible without the contributions of these institutions and individuals to my studies.

The financial support from Yale and elsewhere has been one piece of this puzzle, but I also cannot understate the long-term role that Steve Anderson has played in shaping the research that has led to this dissertation. Him handing me a copy of his *A-morphous Morphology* during one meeting and saying that I should look over Chapter 11 was what

ultimately gave me the missing piece that caused the analysis of templatic morphology as being composite words to fall into place. I must reiterate my thanks to Steve, for I could never have started this without him. Likewise, I must thank Claire Bower for her immensely helpful comments throughout this dissertation process, and for helping me become more mindful about working with communities whose languages are not always part of their everyday life. She was often the person who pushed this dissertation along, and her suggestion of picking a date for my defense was the boost I needed to finally submit my draft to my committee. Marianne Mithun offered great insight into issues with dealing with diachronic versus synchronic processes raised in my dissertation, and I am grateful for her experience in all matters morphological. After my defense, Natalie Weber was kind and patient enough to help me through streamlining my dissertation and making it a stronger piece of work. She also was generous enough with her time to meet with me over Skype in the evenings and work around my teaching schedule. Though he is no longer at Yale, during his time there, Ryan Bennett also played a pivotal role in the development of the phonological analysis herein, and his comments during my first qualifying paper (which later became this dissertation) were very helpful in moving me in the right direction.

I would be remiss if I did not extend my most sincere gratitude to all the individuals on Fort Berthold who have helped me over the years. Edwin Benson was a warm and patient person, who was very charitable with his time, even if he was not feeling well. I am thankful for the time he shared with me in helping to record his language. In addition, I am thankful to Cory Spotted Bear for meeting with me and working on translating and recording two children's books in Mandan. He has been a long-time advocate of the Mandan language, and I hope his example inspires other Mandan people to learn their heritage languages. Ann Solano has also been a huge help in this process, as she is one of the best detectives I have ever met, finding Mandan materials in various archives, driving across long distances to meet with people, and generally stirring the pot to gain and share knowledge of the Mandan language. Leon Little Owl and Valerian Three Irons have both been great sources of knowledge about Mandan culture and the Mandan language, and I appreciate all the time they have spent instructing me.

I would like to extend my gratitude to John Boyle, first as my professor at Northeastern Illinois University, and later as my colleague after his move to California State University, Fresno. He is the one who introduced me to the Mandan language in the first place, and without him, I never would have learned about all the work needing to be done in documenting and describing indigenous languages of the Americas. I extend my sincerest thanks to Jonnia Torres Carolan, who has spent so many hours with me, driving across the Northern Plains to meet people and collect data, and who has been a consistent co-author and co-presenter over the years. I am likewise grateful to Sarah Lundquist and Brittany McKenna North for their frequent collaboration with me since our time in North Dakota. My thanks also go out to my fellow graduate students at Yale who were a consistent source of good discussion and

shared resources: my cohort-mates Dolly Goldenberg and Natalie Schrimpf, my  $\text{\LaTeX}$  gurus Sabina Matyiku and especially Jason Zentz, and the grads I worked alongside, such as Rikker Dockum, Jen Runds, Sean Gleason, Emily Gasser, and Matt Tyler, among many others. Hadley Austin and Lizz Evalen also have my thanks for being such speedy proofreaders.

These acknowledgments began with my family and must conclude with my family, as the support of my parents, Raymond and Kathleen Kasak, is ultimately what allowed me to even go to college in the first place, which is what led to this Ph.D. in the first place. I am happy to state that all the stress I inflicted on you has paid off, Mom and Dad. Thank you as well to my Aunt Joanne Twomey, who also provided support for my education, and to my grandmother Rosemary DiNanno Twomey. Thank you all.

# Chapter 1

## Introduction

Mandan [ISO: mhq] is a Siouan language spoken in northwestern North Dakota on the Fort Berthold Indian Reservation. With a no remaining L1 speakers and fewer than ten remaining heritage or L2 speakers, Mandan is critically endangered. Mandan also possesses some typologically rare phenomena, such as allocutive agreement similar to Basque, where a sentence-final verb must bear some marking that denotes whether the listener is male or female. Indeed, verbs in Mandan can display a large amount of complex morphology. In particular, Mandan employs a high degree of affixation on its verbs, and has often been described as having templatic morphology, as have Siouan languages in general (Rankin et al. 2003).

Mandan has not been as well-studied as its cousins Lakota (e.g., Rood & Taylor 1996 and Ullrich & Black Bear 2016) or Crow (e.g., Wallace 1993 and Graczyk 2007), and has been described in very compact grammars that do not exceed 40 pages (Kennard 1936, Mixco 1997a). This dissertation represents the first major attempt at presenting a formal description and analysis of Mandan grammar set within a theoretical framework. Furthermore, even less attention has been paid to its verbal template and the motivating factors for the affix order therein. This dissertation contributes to empirical literature by organizing data from existing Mandan corpora in order to contextualize Mandan morphology within the typology of templatic morphologies.

In this chapter, I then give an overview of the central problem investigated throughout this dissertation in §1.1: i.e., how can we give a synchronic account for the ordering of affixes within Mandan's prefix field? I briefly discuss the analytic framework I will be using to accomplish this task. I present a historical sketch on the Mandan people in §1.2 and talk about Mandan's place within the Siouan language family in §1.3. I elaborate on the work previous scholars have done on the language in §1.4 and what I have done in my own fieldwork in §1.5, and I end the chapter by giving an overview of the organization of the rest of this dissertation in §1.6.

## 1.1 Theoretical focus of dissertation and analytic framework

Mandan is critically endangered, and as such, it is important that resources be made available for community members to learn their heritage language. This dissertation aims to be one such resource by investigating several aspects of the grammar of Mandan: its sound system and the process by which it builds words. The work that follows involves a description of the phonology and morphology of Mandan, though it seeks to contextualize these facets of the grammar through an analytical lens and investigate both what makes Mandan similar to other languages and what makes it different. In this respect, the goal of this dissertation is two-fold: to provide a descriptive account of several aspects of Mandan grammar and to contextualize particular phenomena within a theoretical framework. In particular, this dissertation will focus on the process of affixation in Mandan and what affix order tells us about morphology. To accomplish this goal, we shall investigate the sound system and the distribution of verbal morphology to make the case that affix order in Mandan is constrained neither by its phonology nor its syntax.

Mandan can be described as having templatic morphology (Mixco 1997a, Rankin et al. 2003). There are competing notions of templatic morphology: a system of nonconcatenative morphology often appealing to the notion of some kind of CV skeletal template as often described in Semitic languages (McCarthy 1981:386), or a system of concatenative morphology where there is a strict order of affixes into particular “slots,” where the order is fixed and is not constrained by any other domain of the grammar (Hyman 2003:245). Throughout this dissertation, I will use the term ‘templatic morphology’ to refer to the latter of these two notions of templatic morphology. The issue of how affix order is motivated (i.e., what is constraining the order of affixes) in languages featuring templatic morphology ultimately shapes the first of the three research questions raised in this dissertation.

### (1.1) Question 1:

According to Manova & Aronoff (2010:110), affix ordering could be either motivated (i.e., governed by rules) or unmotivated (i.e., inexplicable). They deem “templatic” to be a subtype of unmotivated affix order, but is affix ordering in languages with templatic morphology truly unmotivated, or can there be at least some motivating factors with respect to affix order?

Manova & Aronoff (2010:111) explain that affix order can be motivated by semantic principles or formal principles like the phonology, morphology, or syntax of a language. That is, information from various linguistic domains can play a crucial role in affix order: e.g., affix order can be motivated by syntactic principles. This system of motivated affix order contrasts with those with unmotivated affix orders, such as the one seen in Mandan. Affix order in templatic morphology is not arbitrary, rather is it “inexplicable but ordered.” To resolve this question, we must take a closer look at affixal morphology of Mandan to determine whether there truly is no extra-morphological (e.g.,

syntactic) principle at work, as well as to see if affix order fits as neatly into a template as [Mixco \(1997a\)](#) describes.

Morphology is often discussed in tandem with some other domain in linguistic literature, especially in terms of morphosyntax (e.g., [Simpson & Withgott 1986](#)) or morphophonology (e.g., [Downing 2006](#)), with less attention paid to the aspects of morphology that cannot be attributed to any other domain (e.g., [Anderson 1992](#) and [Aronoff 1994](#)). In particular, there is a decades-old tradition of deriving a language's syntactic organization through some assumed isometric relationship with the surface morphology (e.g., [Baker 1985](#), [Embick & Noyer 2001](#), [Harley 2010](#), and [Halle & Marantz 1993](#), *inter alios*). The notion that templatic languages are truly unmotivated is challenged by [Rice \(2000\)](#), who claims that templatic morphology is a manifestation of affixes being ordered by grammatical principles. This claim relates to the second of the three research questions investigated within this dissertation.

(1.2) Question 2:

[Rice \(2000:1\)](#) questions the notion of a template as a word-formation device in Athabaskan languages and argues that affix ordering is constrained by semantic scope. Since Athabaskan languages are often held up as exemplars of templatic morphology (i.e., unmotivated affix ordering), does this necessitate that all languages therefore have motivated affix ordering?

This goal of this dissertation is to explore these questions of morphological theory pertaining to the ordering of inflectional affixes in languages with templatic morphology (i.e., languages with large numbers of affixes where an affix appears in a specific 'slot' within an ordered template) and whether we can account for the distribution of inflectional affixes within this template through morphology alone. Given that Mandan is a language with templatic morphology, we can test these questions by investigating whether there are any motivating factors that guide the ordering of its affixes.

The focus on inflectional morphology herein stems from the fact that inflectional affixes in Mandan are able to appear between stems and certain derivational morphology: e.g., INFLECTION-DERIVATION-INFLECTION-STEM. Under certain theories of word building, such as the Lexicalist Hypothesis first raised by [Chomsky \(1970:188\)](#) and later elaborated upon by [Anderson \(1982:573\)](#), the internal forms of words are not visible to the syntax, and as such, the syntax is unable to either access or manipulate the internal structure of words. Let us assume further that inflection and derivation take place at different steps in the word building process: derivation takes place within the lexicon, while inflection takes place outside the lexicon. This separation necessitates that derivation precede inflection, since derivational morphology is closer to a stem than the inflectional morphology that acts upon it. The fact that Mandan commonly produces words where inflectional morphology can interrupt derivational morphology and a stem leads to the third and final research question raised in this dissertation.

(1.3) Question 3:

Anderson (1982:609) states that derivation takes place in the lexicon, after which inflectional affixation can occur, with inflected forms thereafter being unable to undergo additional derivation. Given that inflectional and derivational affixes are frequently interspersed in templates, does this distribution of affixes indicate that inflection and derivation are cyclical morphological processes, or can we account for this interweaving of affix types some other way?

For us to see this INFLECTION-DERIVATION-INFLECTION-STEM pattern in Mandan, we must evaluate whether we can still hold that derivation must precede inflection, or if some other process is simply causing the appearance of vacillation between derivation and inflection.

While this dissertation ultimately seeks to provide a description of the Mandan language, the secondary goal is to contextualize aspects of its grammar within the typology and investigate what languages like Mandan tell us about affixation. There are a number of different hypotheses regarding the motivation for affix order in Siouan languages, such as Boyle's (2007) syntax-driven account of inflectional verbal prefixes really being incorporated DP-heads in Hidatsa. Another proposed motivation for affix ordering in Siouan is McCarthy & Prince's (1993b) prosodic morphology account, which holds that the apparent infixing of inflectional prefixes in Dakota is a repair mechanism to avoid violating the ONSET constraint.

In the sections that follow, I examine the distribution of affixes within the verbal template in Mandan in §1.1.2, noting the patterns we see with respect to inflectional and derivational morphology and their positions within the verbal template. I then provide an explanation for why such patterns are possible by appealing to the notion that words in Mandan have a more articulated internal structure: i.e., words in Mandan are often not as structurally simple vis-à-vis morphology as words in languages like English. This composite structure creates an environment where certain inflectional material can target an edge in a specific domain within the morphological word. We can then appeal to a constraint-based analysis to motivate the ordering of affixes, which is explained further in §1.1.3, wherein I lay out the motivation for why the framework used in this dissertation is advantageous for handling the alignment of affixes.

### 1.1.1 Theoretical assumptions

This work appeals to several theoretical assumptions regarding the classification of morphology. These assumptions are presented here for the sake of clarity, and to lay out the groundwork upon which this dissertation is built. The central issues of this work deal with the interaction between derivational morphology and inflectional morphology

and their mutually exclusive domains within the word building process, what is meant by the term ‘word,’ and what ‘templatic morphology’ is. The purpose of the following subsection is to bring these terms to the forefront immediately and explicitly state their definitions and any assumptions being made in their use.

#### 1.1.1.1 Inflection versus derivation

Chief among the theoretical assumptions present in this dissertation is that there is a distinction between inflectional and derivational morphology, not just in function, but in what domain they affect a stem. These two terms appear often throughout linguistic literature with no additional explanation as to the descriptive notion of what it means that a particular affix is inflectional versus derivational in nature. Per [Anderson \(1982, 1992\)](#), [Perlmutter \(1988\)](#), [Stump \(1992, 1998\)](#), *inter alios*, these two morphological varieties are distinct in their effects upon a stem. We can appeal to [Mithun’s \(2014:88-90\)](#) observation of the behavior of inflection and derivation to summarize this distinction: inflection tends to contribute predictable meanings to words without creating a new lexeme, while derivation can (but need not necessarily) add predictable meaning to or alter the word class of the stem to which the morphology is applied.

The distinction between inflectional and derivational morphology goes beyond their function. A central assumption of this work is that inflection and derivation take place within different domains. If we appeal to a version of the Lexicalist Hypothesis on the theory of word building, which is mentioned in the previous section, then the distinction between inflectional affixes and derivational affixes becomes important. This importance comes from the stance per the Lexicalist Hypothesis that derivational affixation takes place in the leixcon, while inflection takes place outside the lexicon. Affixes in Mandan can seemingly alternate between inflectional and derivational in nature (see §1.1.2), so the delineation between inflection and derivation is particularly important to identify, as moving between modes of morphology would work counter to the Lexicalist Hypothesis.

Certain theoretical frameworks assume a single domain of word formation (e.g., [Halle & Marantz 1993](#), [Embick & Noyer 2001](#), [Travis 2000](#), *inter alios*), so the interspersion of derivational and inflectional material within the linear order of affixes during word building is unproblematic. Ultimately, the core argument of this dissertation is that derivation happens in the lexicon before a word is able to undergo inflection per the Lexicalist Hypothesis ([Anderson 1982:573](#)). There are several reasons that motivate the choice to classify certain morphology as inflectional rather than derivational. Firstly, morphology is classified as inflectional herein if this morphology conveys information about person or number. Secondly, negation and relativization are classified as inflectional because of how productive they are and how uniform their semantics are. All other affixes are deemed to be derivational due to the fact that they may not be very productive, that they alter the semantics of the word, or their use is not predictable.

### 1.1.1.2 Wordhood

The use of the term ‘word’ throughout this dissertation must be explicitly addressed here, because the general thrust of this dissertation is the question of how words are formed. As Matthews (1991:208) remarks, there are numerous kinds of words that have been discussed throughout the literature, which is why he remains evasive on the issue of the definition of a word in his own work. The use of ‘word’ in the present work does not fit neatly into the phonological word versus grammatical word dichotomy that Dixon & Aikhenvald (2003:34) propose: phonological words are defined by phonological criteria (i.e., segmental features, prosodic features, and/or phonological rules), while a grammatical word is comprised of grammatical elements (i.e., elements are cohesive, occur in a fixed order, and have a conventionalized coherence and meaning). In Chapter 2, there are number of processes that are sensitive to the prosodic domain in which a particular word appears, and in chapter 4, I demonstrate that the underlying semantic scope can affect the ordering of enclitics, so it is not advantageous to just appeal to the notion of a grammatical (or morpho-syntactic) word herein.

As such, any discussion of ‘word’ in this dissertation should be assumed to focus on the notion of a morphological word, which is a word that is defined by morphological criteria (i.e., affixation and internal word structure). This notion of ‘word’ assumes that morphology is its own domain and that it can interface with others, as we see in cases where phonological rules treat morphological word boundaries as blocking mechanisms or when the syntactic structure of a clause yields one order for enclitics for one particular semantic reading versus changing the order of enclitics and altering the semantic scope of those enclitics. We must separate the notion of a morphological word from a syntactic word or a phonological word due to the fact that affix order is not sensitive to the underlying syntactic structure in Mandan, so the notion of a morphological word and a syntactic word do not always coincide because the composition of a phrase structure may yield a different enclitic order to reflect the semantic scope of each enclitic, but the organization of the morphological word remains consistent regardless of the semantics (see §4.5 for additional argumentation).

One notion that must be made clear is that of headedness. The head of a word is the element within a complex word (e.g., a compound) that occupies the most salient structural position in the overall morphological word. Most importantly, this structural position within the word causes any inherent attributes of the head to extend to the overall word. For example, the English compound *washing machine* has the head *machine*, which is a noun. The entire compound is treated like a noun, and can take nominal morphology because of this fact (e.g., *washing machines*), despite the fact that the compound also contains the verb *washing*. Since *washing* is not the head of the compound, the compound can take no verbal morphology: i.e., one cannot own a \**washed machine* that has the same meaning

as a *washing machine*; only *machine* may take morphology. In Mandan, I argue that the internal structure of words can be complex, where a single morphological word can have internal word boundaries. Additional morphological material can exist within a greater morphological word, outside the domain of its head. In languages like English, morphology is typically affixed to the head of a word. In Mandan, I argue that different affixes have specific word boundaries to which they must align. This difference in specification for which word boundary is a target for various affixes is what yields a seemingly counter-Lexical Hypothesis affix order of inflection, then derivation, then inflection (see §4.3 for an explanation on how affixes interact with these internal word boundaries).

### 1.1.1.3 Templatic morphology

Manova & Aronoff (2010:110) define templatic morphology as a system whereby the order of affixes is unmotivated. These authors use ‘unmotivated’ to mean that affix order is not explicable by looking at the rules of another domain (e.g., phonology, syntax, semantics, etc.). In Good’s (2016:22) typology of templates, he defines a template as an “analytical device used to characterize the linear relation of a linguistic constituent whose linear stipulations are unexpected from the point of view of a given linguist’s approach to linguistic analysis.” This definition leaves room for several different interpretations of what it means to be a template, so long as there is something unexpected vis-à-vis the analysis of the linear order of morphological items.

The definition by Good (2016) of what a template is allows for the intentional use of the term to describe a wide range of phenomena as a ‘template.’ For the purposes of this dissertation, this definition encapsulates the intents of the use of this term throughout the work. Affix order in Mandan is a template precisely because the linear stipulations of its ordering are unexpected under a Lexicalist Hypothesis account due to the interspersions of inflectional and derivational morphology. Moreover, a question with which Good (2016:270) ends his book deals with how templates arise. While templates are clearly a synchronic phenomenon, I argue herein that they originate in the diachrony, and that a template can develop through a formerly regular process of determining affix order. Over time, changes in affix order can occur through the reanalysis of extra-lexical material as being an integral part of an adjacent word: e.g., a pronoun becoming a clitic, then a clitic becoming an inflectional affix.

## 1.1.2 Templatic morphology in Mandan

At the annual Siouan and Caddoan Languages Conference, the topic of affix ordering is often discussed (e.g., Boyle 2012, Kasak 2014a), and most modern grammars of Siouan languages have an explicit table organizing the slots within the verbal template (e.g., Ingham 2003, Mixco 1997a, Quintero 2004). This section aims to provide a sketch of the template in Mandan, and highlight the interspersions of inflectional and derivation morphology within the prefix

field.<sup>1</sup> Within Mandan’s verbal template, inflectional prefixes can appear interspersed with derivational prefixes, as shown on the table below.

Table 1.1: Prefix field in Mandan

11	10	9	8	7	6	5	4	3	2	1	0
REL	NEG	UNSP	1PL	PV.IRR	PV.LOC	1SG	2SG/2PL	SUUS	ITER	INS	STEM
					PV.INS			MID	INCP		
					PV.TR			RECP			

In slots 4-5 and 8-11, we see inflectional prefixes relating to subject and object marking, as well as negative marking. I assume that all the aforementioned prefixes, relating to person and number marking are inflectional, and that all other prefixes are derivational. The rest of the template is dominated by derivational prefixes. In slot 1, we see derivational morphology involving manner adverbials referred to in Siouanist literature as instrumentals. These prefixes indicate that an action is taken by way of some instrument: e.g., using one’s hand or using cutting force.

(1.4) Manner adverbials in Mandan from [Hollow \(1970:235\)](#)

- a. *shirih* ‘to be scattered’
- b. *rushirih* ‘to scatter with one’s hand’
- c. *rashirih* ‘to scatter by kicking’
- d. *kashirih* ‘to scatter by striking’

These manner adverbial instrumentals can alter the argument structure of the stem to which they are added, as we can see in the data above, where an intransitive verb become transitivized with the additional of various instrumentals. These prefixes are not productive. Slots 2 and 3 contain aspect and voice morphology. The aspect marking for inceptive acts is lexical selected; there is no allomorphic process that determines why one inceptive prefix occurs and the other does not.

(1.5) Inceptive marking in Mandan: *ki-* versus *ka-*

- a. *kixkqharaani*  
**ki-xkaḥ#hrE=rḭ**  
**INCP-move.away#CAUS=SS**  
‘she began chasing him and...’ ([Hollow 1973a:222](#))

<sup>1</sup>The focus of this dissertation is on the ordering of inflectional prefixes with respect to the stem and its derivational prefixes. Suffixes are not discussed here due to the fact that the ordering of the suffix field in Mandan is consistent with Bybee (1985) and Greenberg’s (1963) observation of the kinds of affixes that appear closer to the stem (e.g., the object plural suffix in Mandan is closer to the stem than the subject plural suffix).

- b. *karóokereromako'sh*  
 ka-roo=krE=oowak=o'sh  
 INCP-talk=3PL=NARR=IND.M  
 'they started talking' (Hollow 1973b:149)

The iterative aspect *ki-* is quite productive in Mandan, and generally indicates a single repeated action. However, there are cases where the use of the iterative carries the meaning of an action that keeps happening over and over again. The first pair of examples below shows the typical reading that the iterative conveys, but the second pair shows a reading that should mean 'he drinks again' in the sense that he drank something before and now he is taking a drink once again, but it actually conveys a habitual meaning, even though it bears any habitual marking.

(1.6) Predictable and unpredictable readings for iterative aspect

- a. *úx'osh*  
 ux=o'sh  
 be.broken=IND.M  
 'it is broken' (Hollow 1970:263)
- b. *ki'úx'osh*  
 ki-ux=o'sh  
 ITER-be.broken=IND.M  
 'it is broken again' (Hollow 1970:449)
- c. *híjro'sh*  
 hij=o'sh  
 drink=IND.M  
 'he drinks it' (Hollow 1970:74)
- d. *kihíjro'sh*  
 ki-hij=o'sh  
 ITER-drink=IND.M  
 'he drinks (alcohol) habitually' (Hollow 1970:449)

Similarly, the voice prefixes are generally productive, though there are words where the use of a voice prefix results in an unexpected reading. In the first pair below, we see the expected semantics for the use of the middle voice prefix; added to 'small,' it gives the meaning of 'become small.' However, in the second pair, the use of the middle voice does not result in a meaning like 'it gets spilled,' but it assumes the same subject and object, only that the act itself was not intentional.

(1.7) Unpredictable semantics of voice prefixes

- a. *xté'sh*  
 xtE=o'sh  
 be.big=IND.M

‘it is big’

b. *kixté’sh*

ki-xtE=o’sh

MID-be.big=IND.M

‘it gets big(ger)’ (Hollow 1970:326)

c. *pashúho’sh*

pa-shuḥ=o’sh

INS.PUSH-spill.something=IND.M

‘he spills it’ (Hollow 1970:289)

d. *pkashúho’sh*

k-pa-shuḥ=o’sh

MID-INS.PUSH-spill.something=IND.M

‘he spills something accidentally’ (Hollow 1970:289)

Preverbs occupy slot 6, and the irrealis prefix occupies slot 7. These preverbs are derivational in nature due to being lexically selected and because they can alter the semantics of the stem in unpredictable ways. In the examples below, the word for ‘cross a river’ with the addition of the instrumental preverb *i-* yields ‘tease, laugh, smile.’ It is possible this is an idiomatic expression or is metaphorical in some way, but the relationship between the two words is opaque, beyond sharing the same stem.

(1.8) Unpredictable semantics of Mandan preverbs

a. *kxq̄h* ‘to cross a river’ (Hollow 1970:126)

b. *ikxq̄h* ‘to tease, laugh, smile’ (Hollow 1970:126)

The applicative preverbs in slot 6 are neither productive nor always predictable, though the irrealis preverb is both productive and semantically consistent. The irrealis preverb, like all other preverbs, the irrealis has a tendency to attract unexpected stress and, based on this phonological test, is also considered derivational due to the fact it patterns with morphology that is also derivational in nature (see §2.5.4.4.2 for further argumentation on the phonological case for all preverbs indicating word-internal word boundaries caused by the juncture between derivational material).

With respect to the ordering of the inflectional prefixes, there is no obvious synchronic motivation for first person singular and first person plural to be marked at different positions within the affix field.

(1.9) First person marking: singular versus plural

a. *iwapashiriho’sh*

i-wa-pa-shrih=o’sh

PV.INS-1A-INS.PUSH-think.about.something=IND.M

‘I thought about it’ (Hollow 1970:236)

- b. *rípashiriho'sh*  
**rV**-i-pa-shrih=o'sh  
**1A.PL**-PV.INS-INS.PUSH-think.about.something=IND.M  
 'we thought about it' (Hollow 1970:236)

Second person has no analogous distribution; the plurality of a second person argument is expressed through either a plural enclitic.

(1.10) Second person: singular versus plural

- a. *rapxí'sh*  
**ra**-pxi=o'sh  
**2A**-sneeze=IND.M  
 'you sneezed' (Hollow 1970:162)

- b. *rapxínito'sh*  
**ra**-pxi=**rít**=o'sh  
**2A**-sneeze=**2PL**=IND.M  
 'you (pl.) sneezed' (Hollow 1970:473)

In (1.11) below, we see the inflectional prefixes for the first person plural stative pronominal *ro-* preceding the irrealis preverb *o-*. The second person active pronominal *ra-* appears between the aforementioned derivational prefix and the root *he* 'see.'

(1.11) *Róoraheкто'na?*

[Mandan]

**rV-** o-      **ra-** hE =kt =o'rq  
**INFL-** DERIV- **INFL-** root =INFL -INFL  
**1s.PL-** PV.IRR- **2A-** see =POT =INT.F

'Will you see us?' (Mixco 1997a:18)

Derivational morphology is typically observed closer to the root than inflectional morphology (Bybee 1985:33), which makes the distribution of inflectional morphology in the Mandan data above unexpected. Rankin et al. (2003) and Helmbrecht (2008) argue that applicative preverbs in Siouan languages and their positions within the verbal template are a matter of historical accident, where postpositions were reanalyzed as being integral parts of the verb in Pre-Proto-Siouan. In later Pre-Proto-Siouan, the first person plural pronominal ceased being analyzed as either an independent pronoun or pronominal proclitic. This repeated cycle of preverbal elements being reanalyzed as being verbal morphology has led to the progressive accretion of inflectional and derivational prefixes in the order in which they were acquired by the verb.

So we are faced with the question: what exactly is allowing inflectional morphology to interrupt the derivational morphology and the root? While the explanation offered by Rankin et al. (2003) and Helmbrecht (2008) is certainly logical, they offer no theoretical impetus for why such morphology must appear in the order it does synchronically. Baker's (1985) Mirror Principle roughly predicts that affix order parallels the hierarchy of syntactic projections, and as such, the distribution of inflectional morphology in (1.11) is unexpected, since patient marking would be predicted to be closer to the verb than agent/experiencer marking. This ordering of affixes is not what we see below, where the first person prefix always precedes a second person prefix, regardless of the role that argument plays in the structure: i.e., both a first person agent and a first person beneficiary will appear before any second person marking. Languages like Mandan, with so-called templatic morphology, assail the universality and inviolability of Mirror Principle (Hyman 2003:249).

(1.12) Affix order flouting the Mirror Principle

- a. *minikú'ro'sh*  
**w-rj-ku'**=o'sh  
**1A-2s-give=IND.M**  
'I give it to you' (Hollow 1973a:235)
- b. *manakú'kto'sh*  
**w-rq-ku'**=kt=o'sh  
**1s-2A-give=POT=IND.M**  
'you will give it to me' (Hollow 1973a:187)

Instead of relying on an underlying phrase structure to provide the surface order of formatives, we can appeal to a Lexicalist Hypothesis-centric notion of the word. Under this analysis, the syntax is unable to manipulate or access the internal form of words (Anderson 1992:84). This assumption does not assume that all words must lack internal structure altogether, however. Some words, which Anderson refers to as composites, contain a word couched within the domain of a greater word. These complex words differ from compounds in that a composite contains a single morphological word within another morphological word (e.x., [X[Y]]), whereas a compound is at least two morphological words within the domain of a single morphological word (e.x., [[X][Y]]). A subscript H marks the head of a word, with inflectional morphology shown in bold.

(1.13) Internal structure of word types and examples of their inflection

- a. Simplex word: [dog-**s**]<sub>H</sub> or [lift-**ed**]<sub>H</sub> or [passer-**s**]<sub>H</sub>
- b. Compound word: [[hot][dog-**s**]<sub>H</sub>] or [[air][lift-**ed**]<sub>H</sub>] or [[passer-**s**]<sub>H</sub>[by]]
- c. Composite word: [X[Y-**af**]<sub>H</sub>]

As seen in (1.13) above, each word is headed (i.e., has a constituent that determines the syntactic category for the whole word and that can undergo inflection). In the case of simplex words, each simplex word is vacuously its own head, and each of the examples above demonstrate that inflectional affixes in English are attracted to the right edge of the domain of the head. This distribution of affixes is further demonstrated with the compounds, where the overall compound is not undergoing inflection, but only the head of the compound, as the example of [[passer-**s**]<sub>H</sub>[by]] versus \*[[passer]<sub>H</sub>[by-**s**]] or \*[[passer]<sub>H</sub>[by]-**s**] demonstrates.

This distribution of inflectional morphology is one test for determining the headedness of a compound, showing that inflectional morphology in English is not simply attracted to the rightmost edge of the overall word. Examples of both simplex and compound words appear above in (1.13a) and (1.13b), but no English data appear in (1.13c). English has not been analyzed as having composites, though other European languages have (Anderson 1992:302). For the composites that appear below in (1.14), inflectional morphology is shown in bold. Non-Russian data come from Anderson (1992).

(1.14) Composite words and examples of their inflection

- a. *bojals'a* [Russian]  
 [[boj -**al**]<sub>H</sub> s'a]  
 ROOT -**INFL** DERIV  
 be.afraid -**PST.M** REFL  
 '[I] was afraid'

b. *kölluðumst* [Icelandic]

[[kall -að -um]<sub>H</sub> st]  
ROOT -INFL -INFL DERIV  
call -PST -1PL MID

‘[we] were called’

c. *movk’lav* [Georgian]

[mo [v- k’lav]<sub>H</sub>]  
DERIV INFL- ROOT  
PERF 1SG- kill

‘I will kill him’

Just like in the data in (1.13), the inflectional morphology in (1.14) is attracted to an edge within the domain of the head. Additional morphological material is part of the overall word, but that material does not constitute a word unto itself, unlike the compounds in (1.13) (e.g., [[hot][dog-s]<sub>H</sub>]), where there are two morphological words within the domain of a single morphological word. In all three examples in 1.14, we see a pattern where inflectional morphology can come between a verb root and derivational morphology. For instance, in Russian, the past tense suffix *-al* is able to bypass the reflexive *-s’a* marker. This is not a kind of infixation, because the process is still suffixal: inflectional morphology in Russian is drawn to the right edge of the head of a word. In the aforementioned example, the head of the word includes the root *boj* ‘be afraid,’ while the reflexive marker exists outside the domain of the head, but still within the same composite word. The inflectional morphology cannot suffix onto *-s’a* because *-s’a* is outside the domain of the head, and inflectional morphology in Russian is attracted to a very specific boundary: the right edge of the head of the word, not the right edge of the overall morphological word.

The behavior of Russian’s inflectional affixes with respect to the verb root and accompanying derivational affixes is a hallmark of templatic morphology. However, to the best of my knowledge, no one has made that case that Russian or Icelandic fall into the same morphological category as Mandan or Navajo.

It is unsurprising that the morphological head of the word (i.e., the internal domain of the composite) and the edges of the domain of the head are typically treated as the loci of inflection (Anderson 1992:310). The head of composite verbs are the verbal roots themselves, and we can extend this same generalization to Mandan. Unlike other languages described as having composites, Mandan allows inflection at both the edges of the head and the edges of the word in general. That is, that there is a set of head-specific inflectional affixes and a set of word-specific inflectional affixes. The data from (1.11) re-appear below with the domains of the composite clearly bracketed.

(1.15) Distribution of inflectional affixes within a Mandan composite

*Róorahekto’na?*

$[rV- \quad o \quad [ra- \quad hE]_H] =kt \quad =o'rq$   
**INFL-** DERIV    **INFL-** ROOT =INFL =INFL  
**1S.PL-** PREV.IRR- **2A-** see    =POT    =INT.F

‘Will you see us?’ (Mixco 1997a:18)

The irrealis preverb exists as part of the verb without being part of the verb root (i.e., the head of the word). The first person plural stative pronominal targets the left edge of the overall word, allowing it to precede the pronominal. The second person active pronominal targets the left edge of the head of the word, which creates the appearance of infixing or appearing before the preverb. In reality, both affixes are prefixing onto their targets. There are simply two different possible edges where affixation can take place: the edge of the head of a word and the edge of the overall morphological word.

### 1.1.3 Previous OT-based approaches and Realization OT

We can motivate this placement of inflectional affixes by using an OT-based account, where we incorporate constraints dealing with the placement of particular affixes with respect to specific domains within the word. Such an approach would also allow for morphological constraint hierarchies to motivate the ordering of affixes without having to be directly dependent on other domains of the grammar: i.e., if a language like Mandan is able to have particular morphological realization constraints ranked with respect to one another, this ranking can rule out candidates whose affixes are not ordered in a manner matching the template.

#### 1.1.3.1 Previous OT-based approaches

Similar proposals have been made by [Anderson \(2005\)](#) with respect to motivating the distribution of clitics within an OT framework. Per [Anderson](#), the placement and ordering of special clitics can be motivated by the interaction of  $EDGE_{MOST}(e, \mathcal{D})$  and  $NONINITIAL(e, \mathcal{D})$ , where  $e$  is some morphological element and  $\mathcal{D}$  is the domain in which it appears. In the case of composites, domain  $\mathcal{D}$  will either be the head of the morphological word (WHead) or the entire morphological word (MWd). A prefix would be the realization of a  $LEFTMOST(e, \mathcal{D})$  constraint, while a suffix would be the realization of a  $RIGHTMOST(e, \mathcal{D})$  constraint. While he does not go into detail regarding the distribution of affixes within composites, [Anderson](#) does come close to the issue of how to handle affix ordering in templatic morphology in his treatment of “endoclitics” in European Portuguese, where clitics are able to seemingly interrupt a future or conditional verb.

(1.16) European Portuguese endoclitics from [Anderson \(2005:158\)](#)

a. *daríamos*

dar -íamos  
give -1PL.COND  
'we would give'

b. *dár-te-íamos*

dar =te -íamos  
give =you2SG.DAT -1PL.COND  
'we would give you'

c. \**daríamos-te*

'we would give you'

The fact that a clitic is seemingly able to insert itself between a lexical root and an inflectional suffix of said root is peculiar. However, given the history of how future and conditional forms arose in Iberian Romance languages, it is possible to come up with a satisfactory account. Future and conditional suffixes in Portuguese are historically auxiliary verbs from 'to have' that have been grammaticalized onto the stem of the main verb. Instead of allowing a clitic to interrupt between a root and its inflectional affixes, [Anderson \(2005:160\)](#) proposes that we are really looking at a kind of serial verb, where a single prosodic word contains two other prosodic words: the verb root (i.e., *dar* in the case of the above example) and the serial auxiliary that conveys future tense or conditional mood along with the relevant features of the subject (i.e., the *-íamos* above). We are left with a structure like the one seen below:

(1.17)  $[[dár=te]_H íamos]$

For the clitic to be drawn to the right edge of *dar* over *íamos*, there would have to be an  $EDGE_{MOST}(e, \mathcal{D})$  constraint, where the domain  $\mathcal{D}$  is not the head of a word or the edge of word, but the head of a functional projection. In this case, the clitic *=te* is drawn to the V-head *dar*: i.e.,  $RIGHT_{MOST}(te, V\text{-head})$ . Since *-íamos* exists outside the domain of the V-head, *=te* is able to ignore it to cliticize onto its proscribed position within its proscribed domain. The behavior of these so-called endoclitics thus are not endoclitics at all, as they are not interrupting a lexical word. Rather, they are cliticizing onto a particular word that happens to also be couched within a superordinate word. The distribution of clitics with future and conditional verbs in European Portuguese is similar to the distribution of inflectional affixes in templatic languages like Mandan; in a sense, they all involve morphology being drawn to a position within a specified domain, where the domain to which they are attracted may also be within the domain of another morphological word.

### 1.1.3.2 Realization OT

Xu (2007) similarly employs a constraint-based account to motivate inflectional affix placement, but does not address the issue of templatic morphology. His framework addresses simplex words, and an analysis that can account for the distribution of inflectional morphology in templatic languages is sorely needed. By looking more broadly at the grammar of Mandan, this work aims to bring the issue of the interaction between inflectional morphology and composites to the forefront and rule out the ordering of affixes being motivated by either the phonology or syntax of Mandan. Instead, the ordering of Mandan inflectional affixes is governed by its morphology alone.

One advantage that Xu's (2007) Realization OT framework brings that is not present in Anderson's (2005) is the overt influence of semantic scope over the ordering of affixes. Aronoff & Xu (2010:381) state that there are three factors that determine affix order: semantic scope, phonology, and morphological templates. With respect to the last two items, the machinery that Anderson employs takes into account the effect phonology can have on clitics (e.g., Tagalog disyllabic pronoun clitics following monosyllabic particles) or that certain clitics have a template in which they must appear (e.g., Hittite second position clitic ordering). This is the main difference between the approach Anderson takes versus Xu's, as Anderson does not overtly incorporate semantic scope as a regulating mechanism to determine affix order. In Realization OT, there is a family of SCOPE constraints that act as faithfulness constraints, where they are violated in instances where the ordering of affixes is not faithful to the compositional semantic scope. Affixes, in turn, are determined by realization constraints (RCs), which are comprised of a bundle of features, a phonological representation, and an alignment. In (1.18) below, we see an example of an RC formulation for Mandan's first person singular active pronominal prefix *wa-* 1A.

(1.18) {1, SG, A}: *wa-*: The feature value set containing first person, singular, and active is realized by the prefix *wa-*.

The RC above can combine with other RCs that specify how a certain feature set should be realized: i.e., RCs can interact with each other in the same way phonological constraints can. These RCs then interact with SCOPE constraints, which can cause affixes to be ordered in a way that is consistent with their semantic scope. We can appeal to a slightly modified definition of SCOPE in Xu (2007:61), which is adapted from Spencer (2003:643). The definition below differs from the two previously mentioned authors' definitions in that it is able to assign OT violations, which Xu's definition does not.

(1.19)  $SCOPE(f_1, f_2)$ : Given two scope-bearing features  $f_1$  and  $f_2$ , if  $f_1$  scopes over  $f_2$ , then  $e_2$  which is the exponent of  $f_2$  cannot be farther away from the same stem than  $e_1$  which is the exponent of  $f_1$ . Assign one violation for each exponent that does not conform to the aforementioned conditions.

For example, a subject will take semantic scope over an object, and as such, we can posit the existence of  $\text{SCOPE}(\text{Subj}, \text{Obj})$ , where affixes pertaining to a subject should scope over affixes pertaining to an object: i.e., subject marking should be farther from the stem than object marking.

In languages where words can take more than one inflectional affix, we should expect the ordering of said affixes to be indicative of the underlying semantics due to having highly-ranked  $\text{SCOPE}$  constraints. For example, a language that has prefixal subject- and object-marking where subject-marking must precede object-marking can be expressed by having the following hierarchy of constraints:

- (1.20)  $\text{SCOPE}(\text{Subj}, \text{Obj}) \gg \{ \{\text{subj}\}: af_{\text{subj}}^-, \{\text{obj}\}: af_{\text{obj}}^- \}$   
 (i.e., subject-marking precedes object-marking)

{subj}, {obj}, stem	$\text{SCOPE}(\text{Subj}, \text{Obj})$	{subj}: $af_{\text{subj}}^-$	{obj}: $af_{\text{obj}}^-$
a. $af_{\text{subj}}af_{\text{obj}}\text{stem}$			
b. $af_{\text{obj}}af_{\text{subj}}\text{stem}$	*!		
c. $\text{stem}af_{\text{obj}}af_{\text{subj}}$		*!	*!
d. $af_{\text{subj}}\text{stem}$			*!

Candidate A is the optimal candidate, since it incurs no violations. As for candidate B, it immediately incurs a fatal violation of  $\text{SCOPE}(\text{Subj}, \text{Obj})$  due to the fact that object-marking is preceding subject-marking. Candidate C is disqualified because each affix is aligning to the right edge of the word instead of the left edge (i.e., the RCs specify that the formatives are prefixes, not suffixes), while candidate D is eliminated due to the fact that no formative corresponding to the feature set {obj} in the output.

We can take these same constraints and paint a very different picture regarding affix ordering. Templatic languages appear to order affixes in an unmotivated but predictable way, and as such, must not have highly-ranked  $\text{SCOPE}$  constraints. To wit, we can imagine a language where object-marking precedes subject-marking, which would have  $\text{SCOPE}(\text{Subj}, \text{Obj})$  ranked lower than a realization constraint {subj}:  $af_{\text{subj}}^-$ , which in turn is dominated by {obj}:  $af_{\text{obj}}^-$ . Thus, it is less preferable in this example language to be faithful to  $\text{SCOPE}(\text{Subj}, \text{Obj})$  than it is to align some object-marking affix  $af_{\text{obj}}$  at the left edge of the word (i.e., make it the leftmost prefix).

- (1.21)  $\{\text{obj}\}: af_{\text{obj}}^- \gg \{\text{subj}\}: af_{\text{subj}}^- \gg \text{SCOPE}(\text{Subj}, \text{Obj})$   
 (i.e., object-marking precedes subject-marking)

{subj}, {obj}, stem	{obj}: $af_{obj}$ -	{subj}: $af_{subj}$ -	SCOPE(Subj, Obj)
a.  $af_{subj}af_{obj}stem$			
b.  $af_{obj}af_{subj}stem$			*!
c. $stemaf_{subj}af_{obj}$	*!	*	*
d. $af_{obj}stem$		*!	*

The tableau in (1.21) shows that candidate B, the actual output loses out to candidate A, which is faithful to SCOPE(Subj, Obj) and has no violations. Candidate C incurs a fatal violation of {obj}:  $af_{obj}$ - due to the fact that the exponent  $af_{obj}$  appears as a suffix, despite the fact that the RC encodes the formative as a prefix. Candidate D omits subject marking entirely, garnering it a fatal violation of {subj}:  $af_{subj}$ -. This failure to produce the desired output stems from a major issue with Xu’s (2007) RC notation. Namely, each RC involved in (1.21) specifies that their respective formatives must be realized as prefixes, not that said formatives must be realized as the leftmost prefix. The machinery of Xu’s Realization OT breaks down when confronted with affix order that is anti-scopal and has no other conditioning: i.e., there are no phonological constraints conspiring to have the object prefix precede the subject prefix above. Having SCOPE as a structural faithfulness constraint helped produce the desired output in (1.20), but not in (1.21).

We need not abandon the proposal of Rice (2000), Xu (2007), and Aronoff & Xu (2010) that SCOPE can play a large role in motivating affix order, however. The problem in (1.21) stems from how RCs are formulated. If each RC simply cares about whether it is a suffix or a prefix without concern to what other intervening morphological material might interrupt it and its target edge, then RCs must be encoded in such a way that there is a difference between violations for omitting a formative despite the presence of a corresponding feature set in the input and simply having an exponent in the wrong place (i.e., targeting the wrong edge of a word). In addition, RCs must be sensitive to intervening material between a formative and its target edge. For that, we must revisit the RCs proposed by Anderson (2005), which rely on  $EDGEMOST(e, \mathcal{D})$  constraints to align a morphological element to a particular domain edge. We can reformat the RC in (1.18) to address the issues raised above.

(1.22)  $LEFTMOST(wa, WHead)$ : Assign one violation if the feature value set containing first person, singular, and active is not realized as the formative  $wa$  AND assign one violation for each formative between the formative  $wa$  and the leftmost edge within the domain of the head of a word.

With the RC for the first person singular active pronominal prefix  $wa$ - formulated above, we can see that violations are assigned when that feature set is not realized as [wa], as well as for each formative that keeps it from

being at the left edge of the head of a word. By adding this caveat regarding distance away from the left edge, each intervening formative between it and the left edge of the word incurs an additional violation. In (1.21), Xu's (2007) RCs do not penalize an affix for not appearing at the leftmost edge of a word any differently than an affix that appears as a suffix instead of a prefix. Now, given the definition in (1.22), we can assign additional violations for increasing the distance between an affix and its target edge in addition to the violation incurred for omitting a formative from the output.

Anderson's (2005) RCs lack the explicit feature set that Xu (2007) has, but we can simply assume that the formative being aligned in (1.22) above is a shorthand for the correspondence between the feature set and the phonological form that is overtly stated in (1.18). Conversely, Xu's RCs are largely insensitive to ordering that is not determined by semantic scope, so even if two affixes are ordered with respect to one another within a template, there is no other factor constraining that order.

Xu (2007) adopts Rice's (2000) position that semantic scope plays a large role in the motivation of affixes, and SCOPE is a desirable faithfulness constraint to help motivate the ordering of affixes. It is also desirable to have RCs that stipulate a preference for an edge within a particular domain, as Anderson's (2005) does. Xu assumes that the domain onto which an exponent aligns is a word, but as seen in (1.14), languages with a more articulated internal structure involve multiple domains. In particular, my proposal is that words in Mandan can be composites, where affixation can target an edge in either the head of the word or the greater morphological word itself.

We can take the Mandan word *ihaaxik* 'to not know' and inflect it to demonstrate that Mandan affixes target different domain edges.

- (1.23) Inflection of *ihaaxik* 'to not know'
- a. *íwahaaxiko'sh* 'I don't know'
  - b. *írahaaxiko'sh* 'you don't know'
  - c. *ihaaxiko'sh* 'she/he does not know'
  - d. *ríihaaxiko'sh* 'we do not know'

The pronominals *wa-* and *ra-* both appear between the verb stem and the instrumental preverb *i-*, but the first person plural pronominal *r(V)-* precedes the preverb. This behavior presents a INFLECTION-DERIVATION-INFLECTION-STEM pattern. This pattern is reminiscent of the composites in (1.14), where inflectional morphology is likewise trapped between the stem and a derivational element. In (1.14), we see that all inflectional morphology is drawn to the head of the word. The Mandan pronominals *wa-* and *ra-* likewise seem to target an inner domain (i.e., the head of the word). Where Mandan is dissimilar to other reported languages with composites is that there is a set of affixes

like the first person plural  $r(V)$ - that do not target the head, but rather the edge of the overall word. Thus, we can posit the following internal structure for *ihaaxik* ‘to not know’:

(1.24) [ *i* [ *haaxik* ]<sub>H</sub> ] ‘to not know’

By analyzing certain words in Mandan as composites, we can refute the notion that templatic languages are inherently unmotivated with respect to affix order. It is simply the case that inflectional affixes in templatic languages can target different domain edges: the head of the word or the overall word edge. In non-templatic languages, the domain of the head of the word and the overall word edge are often one and the same, so defaulting to adding inflection to an edge within the head of the word accounts for the distribution of inflectional affixes, like in (1.13).

Between Anderson (2005) and Xu (2007), there is sufficient groundwork laid to make the case for a constraint-based approach to clitic and affix ordering. In particular, templatic morphology lends itself particularly well to this kind of analysis, as we can rely on  $\text{EDGE}_{\text{MOST}}(e, \mathcal{D})$  constraints with a hierarchy for what realization constraint dominates another (e.g.,  $\text{RIGHT}_{\text{MOST}}(um, \text{Head}) \gg \text{RIGHT}_{\text{MOST}}(að, \text{Head})$  in Icelandic, which accounts for the first-person plural suffix *-um* being the rightmost element in the example in 1.13 above, and how both affixes are able to ignore the middle voice marker *-st*, since *-st* is outside the domain of the head, and as such does not factor in to the placement of inflectional morphology in Icelandic.

I propose that the distribution of inflectional morphology within the Mandan verbal template can be accounted for in a similar fashion. In (1.15), we saw that the first-person plural stative marker *ro-* appears to the left of the irrealis preverb *o-*, but the second person active marker *ra-* appears closest to the verb root *he* ‘see.’ A  $\text{LEFT}_{\text{MOST}}(ro, \text{MWd})$  constraint would draw the *ro-* to the left edge of the overall morphological word, while a  $\text{LEFT}_{\text{MOST}}(ra, \text{Head})$  constraint draws the *ra-* to the left edge of the head. Both elements are prefixing onto their target domains and are not in competition for the same locations.

Using Mandan as a case study, I argue that templatic morphology in Siouan in general, and perhaps even all templatic morphology of this variety, can be reduced to an analysis that breaks a verb into a composite, where certain affixes are drawn to certain domains because there are head-seeking affixes and word-seeking affixes. Furthermore, we can make a parallel between the behavior of affixes and clitics, in that affixes are the morphology of the word level, but clitics are the morphology of the phrase level. Clitics can target the head of a particular phrase (e.g., the head of a TP), or it can take a specific position with respect to the edge of a phrase (e.g., first-position clitics). This same behavior can be extended to affixes, with most inflectional morphology targeting the head of a word like in (1.23a) and (1.23b), but templatic languages can take a specific position with respect to the edge of a word like in (1.23d).

Xu (2007) dubs his constraint-centric approach to inflectional morphology as Realization OT. I continue to use this term with respect to an OT framework where constraints affect the realization of formatives, though the manner of encoding RCs does differ from those of Xu and is more closely aligned with those of Anderson (2005).

## 1.2 Background on the Mandan people

The theoretical groundwork for this dissertation is laid out in the section above. In this section, I provide a background of the Mandan people and the circumstances behind the massive drop in the population of Mandan speakers, which has ultimately forced any future research on the language to be done through extant corpora and recordings instead of fieldwork with fluent speakers to seek judgments and record novel data. The lack of fluent L1 speakers of the language restricts the future viability of exploring the grammar of Mandan more fully and the need to document as much of the language as possible while heritage speakers are still able to contribute their own insight to our understanding of Mandan. It is necessary to understand the context behind the interaction between the Mandan people and outside groups and individuals, as a number of factors have contributed to the state of the language today and the shift to languages other than Mandan, such as English and Hidatsa.

### 1.2.1 Overview

According to tradition, the Mandan have several creation stories that explain the origin of their people and how they came to live on the Upper Missouri. In Hollow's (1973a) narratives, Mmes. Otter Sage and Annie Eagle both tell variations on how *Kinúma'kshi* 'Royal Chief'<sup>2</sup> and *Numá'k Máxana* 'Lone Man' create the world and populate it with beings that look like them, as well as other beings. While this dissertation focuses linguistic attention on one of the two varieties of Mandan to make it into the twentieth century, Bowers (1950:24) cites Crows Heart<sup>3</sup> (1856-1951) and

---

<sup>2</sup>The name of this figure often is rendered in English as 'Old Man Coyote,' and stories involving his deeds and travails are often called coyote stories, which traditionally should be told only during the winter, according to consultants.

<sup>3</sup>A more accurate translation of his name is 'Raven Heart,' or *Kéekanatka*. He is always referred to by the English translation of his Mandan name, though his death certificate lists him as Paul Crows Heart.

Scattercorn<sup>4</sup> (1858-1940), who say that there were at one time five bands<sup>5</sup> of Mandan: the Nuitadi,<sup>6</sup> the Nuptadi,<sup>7</sup> the Istope, the Mananare,<sup>8</sup> and the Awikaxa.<sup>9</sup> Bowers also states that not all his consultants agreed that the Mananare were a band unto themselves, and this was in actuality just the term used to describe any group who left a village due to some disagreement. Bowers' consultants state that there were three dialectal differences among the Mandan: Nuitadi, Nuptadi, and Awikaxa. After the first smallpox epidemic in 1782, the Awikaxa were absorbed by the Nuitari, leaving only two varieties to survive the next smallpox outbreak a half-century later in 1857.

One complication in describing the Mandan is that the Mandan traditionally have had no autonym for their people as a whole. When Prince Maximilian (1839) lived among the Mandan, he wrote that they called themselves *Númangkake*,<sup>10</sup> meaning 'people.' When the artist and adventurer George Catlin lived among the Mandan between 1834 and 1835, just before the looming smallpox outbreak, Catlin (1844:260) states that the Mandan called themselves *See-pohs-ka-nu-mah-ka-kee* 'the people of the pheasants.' However, this is not an accurate translation, as *sípuyshka numá'kaaki* means 'prairie chicken people.' Prairie Chicken is one of the original thirteen clans of the Mandan, though only four survived into the twentieth century (Bowers 1950:30).<sup>11</sup> It is very likely that Catlin's consultant(s) proffered their clan affiliation rather than their ethnicity.

Due to their location within the North American continent, the Mandan did not directly interact with European settlers until possibly the eighteenth century. Pierre Gaultier de Varennes, sieur de la Vérendrye, is considered to be the first European to make contact with the Mandan in 1738 with the help of his Assiniboine guides. He recorded that the Assiniboine refer to the Mandan as *Mantannes*,<sup>12</sup> though his Cree guides had earlier referred to them as

---

<sup>4</sup>Her name in Mandan is *Wóopjite*, literally 'something that has been scattered all over the place.' Her death certificate identifies her simply as Mrs. Holding Eagle, without any first name.

<sup>5</sup>The use of the term 'band' here refers to a subdivision of the Mandan people that is based on linguistic and/or political differences between other Mandan groups. This distinction differs from that of a clan, which centers around the biological or social kinship one has, apart from the polity with which one associates. For example, it is possible for members of the same clan to come from different bands and members of the same band may have different clan affiliations. Additional information on Mandan social organization appears in Bowers (1950).

<sup>6</sup>Also called Nueta, which is *Núu'etaa* or *Núu'etaare* in the modern orthography. Their name means 'our people.'

<sup>7</sup>Also called Rupta or Nupta, which is *Rúpta* or *Rúptaare* in the modern orthography. Though Bowers (1950:25) gives no definition for this band's name, consultants tell me it means either 'two voices,' or 'ones who came second,' because they formerly lived apart from the *Núu'etaa* until an attack from the Lakota drove them away from their village in 1792 (Bowers 1950:116).

<sup>8</sup>Their name means 'those who quarrel,' and is written *Máananaare* in the modern orthography.

<sup>9</sup>This group's name is also spelled Awigaxa. Bowers (1950:25) gives no definition for this name, but it does resemble *Aqwe kaxé*, a name that one of my consultants gives for all Mandan, which he says means 'something everyone has.'

<sup>10</sup>In the modern Mandan orthography, this word would be *numá'kaaki*.

<sup>11</sup>The remaining Mandan clans are the *Waxihkina* 'Tells Bad Stories' or 'Bad News,' the *Tamísik*, whose clan name is never given a translation, and the *Ípuyshka numá'kaaki* 'Speckled Eagle People,' who were later absorbed by the Prairie Chicken clan.

<sup>12</sup>The etymology of this term is not clear, though it is worth noting that a cognate for the Mandan is found in all other Dakotan languages, with Lakota and Dakota varying between *miwátani* or *mawátani*, and *mayádqna* in modern Assiniboine (Parks & Demallie 2002). If these words have some literal meaning (as most Siouan words are wont to), then one possible meaning might be gleaned from the Assiniboine form. The word *mayá* 'river bank' is shared between Lakota, Dakota, and Assiniboine, and the *-da* looks to be a reflex of the Proto-Dakotan locative marker \*-ta,

*Ouachipouennes* ‘Sioux who go underground’ or by the French term *caserniers* ‘quartermasters’ (Mapp 2013:213).<sup>13</sup>

It is possible that Europeans made contact with the Mandan as early as 1689, when the French aristocrat-adventurer Louis Armand de Lom d’Arce Lahontan, Baron de Lahontan, met a people he called the *Essanape*, who were the enemies of the *Eokoros* he had met some sixty leagues south. The *Eokoros* are likely the Arikara, which would make the *Essanape* likely contenders for being the Mandan (Fenn 2015:28). In particular, it is possible that *Essanape* is not the name of whole body of Mandan, but the *Istopa*<sup>14</sup> band of the Mandan.

The Mandan themselves have competing accounts of how they first encountered Europeans. One elder told me that the Mandan word *mashí* ‘white person’ came from the word *shí* ‘good,’ since the first European-Americans they saw were members of the military, whose uniforms were very impressive so the Mandan said that they “looked good,” which then became lexicalized to *mashí*. Another elder informed me that *mashí* is short for *mashí’na* ‘generous,’ since early traders made a habit of bringing gifts when entering villages. This etymology seemingly conflicts with a similar word for whites in Lakota, *wašíču*, whose folk etymology holds that it means ‘one who takes the best part [of the meat]’ after the story of the first time the Lakota encountered a white person, who being brought back to their village and given food, grabbed the best part of the meat and ran away.<sup>15</sup>

In more recent times, ‘Núeta’ or ‘Nu’eta’ has generally been the term used to describe all Mandan, regardless of which band one belongs to, though some individuals resist this and prefer to identify by their own band.<sup>16</sup> Throughout this dissertation, I will simply use the exonymic term ‘Mandan’ instead of attempting to use an autonym, given the lack of consensus over what members of this ethnic and linguistic community wish to call themselves.

Today there are no L1 speakers of Mandan, given the fact that the last L1 speaker of the *Núu’etaa* variety of Mandan passed away on December 9, 2016 at his residence in Twin Buttes, ND. There are several heritage speakers between Twin Buttes, Mandaree, and New Town, and one of these heritage speakers grew up with the *Rúptaa* variety

---

with *-na* being a distal marker. Thus, the meaning of the Assiniboine term would be ‘people who at the river bank over there.’ This interpretation lines up with what the Hidatsa call the Mandan, *Aróxbagua* ‘people at the confluence [of the Heart and Missouri],’ and what the Crow call them, *Assahkashi* ‘people at the river’s edge.’

<sup>13</sup>The term *Ouachipouennes* does not appear to be a Cree term, since the *-pouennes* resembles the Ojibwa *bwaan* ‘Sioux’ more than the Cree *pwâta* ‘Sioux.’ Furthermore, *ouachi-* resembles the Ojibwa *waazhi* ‘cave,’ versus the Cree *wâti* ‘cave,’ making it more likely that de Vérendrye had conflated the Cree and Ojibwa and called them both ‘Cree.’ The modern word for Mandan in Cree is *kâ-otasiskîwîkamîkowak* ‘those who have earth (clay) lodges’ (Arok Wolvengrey p.c., Kees van Kolmeschate p.c.). The term ‘cave Sioux’ does not appear in either modern Cree or Ojibwa, though it is possible that it is an epithet used in the past, owing to the fact that the Mandan differed from the neighboring Algonquian and Dakotan peoples by living in earth lodges rather than tipis or other dwellings.

<sup>14</sup>The name literally means ‘tattoo’ in Mandan, and is spelled *Istópe* in the modern orthography.

<sup>15</sup>Older Mandan sources state that the word for ‘white person’ is actually *washí* (Kipp 1852). Sentence-initially, /w/ is often pronounced as [m] in Mandan, and the older term *washí* may have eventually been reanalyzed as *mashí*. The term *washí* furthermore suggests that this word may be a borrowing from Lakota. Mandan certainly could have clipped the final syllable of *wašíču* to get *washí*, which eventually became *mashí*. This hypothesis is complicated by the cognate in Hidatsa *mashii* ‘white person,’ which features a long vowel of unclear origin. Hidatsa could have innovated this length to avoid confusion with *mashí* ‘blanket.’

<sup>16</sup>The Hidatsa similarly are named for their largest band, the *Hiráaca*, though there is currently no contention over using this as a cover term for that group in English or Hidatsa.

of Mandan. Much of the old dialectal differences have been leveled due to the population loss that occurred after the Smallpox Epidemic in 1837. [Carter \(1991a\)](#) examines the only published source of grammatical and lexical differences between Mandan dialects: the [Maximilian \(1839\)](#) wordlist. These grammatical differences will be further discussed at a later point in this dissertation, but some lexical differences remain even into the present. The *Núu'etaa* variety is the prevalent one found in previous literature and represents the vast majority of the data presented herein. I note any non-*Núu'etaa* forms within the present work, but *Núu'etaa* remains the de facto standard speech variety.

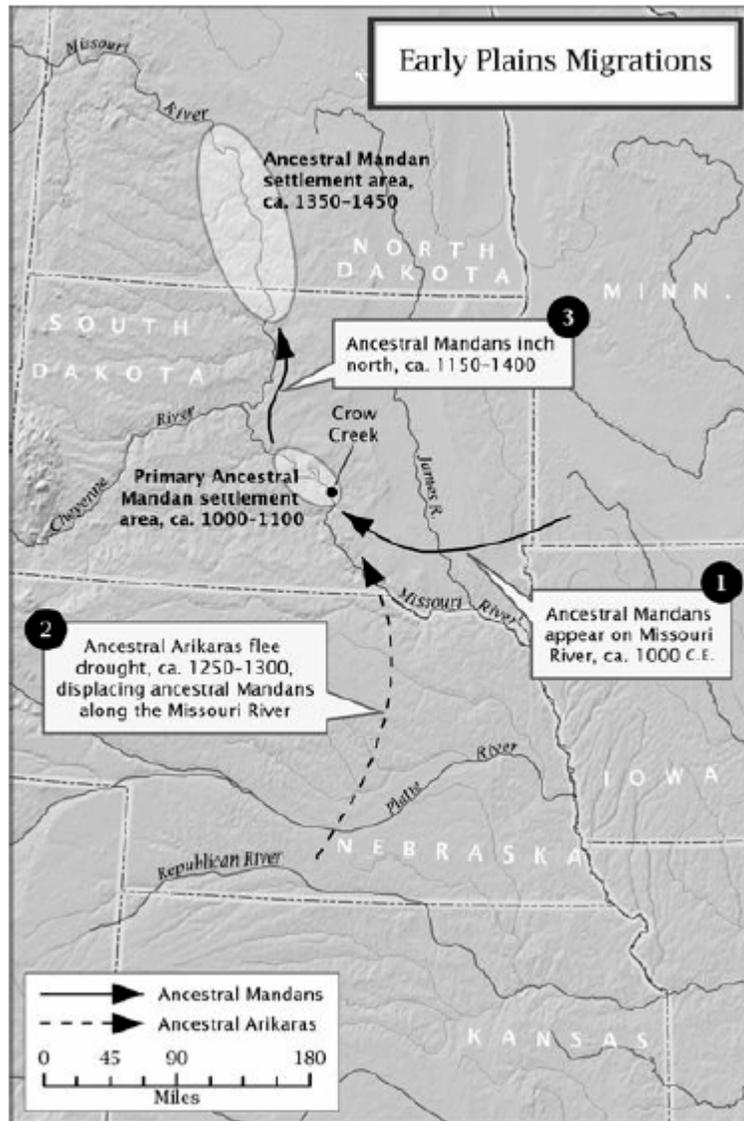
There is an urgent need for documentation and sharing of linguistic materials kept around Fort Berthold and at other locations off the reservation. There is currently a coordinated reservation-wide push for revitalization under the auspices of the MHA Nation itself. From 2013 until 2017, the Tribal Council had been awarding the Language Conservancy a contract to produce pedagogical materials for all three languages on the reservation and put on a two-week long summer institute. I was affiliated with the Language Conservancy and taught at the inaugural summer institute and each subsequent one until the summer of 2016. In Twin Buttes, the Nueta Language Initiative works with residents and local elementary school children to produce materials and lessons to pass on the language. With the last L1 speaker having passed away, the Mandan language is in a precarious situation and is desperately in need of additional study, not just for the purposes of examining the several typologically rare features it has, but also for the sake of current and future Mandan people who may wish to experience this aspect of their cultural heritage.

### 1.2.2 900 CE to 1851 CE

The Mandan and their ancestors have lived near the Middle Missouri River since at least 900-1000 CE. [Lehmer \(1971:203\)](#) notes that historic Mandan material culture represents a direct continuation of the older Middle Missouri Tradition. The Middle Missouri Tradition is the cultural complex found within the Missouri valley and the adjacent prairie and plains from the confluence of the Missouri and Cheyenne Rivers in central South Dakota to the confluence of the Knife and Missouri Rivers in western North Dakota ([Will & Spinden 1906:84](#)). The Middle Missouri Tradition is distinct from that of neighboring Central Plains traditions in its style of pottery, design of domiciles, composition of fortifications, and manner of burials ([Lehmer 1971:202](#), [Johnson 2007:10](#)). Further archaeological evidence supports the notion of uninterrupted habitation of the region of the Middle Missouri River, with distinct archaeological evidence directly attributed to the Mandan ([Lehmer 1971:97](#), [Johnson 2007:109](#)). The map in [Figure 1.1](#) from [Fenn \(2015:5\)](#) highlights the major movements of the bulk of the Mandan people since the end of the Woodlands period until the era of European contact.

The confluence of the Heart and Missouri Rivers in North Dakota is often considered to be the homeland of the Mandan, though they had occupied lands farther down the Missouri River in the past. This area is highlighted on

Figure 1.1: Mandan migrations



the map in Figure 1.1. Lehmer (1971:26) states that sites in southern Minnesota and northern Iowa form a cultural continuum with sites in central South Dakota that archeologists attribute to the Mandan and their ancestors. The migration of the Caddoan-speaking Arikara from the central Plains onto the Missouri River during the thirteenth century resulted in the Mandan gradually moving farther upstream.<sup>17</sup> This re-settlement up the Missouri brought the Mandan to the Heart River in North Dakota and into close contact with the Hidatsa, with whom they developed

<sup>17</sup>The confluence of the Heart River and the Missouri is approximately at the center of the region highlighted as the Ancestral Mandan settlement area in the map above.

close relations—with occasional disputes—that have lasted into the present day.

It is not clear whether this relocation upstream was voluntary on the part of the Mandan, or if the movement of additional peoples onto the upper Missouri triggered the northern migration of the Mandan.<sup>18</sup> The infamous Crow Creek site contains the aftermath of a brutal massacre that took place around 1350 CE that could have been spurred on by the drive to take the arable land upon which that settlement sat. The identity of the villagers is thought to be that of a group related to or ancestral to the Arikara. The belligerents were almost certainly groups ancestral to the Mandan, given that these two groups were relatively alone in the area until the arrival of newer groups from the upper Midwest (e.g., the Cheyenne and the Lakota) almost three centuries later (Zimmerman & Whitten 1980, Fenn 2015).

Within the Heart River area, the Mandan did not necessarily inhabit a single site continuously throughout the time frame between 1350 and the era before relocation to the Fort Berthold Indian Reservation in 1870. There is evidence from both archeology and first-hand accounts of the Mandan migrating short distances to be closer to supplies of lumber or moving to avoid a hostile group, such as the Assiniboine or the Lakota. Allen (1814:104) cites a November 21, 1804 journal entry by Meriwether Lewis on this subject, with additional points of clarification in presented in footnotes:

The villages near which we [the Corps of Discovery] are established are five in number, and are the residence of three distinct nations: the Mandans, the Ahnahaways<sup>19</sup>, and the Minnetarees<sup>20</sup>. This history of the Mandans, as we received it from our interpreters and from the chiefs themselves, and as it is attested by existing monuments, illustrates more than that of any other nation the unsteady movements and the tottering fortunes of the American nations. Within the recollection of living witnesses, the Mandan were settled forty years ago in nine villages, the ruins of which we passed about eighty miles below, and situated seven on the west and two on the east side of the Missouri. The two finding themselves wasting away before the small-pox and the Sioux<sup>21</sup>, united into one village, and moved up

---

<sup>18</sup>Fenn's (2015) map in Figure 1.1 does not reflect the migration of various groups of Lakota, Dakota, and Nakota who moved out of the Great Lakes region in the 16th century due to pressure from the Ojibwa and Cree, who had moved to the region from the east and had procured guns through the French via the fur trade (Riggs 1893:170). The Cheyenne likewise had to abandon their lands in the Great Lakes due to conflict with neighboring peoples and pass through the Missouri Valley, coming into contact with the Mandan (Moore 1999:18). The coming of these peoples into the region could also been a factor in the gradual progression northward of the Mandan people.

<sup>19</sup>i.e., the Awaxaawi band of Hidatsa, whose name means something similar to 'branching land.'

<sup>20</sup>i.e., the Awadixaa band of Hidatsa (whose name means 'short village') and the Hidatsa proper (whose meaning is opaque, but folk etymology states that it is derived from a variety of willow) are collectively called *Minītaari* 'water crossers' by the Mandan, due to the story of the Mandan and Hidatsa's first meeting, where the Hidatsa had crossed the Missouri River in bullboats to greet the Mandan.

<sup>21</sup>i.e., the Lakota (also known as Tetons or *Thítħuŋwaŋ* [tʰi.tʰũ.wā] 'prairie dwellers,' and Yankton Dakota or *Ihánktħuŋwaŋ* [i.hā.ktʰũ.wā] 'those dwelling at the end').

the river opposite the Ricara<sup>22</sup>. These same causes reduced the remaining seven to five villages, till at length they emigrated in a body to the Ricara nation, where they formed themselves into two villages, and joined those of their countrymen who had gone before them. In their new residence they were still insecure, and at length the three villages ascended the Missouri to their present position.

The Mandan split their time between summer villages and winter villages. The winter village would serve as their home for a quarter of the year; they would move into the lowlands near their summer villages. Such areas would have forestation or topography that would serve to block the cold winter winds of the Plains. Their summer villages, however, were more permanent and were chosen for their defensibility and the fecundity of the land for agriculture. A summer village depended on a reliable source of lumber for the construction of new earth lodges and to fuel the hearth fires at the center of each lodge. Once the supply of lumber had been exhausted, the village would have to move elsewhere. A village could normally last one or two generations before the local supply of wood had been depleted. However, On-a-Slant Village, located a few minutes south of modern Bismarck, ND at the confluence of the Heart and Missouri Rivers, had been occupied since the last half of the sixteenth century and was only abandoned near the beginning of the eighteenth century due to population collapse caused by Old World diseases (Fenn 2015:118).

The catastrophic effect that illnesses like smallpox and the measles had upon the Mandan cannot be overstated. The village chief of Mitutanka<sup>23</sup> Shehek Shote<sup>24</sup> related to Meriwether Lewis that he was born in On-a-Slant Village, which was the smallest of the nine Mandan villages at the time, having a mere eighty-six earth lodges and approximately one thousand inhabitants. Shehek Shote's description of On-a-Slant before the 1781 smallpox outbreak suggests that the total pre-pandemic population of the Mandan was between ten and fifteen thousand. One generation later, Meriwether Lewis estimates that the two Mandan villages near Fort Lincoln could raise a total of seven hundred warriors, suggesting a population of at least two thousand people, with similar numbers estimated for the Hidatsa two miles upriver Allen (1814:131).

Three decades after Lewis and Clark had visited the Mandan, smallpox returned to the Middle Missouri. The outbreak of 1837 nearly caused the extinction of the Mandan people. The fur trader Francis Chardon wrote that "the small-pox had never been known in the civilized world, as it had been among the poor Mandans and other Indians." (Stearn & Stearn 1945:20). The smallpox first took hold among the Mandan in June of 1837, and by the end of August, Chardon wrote that "the Mandan are all cut off except twenty-three young and old men" (Calloway

---

<sup>22</sup>i.e., the Arikara (also known as Ree or *Sáhniš* [sah.niʃ] 'people').

<sup>23</sup>This name is also spelled Mih-Tutta-Hang-Kush by Maximilian (1839), which is *Mí'tyutahq'kash* 'the East Village' in the new orthography.

<sup>24</sup>His name is also spelled Shekehe Shote or Shahaka, which is *Shehékshot* 'White Coyote' in the modern orthography.

2008:297). The fact that Chardon focused on the number of men makes it difficult to give a precise number for the Mandan who survived the devastation of the 1837. Fenn (2015:223) cites various sources that give conflicting accounts of how many Mandan survived the smallpox outbreak, but the number was certainly no more than three hundred and possibly as low as near thirty.

This population crisis severely affected the economic and political position of the Mandan on the Middle Missouri. By 1851, the two Mandan villages visited by Lewis and Clark, Mittutaka and Ruptare<sup>25</sup> were still severely depopulated, with Mittutaka having between eight and twenty-one lodges occupied, depending on the source, while a fur trade said that Ruptare was occupied by just “fourteen huts, most of them empty” (Kurz 1937:72).

The Mandan of Mittutaka moved upriver in the summer of 1845 to join with the Hidatsa, who had suffered severely from the smallpox as well. Together, these two people settled Like-a-Fishhook Village, named so for the shape of the land jutting into the Missouri River upon which they built their new homes. This was the beginning of the cohabitation between the Mandan and Hidatsa, which continues to this day. The residents of Ruptare followed the rest of the Mandan to Like-a-Fishhook 1857 following yet another smallpox outbreak, and in 1862, the Arikara joined them. These three tribes have lived with each other ever since, and are classified as a single tribe by the federal government under the name The Three Affiliated Tribes.

### 1.2.3 1851 CE to present day

The government included the Three Affiliated Tribes in with a group of other nations in the 1851 Treaty of Fort Laramie, wherein they were allotted 12.5 million acres that encompassed portions of North and South Dakota, Montana, and Wyoming. Gradually, through a series of executive orders during the eighteenth century, the land was whittled down to just over 643 thousand acres by 1891, as shown in Figure 1.2.<sup>26</sup>

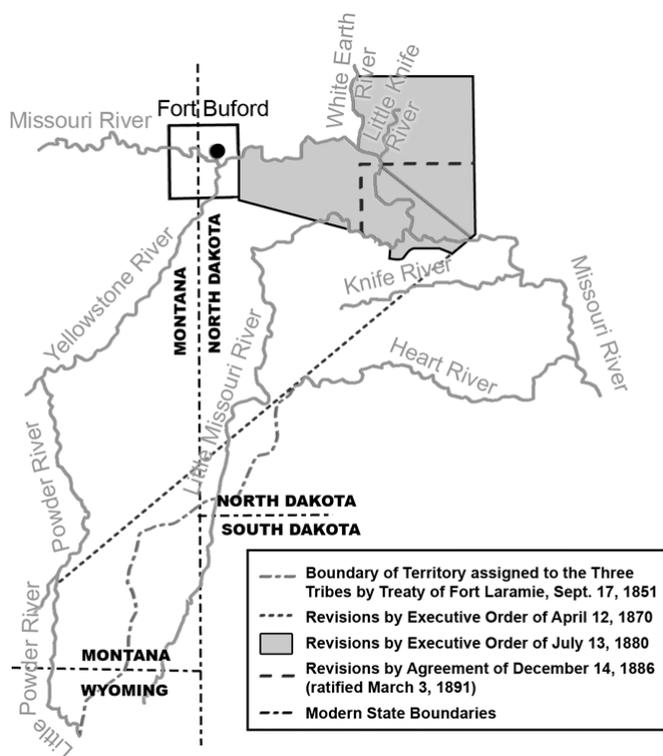
The Mandan and other treaty signatories were promised an annuity of fifty thousand dollars for fifty years, which Congress later amended to just ten years. Settlers were permitted to pass through Mandan lands, but in the rush for gold on the West Coast, some prospectors decided to stay. The United States did not uphold its end of the treaty in preventing Americans and Europeans from homesteading on sovereign lands. Like-a-Fishhook, near Old Fort Berthold, was gradually abandoned due to high volume of white settlers and attacks by hostile bands of Dakota and Lakota (Meyer 1977:119). By 1887, The U.S. government encouraged residents to move upriver to settle

---

<sup>25</sup>The name of this village is synonymous with the band of Mandan that occupied it: *Rúptaare*, called the ‘two voices’ or ‘the ones who came second’ by other Mandan. In the *Nú’etaare* variety, they may call this dialect *Núptaare*. It is variously referred to in the literature as Rupta, Nupta, Ruptadi, or Nuptadi.

<sup>26</sup>This map was created for the North Dakota Studies website, and is available at [http://www.ndstudies.org/resources/IndianStudies/threeaffiliated/demographics\\_land.html](http://www.ndstudies.org/resources/IndianStudies/threeaffiliated/demographics_land.html)

Figure 1.2: Land under the Treaty of Fort Laramie and subsequent cessions



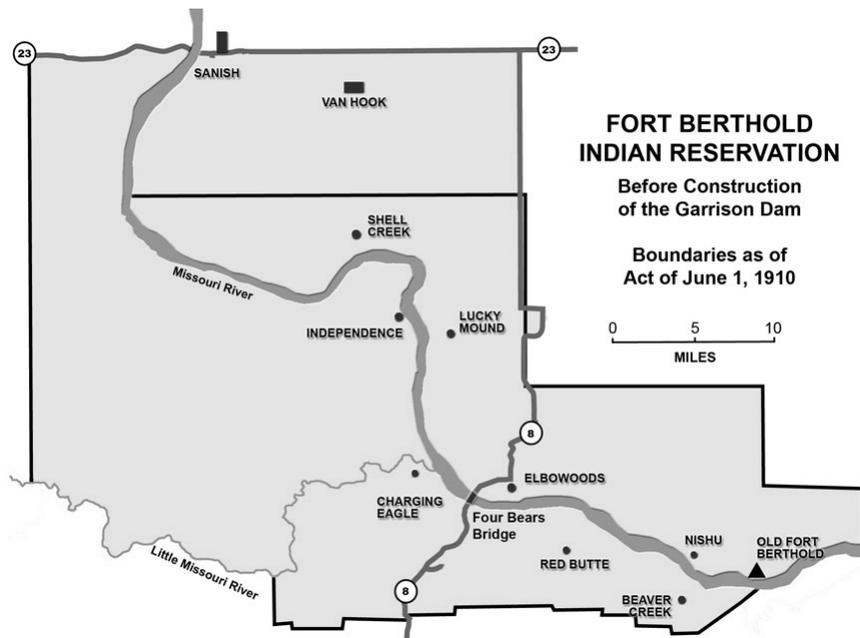
on allotments in and around Elbowoods, which would remain a major population center for the next seven decades (Densmore 1923:1).

This problem of European-American encroachment continued even into the twentieth century, where in 1910, the tribe was forced to allow homesteaders in the northeastern quadrant of the reservation under the Act of June 1, 1910 (36 Stat. 455). The act of opening up this land to white settlers alienated another 60 thousand acres from the Three Affiliated Tribes. A map of the Fort Berthold Indian Reservation and the major population centers appears below in Figure 1.3.<sup>27</sup>

The seasonal flooding of the Missouri River created excellent farmland in the river valley as nutrients were added to the lowlands every year. The Army Corps of Engineers, however, decided that the seasonal flooding of the Missouri was too problematic for farmers and boat traffic farther downriver, so a series of dams were constructed to prevent such floods. The result of these dams, and the Garrison Dam in particular had a strongly negative impact upon the Mandan, who had often continued to support themselves through farming throughout the reservation period. The construction of the Garrison Dam resulted in the creation of an artificial lake where the Missouri would rise up and

<sup>27</sup>This map was created for the North Dakota Studies website, and is available at [http://ndstudies.gov/threeaffiliated\\_historical\\_overview](http://ndstudies.gov/threeaffiliated_historical_overview)

Figure 1.3: Fort Berthold Indian Reservation pre-1953



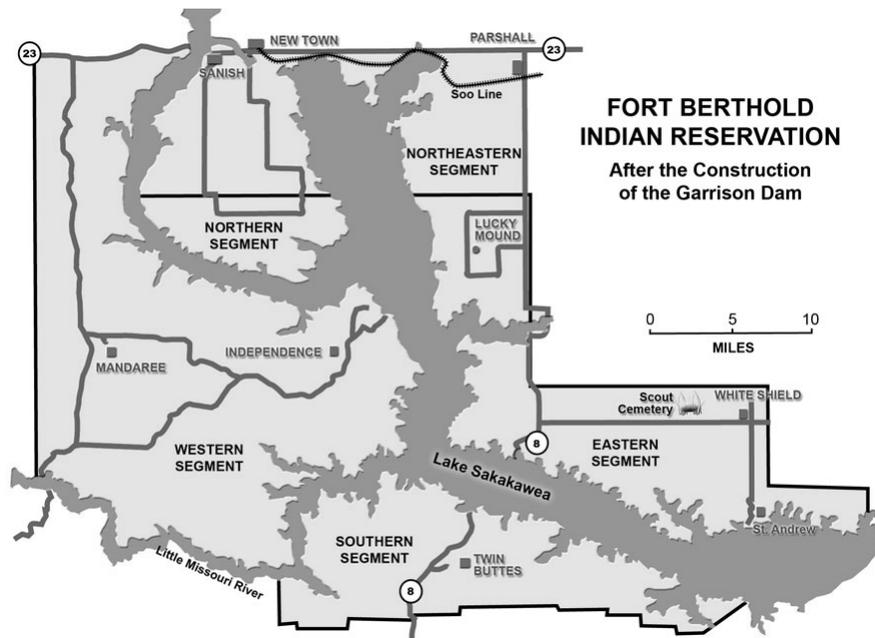
overflow its banks. The Three Affiliated Tribes were given compensation from the Department of the Interior for the loss of 146 thousand acres, over a fifth of their total territory, but the money would not ameliorate the situation that the creation of what is now Lake Sakakawea caused: the majority of the remaining land was dry and rocky, ill-suited for farming. Furthermore, nearly every settlement on the reservation was on the Missouri River, so thousands had to move from their home in the face of the rising waters of the Missouri (Harper 1948). A map of the current-day Fort Berthold Indian Reservation appears in Figure 1.4.<sup>28</sup>

Most of the Mandan lived in Elbowoods, Charging Eagle, or Red Butte before the Dam, and despite the presence of the Missouri River, it was relatively simple for families and friends to cross the river to visit. After the Dam, Lake Sakakawea was too wide and too deep for easy crossing. The Mandan spread out across the reservation, concentrating in the Southern Segment in what is now Twin Buttes, but also being present in Mandaree<sup>29</sup> in the Western Segment or New Town in the Northern Segment. Where the Mandan-speaking community had been relatively concentrated in a single area beforehand, it was now mixed in with Arikara- and especially Hidatsa-speakers. Already a minority on the reservation, many Mandan intermarried with Hidatsa-speakers, resulting in language attrition as the default indigenous language on the reservation shifted gradually to Hidatsa. This shift can be attributed to the fact

<sup>28</sup>This map was created for the North Dakota Studies website, and is available at [http://ndstudies.gov/threeaffiliated\\_historical\\_overview](http://ndstudies.gov/threeaffiliated_historical_overview)

<sup>29</sup>Mandaree was originally intended to be a home for all three peoples on Fort Berthold, with its name being a blend of **M**andan, **H**idatsa, and **R**ee. The latter is a term often used for the Arikara.

Figure 1.4: Fort Berthold Indian Reservation post-1953



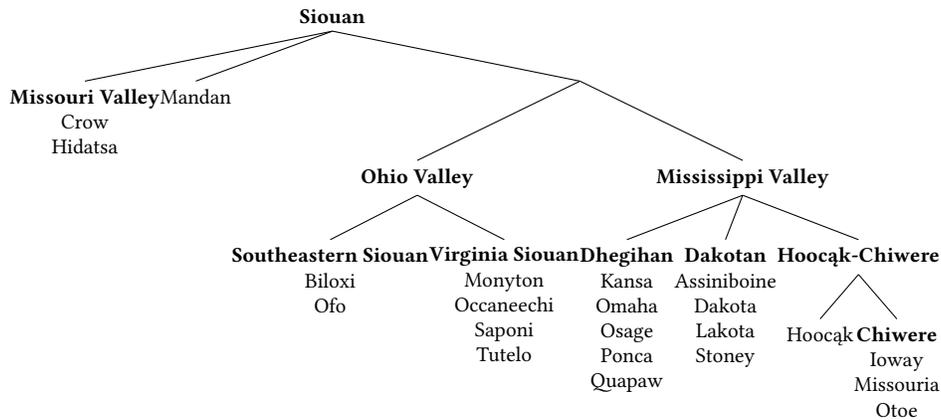
that at the beginning of the twentieth century, there were several larger families of mixed heritage that employed Hidatsa in the home due to Hidatsa being the language with which both parents were most comfortable. Numerous Hidatsa-speaking elders on Fort Berthold are actually ethnically Mandan due to this interruption in language transmission, hastening the decline in L1 Mandan speakers in the middle part of the twentieth century.

### 1.3 Genetic relationships

The position of Mandan within the Siouan language family has long been a point of contention. Grimm (2012:16) summarizes previous analyses of the relationship of Mandan to other languages as “somewhat arbitrary.” These past attempts to explain the relationship between Mandan and other Siouan languages have relied on limited comparisons of vocabulary, not paying much attention to grammar or phonology that is either shared with or innovated from Proto-Siouan. This section makes the case that Mandan is most closely related to Hidatsa and Crow, and that this relationship is supported by original computational phylogenetic work done by the author.

The most current consensus tree appears in Figure 1.5. Within Siouan, there are three families apart from Mandan: Missouri Valley, consisting of just Crow and Hidatsa; Ohio Valley, consisting of Biloxi, Ofo, and various forms of Virginia Siouan; and Mississippi Valley, consisting of numerous other groups like the Lakota, Omaha, and the

Figure 1.5: Current consensus tree for Siouan Proper from Rankin (2010)



Given their proximity and cultural ties with the Hidatsa and Crow, Mandan has often been grouped with them as part of the Missouri Valley family. Early researchers on the Plains, such as Will & Spinden (1906:97), divide the Siouan languages of the Plains into four groups based on archeological and first-hand accounts of their migrations. The Mandan, Hidatsa, and Crow were the first to move onto the Plains, followed by Hoocąk and Chiwere-speaking groups, then Dhegihan speakers, then Dakotan speakers in the seventeenth century.

Will & Spinden’s (1906) proposal for the subdivisions within Siouan language family did not take the Ohio Valley languages into account, nor any other relationships between their proposed four-way distinction. Voegelin (1941:249) groups Mandan with Hoocąk based on a single phenomenon they have in common: i.e., Dorsey’s Law, where a copy vowel is inserted to break up clusters involving a sonorant (Dorsey 1885:923).<sup>31</sup>

(1.25) Dorsey’s Law

$$/CRV_1/ \rightarrow [CV_1RV_1]$$

Grouping Mandan with Chiwere and Hoocąk on the basis of a single shared phonetic characteristic is problematic, as Voegelin (1941:246) himself notes that the intrusive copy vowel found in Mandan and Hoocąk is also found in Dakota and in various Dhegihan varieties (i.e., most of the language family). Wolff (1950a,b,c, 1951) likewise remarks that grouping languages by a single shared phonological feature is not especially convincing, and instead proposes a

<sup>30</sup>The Hoocąk are also known as the Ho-Chunk or Winnebago. This work opts to use their autonym, as Winnebago is an exonym from an Algonquian language (cf. Pot. *winbyégo* ‘Hoocąk’) meaning something to the effect of ‘smelly water people,’ due to their presence by Green Bay, which often experiences strong algal blooms.

<sup>31</sup>I argue in §2.2.3 that these Dorsey’s Law vowels are not phonologically generated, but are post-phonological (i.e., phonetic) in that they are not treated as syllables for the purpose of stress assignment due to their status as excrescent (or intrusive) vowels rather than epenthetic vowels.

different grouping, stating that Siouan had seven divisions: 1) Crow and Hidatsa, 2) Mandan, 3) Dakota,<sup>32</sup> 4) Chiwere and Hoocąk, 5) Dhegia,<sup>33</sup> 6) Ohio Valley Siouan, and 7) Catawba.

Headly (1971:54) argues that Mandan forms a clade with Missouri Valley due to the degree of lexical similarity between those two groups. Rood (1979:255) opts to place Mandan within its own branch of Siouan, while Koontz (1985) argues that Mandan forms a basal clade within the Mississippi Valley family. Ultimately, Rankin (2010) argues that the place of Mandan within Siouan is too difficult to discern due to the large amount of morphology it shares with other Siouan languages and the fact that many of the lexical similarities between it and Crow-Hidatsa could be due to contact.

More recent work in computational phylogenetics points to Mandan truly belonging with Missouri Valley (Kasak 2015a). Making use of a suite of phylogenetic software and a database of cognates derived from Rankin et al.'s (2015) *Comparative Siouan Dictionary*, I created a character set of 446 lexical items coded for cognacy. The data then underwent a Bayesian maximum-likelihood analysis using BEAST (Drummond & Rambaut 2007), using a stochastic Dollo model, a lognormal relaxed clock, and a UPGMA starting tree. The resulting set of trees were then summarized into a target tree using TreeAnnotator, followed by generating this target tree using FigTree. The results firmly placed Mandan with Hidatsa and Crow, though at a deeper time depth than Hidatsa and Crow from each other. Furthermore, this analysis supports the language isolate Yuchi being genetically related to Siouan, a relationship first championed by Sapir (1929) and latter again by Rankin (1996, 1998) and Kasak (2016) since Yuchi clusters within already existing branches of the Siouan family tree.

The newly-proposed Siouan family tree appears in 1.6, where Mandan forms a basal clade within Missouri Valley, while Catawba and Yuchi form a clade with Mandan-Missouri Valley. Ohio Valley and Mississippi Valley likewise form a clade, as previously described by Rankin (2010). This study was done just on lexical items, and future work should involve incorporating morphology into the character set. However, what is noteworthy about this work is that it captures the established subgroupings within Siouan, both with respect to the major families (i.e., Mississippi Valley, Ohio Valley, Missouri Valley, and Catawban), but it also captures higher-order groupings that had been discussed openly among Siouanists, such as the fact that Mississippi Valley and Ohio Valley share a large number of lexical innovations not found in Missouri Valley, Mandan, or Catawban.

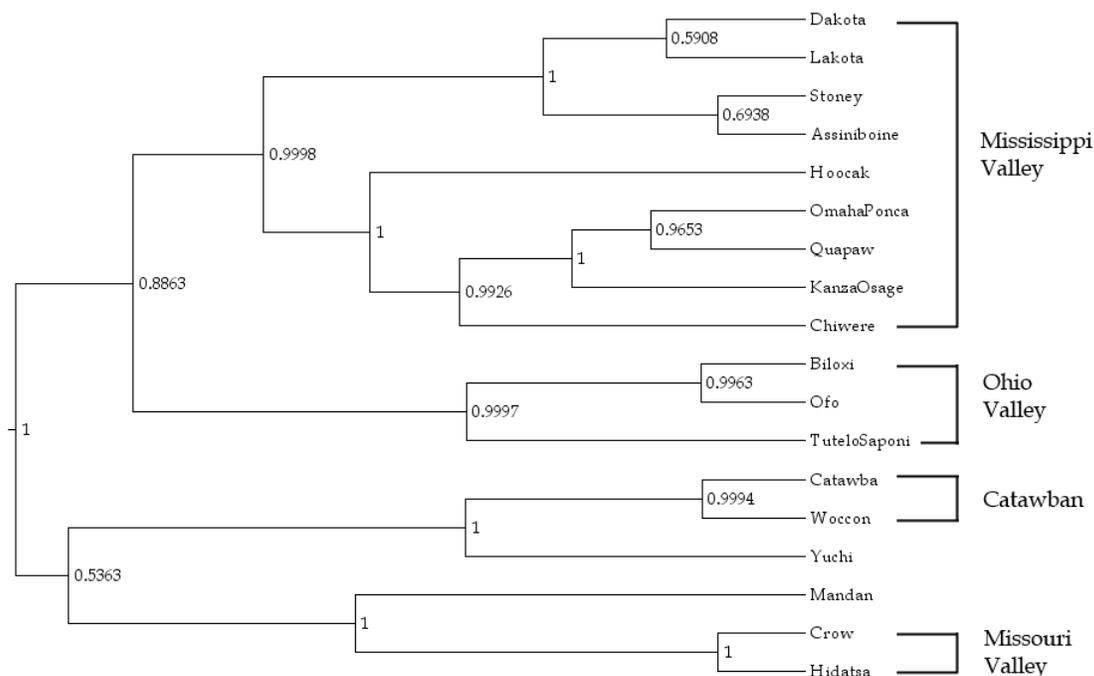
The tree in Figure 1.6 includes the posterior probabilities of each clade given the taxa inputted into the data (i.e., each language with data in the character set). A posterior probability is the statistical probability that proposition is true having taken some evidence into account under a Bayesian analysis. For the established subgroupings (e.g.,

---

<sup>32</sup>Wolff (1950a,b,c, 1951) uses Dakota as a cover term for all Dakotan languages: i.e., Lakota, Yankton Dakota, Assiniboine, Stoney, etc.)

<sup>33</sup>The Dhegihan group includes Omaha-Ponca, Kanza-Osage, and Quapaw.

Figure 1.6: Siouan family tree from Kasak (2015a)



Dakotan, Southeastern, Dhegihan, etc.), the posterior probabilities were quite high (i.e.,  $p > 0.95$ ). For other expected groupings, like Lakota and Dakota, which form a dialect continuum, we see a low posterior probability that is due to the Bayesian analysis dealing with very closely-related language varieties by trying different results (i.e., trees) that do not improve the probability for forming a clade. Another confounding factor lies in the composition of the cognate set, since instances where Lakota and Dakota shared a lexical item were rarely recorded, but items that differentiate between them were regularly included. If a newer set of data were coded that includes every cognate between Lakota and Dakota that did not simply assume that Lakota and Dakota share an item unless otherwise stated, we would expect to see an extremely high posterior probability of Lakota and Dakota forming a clade, given their mutual intelligibility.

The low posterior probability for the clade including Yuchi-Catawban and Mandan-Missouri Valley could be caused by the time depth separating them or the high degree of innovation within Yuchi-Catawban. The analysis yields a tree where Catawban and Yuchi form an in-group, rather than an out-group, suggesting further work is needed to understand the correspondences between Proto-Siouan and Catawban-Yuchi. Nonetheless, the biggest takeaway from these findings is that Mandan is not an isolate within the Siouan language family, but has demonstrably closer ties to Missouri Valley languages and shares a stronger lexical affinity with Catawban and Yuchi than with Mississippi and Ohio Valley Siouan.

The purpose of building the case for the place of Mandan within Siouan serves two purposes for this work. Firstly, we can see that Mandan is not alone within the family tree, despite its uniqueness among Siouan languages in sharing so many features and lexical items with other members of the language family across so many branches. Secondly, this work places Mandan within the same subfamily as Hidatsa and Crow, which suggests further comparative grammatical study is needed between these three languages, as well as raising the possibility for investigating what a proto-language would look like between them. The argumentation in this section is relevant to the dissertation in that if the synchronic analysis of Mandan affix ordering within a template holds, then we can use the same analysis of the templates of other Siouan languages to look at the diachronic reordering of affixes (i.e., realization constraints being reordered with respect to one another) across various branches of the language family to examine the ways in which language change can occur at the morphological level in a language family that features such a diverse array of affixes within the templates of its members.

## 1.4 Previous research on the Mandan language

This section serves to examine the research on the Mandan language that has taken place up to this point in time. There are no published bibliographies of Mandan language resources of which I am aware, so the following information shall act as a bibliography of Mandan. This documentation is meant to assist in future research on the language by pointing academic and community scholars to resources on the Mandan language and where those resources are held.

While European traders have been visiting the Mandan since at least the seventeenth century and missionaries have been living among them since the nineteenth century, the collection of linguistic data has been sporadic. A number of fur traders lived among them since at least the eighteenth century, so a number of Europeans and Americans came to learn the Mandan language to exchange furs and agricultural products for iron tools and guns during the period of colonization of the interior of the North American continent by European powers.

The first published account of the Mandan language was by Prince Maximilian (1839), who lived among the Mandan people with the Swiss artist Karl Bodmer in the years before the Smallpox Epidemic of 1837. Together, they introduced the rest of the world not only to the striking visual depiction of life among the Mandan, but also to their language. To this day, Maximilian's vocabulary with its brief grammatical sketch is the only documented source to compare lexical and grammatical differences between the *Núu'etaa* and *Rúptaa* varieties of Mandan.

The American trader James Kipp's (1852) wordlist was published in the Schoolcraft (1853:446) collection, which aimed to document the numerous indigenous languages of the United States. Kipp lived with the Mandan for a time,

even marrying a Mandan woman. While no linguist, his vocabulary consisted of nearly 350 words, ranging from plants and animals to physical actions and simple verb paradigms. Schoolcraft's (1853) transcription of Kipp's (1852) handwritten vocabulary list is unfortunately riddled with typographic errors, as well as a few instances of confusing Mandan data and non-Mandan data from some other list. As such, any attempts to use these data should refer back to the original handwritten list by Kipp, which is currently stored at the Smithsonian Institution in Washington, DC. When looking at this modest lexicon, there are several words in his vocabulary that are different from the terms used today. One such example of this change appears below in (1.26), where the word for 'horse' went from being a descriptive compound that approximated the appearance of this animal to the compound being reduced through its frequency of use until the second member of the compound replaced the semantics of the original word *minise* 'dog.'

(1.26) Reduced compound in Mandan: 'horse'<sup>34</sup>

- a. Older Mandan: *úupa minise* lit. 'elk dog' (Kipp 1852)
- b. Contemporary Mandan: *minise* 'horse' (Kasak 2014a)

In the twentieth century, there was a renewed interest in the people of the Plains. Musicologist Frances Densmore (1923) recorded over one hundred Mandan and Hidatsa songs, including the lyrics and their translations, though she was more concerned with the music itself rather than the words. Her recordings were done on wax cylinders, and due to the fact she had to power her equipment using the engine of her Model T car, the audio quality is quite poor. However, these represent the first recorded instances of Mandan in an auditory medium. Mr. Ben Benson<sup>35</sup> (1867-1939) was the grandfather of the last L1 Mandan speaker and one of Densmore's principal Mandan consultants, singing 16 of the 82 Mandan songs recorded during Densmore's fieldwork. The anthropologist Robert Lowie (1913) describes meeting with several Mandan consultants in his description of the societies of the Crow, Hidatsa, and Mandan, and Mr. Ben Benson's name is never mentioned. However, it is likely that Mr. Benson would have been among those consulted on the histories and functions of various moieties, given his age and social stature at the time of Lowie's visits to Fort Berthold. Mr. Benson's participation in this project led to him later working beginning a nearly century-long practice of his family working with outside scholars.

The anthropologist Edward Kennard visited the Mandan in the summers of 1934 and 1935, working with many of the same consultants who had worked with Densmore almost two decades earlier. While Kennard was mostly

---

<sup>34</sup>The pre-contact Mandan word for 'dog' was *minise*, which is historically derived from the unspecified argument marker *wa-* and the verb *inís* 'be alive': i.e., 'something that is living' or 'animal.' But upon the introduction of the horse, *minise* became generalized to any domestic quadruped, and eventually 'dog' became *minís wéerut* 'horse that eats feces' to distinguish it from what is now the word for horse, *minise*. Other Plains languages similarly equated horses with dogs: e.g., Lakota *šúŋkawakháŋ* 'horse' (lit. 'holy dog'), though *wakháŋ* 'holy' may be dropped so that *šúŋka* can be either 'dog' or 'horse' in casual speech.

<sup>35</sup>His name was originally *Weróokpa* 'Buffalo Bull Head,' but his legal name was given to him by missionaries.

concerned with the folklore of the Mandan people, he produced the earliest textual corpus of Mandan in the form of 302 typewritten pages containing 28 narratives in Mandan, along with free translations and some basic interlinear glossing for certain texts (Kennard 1934). His work with the Mandan resulted in the first published grammar of this language (Kennard 1936). Two of Ben Benson's grandchildren later assisted with Mandan documentation efforts: Mrs. Louella Benson Young Bear (1921-2008) and Mr. Edwin Benson (1931-2016), who was the last L1 speaker of the Mandan language. Mr. Edwin Benson formerly worked as the Mandan teacher for Twin Buttes School, following the retirement of his cousin, Mrs. Otter Sage.

Alfred Bowers's (1950) ethnographic work on Mandan ceremony and social practice remains a valuable resource for information on Mandan culture due to Bowers's numerous consultants who had grown up before the forced assimilation imposed on Mandan families during the reservation and boarding school era. Bowers was reputed to be a competent speaker of Mandan, being able to translate Crows Heart's autobiography from spoken Mandan into written English in 1947. He later returned to Twin Buttes, ND to back-translate it into Mandan and Hidatsa with two fluent speakers, collecting nearly 150 hours of recordings. These recordings were done in 1969 and then sent to the American Philosophical Society for archiving (Bowers 1971).

Robert Hollow, one of Wallace Chafe and Terrence Kaufman's students at the University of California, Berkeley, undertook field work in the late 1960s that resulted in the first and only dictionary of the Mandan language (Hollow 1970). Hollow continued to work on Mandan after completing his doctorate, recording and transcribing 24 narratives (Hollow 1973a), and also re-eliciting and re-transcribing Kennard's (1934) narratives. Though no known audio recordings of those sessions exist, (Hollow 1973b) re-elicited and transcribed all but four of Kennard's (1934) 28 narratives. He collaborated in efforts to revitalize the Mandan language through the creation of a textbook (Hollow, Jones & Ripley 1976), and he published translated Mandan narratives in the *Earth Lodge Tales from the Upper Missouri* collection (Parks, Jones & Hollow 1978). Hollow died in Bismarck, ND in 1986 due to complications from cancer at the age of 41.

Mauricio Mixco, a classmate of Parks and Hollow's from Berkeley, thereafter began working on Mandan in the summer of 1993. These efforts produced a grammar sketch (Mixco 1997a) and an overview of Mandan's switch-reference system (Mixco 1997b). His fieldwork produced no other publications.

Sarah Trechter began working on Mandan in 2000 following a suggestion from the late Robert Rankin while she was a student at the University of Kansas. She continued to work on Mandan through 2012, producing pedagogical materials alongside local Mandan heritage language learners and Mr. Edwin Benson, the man who was then the last L1 Mandan speaker. These efforts culminated in two DVDs, *In the Words of Our Ancestors*, which showed video footage of Mr. Benson sitting in an earth lodge in traditional regalia, telling traditional Mandan narratives in Man-

dan. The DVDs were accompanied by data CDs that included transcriptions and translations of those narratives so listeners can follow along (Trechter 2012a).

The most recent work on Mandan has been by Indrek Park, who has been working with the Nueta Language Initiative in Twin Buttes, ND. As of this writing, he still lives with the community in Twin Buttes and participates with revitalization efforts for both Mandan and Hidatsa.

This summary of existing Mandan research highlights how limited the extant information on the Mandan language is, despite the major role the Mandan people played on the economy of the Upper Missouri for the past half millennium, leading up until the reservation period.

## 1.5 Personal fieldwork and sources of data

### 1.5.1 Personal fieldwork

My own fieldwork with Mandan began in the summer of 2014, when I first traveled to the Fort Berthold Indian Reservation to meet with the lone L1 Mandan speaker and investigate the possibility of finding other speakers. This trip was partially funded by a 2014 grant from Phillips Fund for Native American Research through the American Philosophical Society. I was asked by the Language Conservancy to create pedagogical materials for Mandan, as they had just received a contract from the tribe to do so. That trip resulted in my Mandan textbook (Kasak 2014a), the first introductory Mandan textbook since Hollow, Jones & Ripley's (1976) nearly four decades earlier.

Through the Language Conservancy, I returned to North Dakota in the winter of 2015 and stayed for almost three months during that same summer. In each of my visits, I found it increasingly difficult to arrange time with the last L1 Mandan speaker due to competition for his time. A local organization had begun its own work to document and attempt to revitalize Mandan, and they had already made arrangements to meet with the last speaker regularly. Due to his age and health, he was unable to meet as much as I would have preferred, so I sought out other Mandan speakers on Fort Berthold.

Though the last L1 speaker has passed, Mandan is not totally forgotten. There is a small number of heritage learners who had spoken Mandan with a parent or older relative and still remembered it. More remarkably, one of these individuals grew up speaking Mandan with a father who spoke the Nuptare (i.e., *Rúptaare*) dialect, which Mixco (1997a:3) cites as having died out well before the beginning of the twentieth century. Hollow (1970:1) goes so far as to state that there are no data recorded on this variety, though he does give several words that consultants inform him belong to the Ruptare dialect.

Given the scarcity of speakers, the spread-out geography of the reservation, the speakers' busy schedules, and

the hyperinflated cost of lodging and travel due to the oil and fracking boom happening in the Bakken region, it has been a challenge to arrange meetings to elicit new data. As such, the bulk of my analysis of Mandan has stemmed from materials collected by previous scholars.

### 1.5.2 Sources of data

The vast majority of extant Mandan materials is derived from the fieldwork of Robert Hollow (1973a,b) during the 1960s and 1970s. There are no known audio recordings from his re-elicitation of Kennard's (1936) narratives, but 20 hours of recordings from his novel elicitation sessions are preserved at the North Dakota State Historical Society. In the summer of 2014, I had these reel-to-reel recordings digitized through the North Dakota State Historical Society. These recordings consist of data from three individuals: Mrs. Mattie Grinnell (1867-1975),<sup>36</sup> Mrs. Annie Eagle (1889-1975), and Mrs. Otter Sage (1912-1994). Given that Mrs. Grinnell was born in Like-a-Fishhook Village before the reservation period, her Mandan is especially valuable to examine, due to it being the language of daily life for several decades before settlers started to outnumber the indigenous inhabitants of the area around the Fort Berthold Indian Reservation. She is also widely described around the reservation as the last full-blooded Mandan.

Mrs. Eagle (née Crows Heart) was a daughter of Crows Heart. She and Mrs. Otter Sage (née Holding Eagle) were also instrumental to helping Bowers translate the materials he archived with the American Philosophical Society. Given the fact that Hollow (1973a,b) transcribed his data, while Bowers (1971) did not, the Hollow materials are much more readily accessible for study. At some point, the Bowers materials will need to be transcribed and published, but that is a task for a later date. The data present in those recordings were not included here, as both consultants produce both Mandan and Hidatsa, and a Hidatsa speaker will be needed in order to interpret side conversations and asides between the two. Both sets of narratives collected by Hollow total 546 pages worth of transcribed and translated Mandan and contain minimal Hidatsa data or code-switching, and as such, these narratives were selected to form the initial corpus of Mandan used within this dissertation.

The other major source of data transcriptions for Mandan is Sarah Trechter's (2012a) work with the Circle Eagle Project, yielding 10 hours of Mandan and 273 pages of transcriptions and translations from her work with Mr. Edwin Benson (2000). Trechter distinguishes herself from Hollow in marking vowel length, a major phonemic features that is not present in Hollow's transcriptions.<sup>37</sup>

---

<sup>36</sup>Mrs. Grinnell's Mandan name is *Náakuhys* 'Many Roads.' Mrs. Grinnell is also noteworthy for being the last individual to receive a Civil War widow's pension, which she was granted in 1971, sixty-seven years after the passing of her first husband John Nagel, who served under the Third Regiment of the Missouri Volunteer Cavalry from 1861 to 1864 (Lovett 1975).

<sup>37</sup>Hollow (1970, 1973a,b) and Hollow, Jones & Ripley (1976) do mark coda glottals in transcriptions, but this marking of coda glottals is inconsistent.

My own personal fieldwork is also part of the data present here, comprised of two hours of recordings done with Mr. [Benson](#), as well as elicitations done with heritage speakers: Mrs. Delores Sand, Mr. Valerian Three Irons, and Mr. Leon Page Little Owl.<sup>38</sup>

Combining all the sources above, this dissertation makes use of 35 hours of Mandan recordings and 819 pages of transcribed Mandan narratives. A dictionary is being compiled that currently has approximately 500 entries at the time of this writing, with the intention of including the lexical and morphological items present in the aforementioned sources of data.<sup>39</sup>

## 1.6 Organization of dissertation

The over-arching aim of this dissertation includes two complementary goals: the description of the phonology and morphology of Mandan, and the demonstration of how the opaque ordering of affixes in the templatic morphology that Mandan possesses can be accounted for through appealing to Optimality Theoretic notions of constraints applying to affixation rather than phonological phenomena. By using Mandan as an example of a language that exhibits fairly typically behavior for a language with templatic morphology, I argue that we can extend the analysis for the distribution of inflectional affixes in Mandan to the rest of the Siouan language family, and possibly to other languages featuring templatic morphology. Indeed, the issue of templatic morphology may simply boil down to languages with more complicated verbal composites, where inflection can occur at different domain edges within those composites.

I begin my description of Mandan in Chapter 2, where I identify the salient sounds present in Mandan with corroborating phonetic evidence from existing recordings. Furthermore, I discuss allophony and phonotactics, as well as word-level phonological processes, such as nasal harmony and different varieties of epenthesis at work in Mandan. Lastly, I give an account of primary stress assignment in Mandan, something that has not been described previously due to the wide variability in stress-marking by previous scholars.

In Chapter 3, I describe the inflectional and derivational morphology that is present on Mandan verbs. In particular, I emphasize how person and number are marked, and also identify morphology for aspect, mood, and evidentiality. The distribution of preverbs in Mandan is an important section within this description of Mandan verbs, as it is with the preverbs that we can most clearly see the separate domains of affixation due to the structure of verbs featuring preverbs. All such verbs are composites. I describe the different ways negation is marked on the verb, as well

---

<sup>38</sup>Mr. Little Owl's father, Mr. Ronald Samuel Little Owl (1941-2003), was formerly the Mandan language instructor at the tribal college. Their family speaks the *Rúptaa* variety of Mandan.

<sup>39</sup>A work-in-progress version of this dictionary is available at the Mandan language website: <http://www.mandanlanguage.org/dictionary/>

as in serial verb situations. Lastly, I give an overview of allocutive agreement on root clauses and switch-reference marking on adjunct clauses.

Chapter 4 is devoted to examining how to best account for the ordering of inflectional affixes in Mandan in an Optimality Theoretic way. What follows is an examination of how morphology is able to autonomously regulate the ordering of affixes without any phonological, syntactic, or semantic motivation. The composite structure of Mandan verbs is examined and I give the distribution of inflectional markers with respect to what domain within the composite an affix is attracted: the head of the composite or the overall edge of the composite. I argue that a finite set of constraints is able to account for the ordering of affixes in Mandan. To expand on how this analysis can apply not only to Mandan, but to Siouan at large, I examine whether this analysis of morphology alone (i.e., through the attraction of particular affixes to a specific edge within a composite verb) is able to account for affix ordering in other languages within Siouan.

I conclude with in Chapter 5 by examining the historical conditions under which these composite constructions developed in Mandan and Siouan in general and reiterate that an underlying composite structure is more common typologically than previously discussed in the literature. I then compare this A-morphous OT-centric approach to other templatic languages of the Americas, and raise issues in need of future research.

## Chapter 2

# Sound system of Mandan

This chapter describes the sound system of Mandan. Very little attention has been paid to phonetic and phonological matters in this language, as previous efforts have focused on the collection of narratives (e.g., [Kennard 1934](#); [Hollow 1973a,b](#); [Benson, Spotted Bear & Trechter 2009](#); and [Trechter 2012a,b](#)), the creation of brief grammatical sketches (e.g., [Kennard 1936](#), [Coberly 1979](#), [Carter 1991b](#), or [Mixco 1997a](#)), or word and affix lists (e.g., [Maximilian 1839](#), [Will & Spinden 1906](#), and [Hollow 1970](#)). Pedagogical materials created for Mandan likewise mention little about the relevant sounds in this language (e.g., [Hollow, Jones & Ripley 1976](#), [Little Owl & Rhod 1992](#), and [Benson 2000](#)).

There are two overall goals for this chapter. One goal is to provide an overview of the phonemic inventory of Mandan, as well as allophonic alternations and phonological processes that influence the realization of surface forms. Furthermore, this chapter deals with information that has not been previously described, such as stress assignment and environments where nasal harmony is blocked. One additional contribution that this work provides to the understanding of Mandan is the inclusion of phonetic data analyzed using Praat ([Boersma & Weenik 2016](#)) to conduct waveform and spectrographic analysis.

The second goal of this chapter relies on the first by using this description of the sound system of Mandan to make a case for phonological sensitivity to word-internal morphological boundaries. There are several processes relating to Mandan morpho-phonology that have blocking environments that are not grounded in the phonology of the language alone. Namely, there must exist some extra-phonological blocking condition to account for the blocking of certain processes where there is not featurally-motivated reason to prevent the implementation of a phonological process.

## 2.1 Consonants

Mandan is similar to other languages of the northern Great Plains in that it has a relatively small consonant inventory within Maddieson’s (2013b) typology of consonant inventory sizes.<sup>1</sup> In particular, the number of phonemic consonants is quite low, with only 10. Mandan is likewise noteworthy for having no underlying nasal consonants, despite the fact that nasal consonants are some of the most commonly-encountered sounds in the language. This lack of underlying nasal consonants is a holdover from Proto-Siouan, which likewise lacked such consonants (Rankin, Carter & Jones 1998). Missouri Valley languages share this feature with Mandan, which is one of the numerous reasons why previous researchers have grouped them together (Rankin 2010).

### 2.1.1 Consonant inventory

Table 2.1 represents a summary of the phonemic consonant inventory of Mandan, with the corresponding orthographic equivalent represented in angled brackets. Allophony is not represented here, but is addressed in subsequent sections.

Table 2.1: Consonant inventory

	Bilabial	Alveolar	Post-alveolar	Velar	Glottal
Plosive	p	t		k	ʔ ⟨ʔ⟩
Fricative		s	ʃ ⟨sh⟩	x	h
Sonorant	w	r ⟨r⟩			

The inventory of consonants listed in Table 2.1 does not differ from the inventory given in Hollow (1970:14). However, the inventory above is smaller than those given in Kennard (1936:2) and Mixco (1997a:13), who identify 13 and 11 consonants, respectively. Kennard’s inventory includes /<sup>n</sup>d n m/, and he does not take allophony into account, however, which accounts for these additional consonants, as [<sup>n</sup>d n] are both allophones of /r/ and [m] is an allophone of /w/ (see §2.1.5). Mixco includes an affricate /tʃ/ (see §2.1.3).

Of note is that Mandan has a drastically diminished consonant inventory when compared to other Siouan languages. The neighboring Lakota have a four-way stop distinction and a two-way fricative distinction, while the

---

<sup>1</sup>Languages of the northern Great Plains have small consonant inventories going off the typology (i.e., fewer than 14 consonants) per Maddieson (2013b), with Hidatsa having 10 (Boyle 2007:27), Crow with 11 (Graczyk 2007:12), Arikara with 12 (Parks, Beltran & Waters 1979:1), Cheyenne with 11 (Leman 2013:214), Arapaho with 12 (Picard 1994:4), Plains Cree with 10 (Wolfart & Carroll 1981:8), and Pawnee with 8 (Parks 1976:13). To the best of my knowledge, there has not been much in-depth study to determine whether this phenomenon is part of some language area effect, particularly since the ancestor languages of the languages mentioned above are reconstructed with drastically larger consonant inventories.

Omaha to the south have a five-way stop distinction. The inventory of consonants described in Rankin, Carter & Jones (1998) in Proto-Siouan appear below in Table 2.2.

Table 2.2: Proto-Siouan consonant inventory

		Bilabial	Coronal	Palatal	Velar	Glottal
Plosive	plain	*p	*t		*k	*ʔ
	glottalized	*pʔ	*tʔ		*kʔ	
	preaspirated	*hp	*ht		*hk	
	postaspirated	*ph	*th		*kh	
Fricative	plain		*s	*š	*x	*h
	glottalized		*sʔ	*šʔ	*xʔ	
Sonorant		*w	*r	*y		
Obstruent		*W	*R			

The two aspirated stop series collapsed with the plain stops in Mandan, and the glottalized series for the stops underwent a particular metathesis, where the glottalized component of the stop became a coda glottal: i.e., PSi \*CʔV > Man CVʔ, as we see in *kú* ‘give’ < PSi \*kʔu. Proto-Siouan glottalized fricatives likewise underwent this change in Mandan: e.g., PSi \*šʔehe ‘drip’ > Man *shé’he* ‘drip’ and Lak *oyúš’e* ‘make a drop into something using one’s hands.’ Mandan shares this typologically-marked sound change with Missouri Valley Siouan, yet another reason to posit a closer genetic relationship between these two branches of the Siouan language family. Further work is needed to explore additional evidence for the closer relationship between Mandan and Missouri Valley Siouan.

## 2.1.2 Plosives

Other branches of Siouan have several contrasting stop series. Osage exemplifies this robust distinction with its five-way stop series: plain, preaspirated, postaspirated, voiced, and ejective (Quintero 2004:17). Mandan is similar to Crow in that it only has a single stop series, though it differs from Hidatsa, which has re-innovated a postaspirated distinction (Boyle 2007:27, Graczyk 2007:12).<sup>2</sup>

### 2.1.2.1 Supralaryngeal stops

The earliest description of Mandan stops comes from Prince Maximilian (1839), who lived among the Mandan in the early 1830s. Though he transcribed Mandan using German orthography, the only voiced stop he consistently writes is ⟨d⟩ between vowels where [r] appears today. This treatment of the flap as a stop is continued by the trader

<sup>2</sup>The postaspirated stops in Hidatsa correspond to geminate stops in Crow: e.g., Hid *-taa* [-tʰa:] NEG and Cro *-ssaa* [-s:a:] NEG, but both in turn originate from simple stops or sonorants. The negative suffix, for example, comes from PSi \*rj NEG plus the adverbial \*haa. The short vowel syncopates before the syllable with the long vowel, creating an \*\*rh cluster. The \*\*r fortifies to \*\*\*t, yielding the aspirated [tʰ] (Jones 1983b:8). Mandan similarly treats PSi \*rh clusters, but only has the plain stops: e.g., PSi \*re-hii ‘arrive here’ > \*\*rhii > Man *tí* [ti] ‘arrive here.’

and translator Kipp (1852). Will & Spinden (1906) describe Mandan as having voiced and unvoiced stops in their grammatical sketch: /p b t d k g/. Kennard’s (1936) grammar describes only one voiced stop, ⟨d⟩, which he describes as a pre-nasalized stop [ʰd] that occurs in complementary distribution with [r]. He has this to say about the quality of these stops: “the series of stops are all slightly aspirated. The degree of aspiration varies with the position of the sound, being more pronounced in initial and medial position than final. Acoustically, the aspiration is stronger when the stop precedes a close vowel than an open, although each represents only one phoneme” (Kennard 1936:2).

Torres (2013a) conducts a phonetic investigation of the quality of stops in Mandan, using a 30-minute recording from the 1980s of Mrs. Otter Sage, along with a transcription produced by Benson, Spotted Bear & Trechter (2009) as a corpus. Torres finds that the stops in Mandan are clearly voiceless, with the measured voice onset times (VOTs) appearing below.

Table 2.3: Measured means: VOT per Torres (2013a:29)

Stop	Number of tokens	Mean (ms)	St.Dev.
/p/	35	12.8	11.4
/t/	255	10.9	6.1
/k/	562	25.8	13.3

My own findings conform to those in Torres (2013a). Under Cho & Ladefoged’s (1999) typology of aspiration, all of these stops fall into the expected range for being unambiguously unaspirated, where VOT values of approximately 30ms form the upper bounds of what most languages treat as a voiceless unaspirated stop. We can compare these numbers with those of a Siouan language that contrasts aspirated and unaspirated stops like Lakota, where we can see that Mandan’s stops clearly pattern as plain stops.

Table 2.4: Mean (ms) VOT for Lakota stops (Torres 2013b)

Stop	Bilabial	Alveolar	Velar
plain	13	14	31
aspirated	94	95	114

Torres (2013a,b) conclusively demonstrates that the supralaryngeal stops in Mandan are unaspirated. What she does not look at, however, is to what degree these stops are voiced.

Analysis done on recorded data from Mandan speakers born prior to 1940 shows that there is no allophonic voic-

ing of these plosives in intervocalic environments. Contra Kennard's (1936) observations, there is no perceptually-significant aspiration: i.e., stops are unaspirated. To illustrate this behavior of both singleton stops and those in clusters, examples of /t/ in the full range of possible stop environments appear below: word-initially, word-finally, intervocalically, and as the first or second element in a consonant cluster.

In Figure 2.1 below, we can see that the word-initial /t/ in the word *túroote* 'must be some' has only a slightly positive VOT. For this particular word, the VOT is 9.1ms, which is lower than the average of 12.2ms for word-initial /t/, but still within a single standard deviation of 5.6ms (Torres 2013a:29). The intervocalic /t/ has an even shorter VOT of 7.8ms. For the word *íkimaapet* 'downward' in Figure 2.2, where /t/ appears word-finally, there is no perceptible VOT between the release of the /t/ and the following segment.

Figure 2.1: #t and \_t\_ in *túroote* (MG)

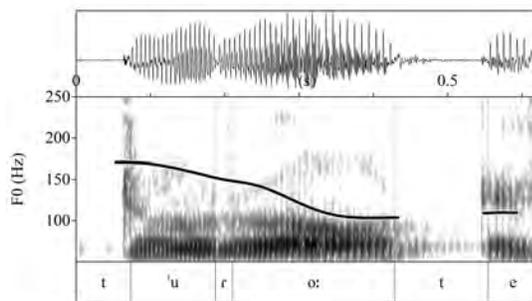
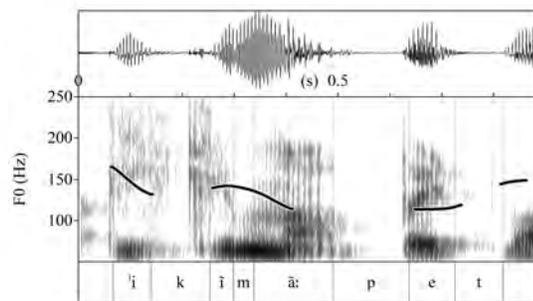


Figure 2.2: t# in *íkimaapet* (MG)



We see no significant bursts after /t/ in Figures 2.3 and 2.4 to signify aspiration, regardless of what position the /t/ takes. In Figure 2.3, where we have a cluster-final and word-final /t/ in *kúupatkush* 'just seven,' we see a VOT of 16.8ms for the cluster-final /t/. In Figure 2.4, the VOT has a value of 16.2ms. Both of these values are in line with other values for unaspirated /t/ in Cho & Ladefoged (1999:219), as well as the data presented in Torres (2013a).

Figure 2.3: /Ct/ cluster in *kúupatkush* (EB)

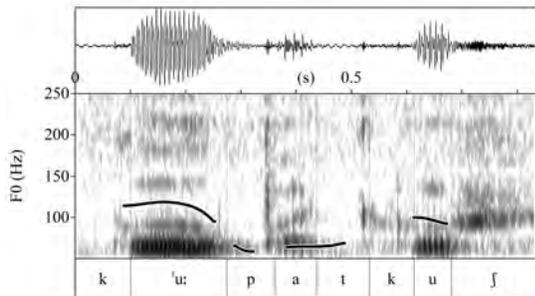
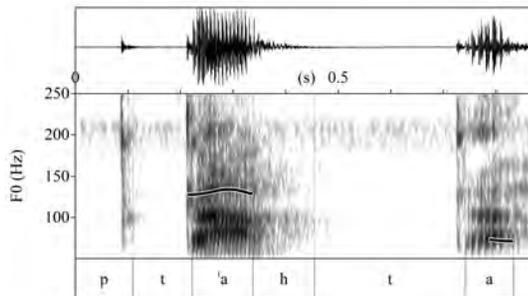


Figure 2.4: /tC/ cluster in *ptáahta* (EB)



In addition to demonstrating the lack of aspiration, contra Kennard’s (1936) description, the examples above act as a representative example of the behavior of voicing with respect to supralaryngeal stops in Mandan. Though the quality of certain recordings may make analysis difficult due to background noise or issues with older recording equipment that cause a band of energy to appear on the spectrogram where the voicing bar should be, we can compare this band with the lack of periodicity to any stops on the accompanying waveform to show that stops in Mandan are robustly voiceless, even in intervocalic environments.

When looking at materials written by Mandan speakers themselves, there are inconsistencies in the ways that they have recorded these stops. The acoustic analyses presented above show that the supralaryngeal plosives /p t k/ in Mandan are always voiceless and are on average without perceivable aspiration. This factor can cause L1 English-speakers to interpret these sounds as voiced. In pedagogical materials used at the school in Twin Buttes, ND or at the tribal college in New Town, ND, these sounds have often been written out as ⟨b d g⟩ by L1 instructors and heritage learners (e.g., Little Owl & Rhod 1992 and Benson 2000).

The singleton supralaryngeal stops can appear in any position within a syllable or word. This distribution is visible in Table 2.5.

Table 2.5: Supralaryngeal stops

	/p/	/t/	/k/
Initial:	[‘po] pó ‘fish’	[‘toʔ.he] tó’he ‘blue/green’	[‘ko:re] kóore ‘squash’
Intervocalic:	[‘ku:.pa] kúupa ‘seven’	[‘o.ti] óti ‘house’	[‘psā:ka] psáqka ‘frog’
Final:	[‘nūp] núp ‘two’	[‘āʔt] á’t ‘that’	[‘suk] súk ‘child’

There is no allophony for singleton supralaryngeal stops based on their position within a word or syllable. When pseudo-geminate clusters arise through compounding or other morphological operations, however, lenition of the

first segment occurs to prevent surface [C<sub>i</sub>C<sub>i</sub>] sequences. See §2.4.1 for further explanation of pseudo-geminate dissimilation.

### 2.1.2.2 Glottal stop

The glottal stop /ʔ/ is a distinctive phoneme in Mandan, and is often found as the first element of consonant clusters, most notably the allocutive markers: e.g., the sentence-final male-addressee indicative marker =oʔsh or its female-addressee counterpart =oʔre.

The only position where /ʔ/ does not appear is word-initially or root-initially. Phonemic /ʔ/ is only found as an element of a syllable coda. Glottal stops are possible intervocalically, but such segments are epenthetic and a repair mechanism to prevent hiatus. This kind of epenthesis is discussed further in §2.5.1 and §2.5.2.1.

#### (2.1) Coda glottal stops<sup>3</sup>

Underlying form	Surface form	Orthographic form	Gloss
/piʔ=E/	[piʔ.re]	<i>piʔre</i>	‘liver’
/wiʔh=E/	[miʔ.he]	<i>miʔhe</i>	‘shawl’
/se=oʔf/	[seʔf]	<i>seʔsh</i>	‘it is red’ (to a male)
/fi=oʔre/	[fiʔ.re]	<i>shiʔre</i>	‘it is good’ (to a female)

In previous descriptions of Mandan, marking of the glottal stop is sporadic, with [Hollow \(1970, 1973a, 1973b\)](#) and [Hollow, Jones & Ripley \(1976\)](#) being the most consistent. However, [Hollow](#) frequently does not mark word-final glottal stops, even going so far as to propose a rule to delete glottal stops in word-final environments. However, word-final /ʔ/ is typically present, as shown below for the DP *waráʔ oráakini* ‘and he built a fire.’ The /ʔ/ in *waráʔ* ‘fire’ is weakly present before the initial /o/ in *oráakini* ‘he built it,’ manifesting with drastically reduced closure and causing the preceding vowel to have creaky voice. This glottal stop is realized by a reduction in amplitude and periodicity, but phonation is still taking place, which accounts for why it is still voiced. The adduction of the glottal folds is insufficient in this lenited position to completely block expiration, which causes the /ʔ/ to have an almost approximant-like appearance on the waveform and spectrogram.

<sup>3</sup>Several of these underlying forms involve the stem vowel /=E/. This enclitic features the ablaut vowel /E/, which is explained later on in §2.4.3.

Figure 2.5: Word-final /ʔ/ in *wará'oráakini* (AE)

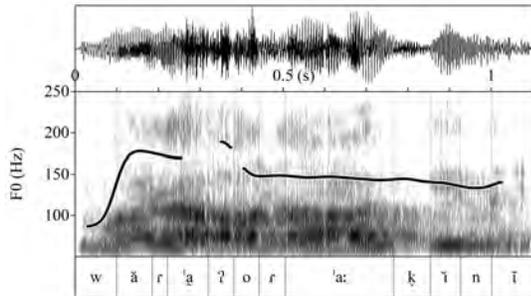
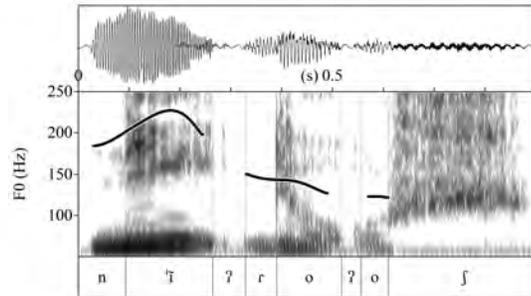


Figure 2.6: Glottal stops in *ní'ro'sh* (OS)

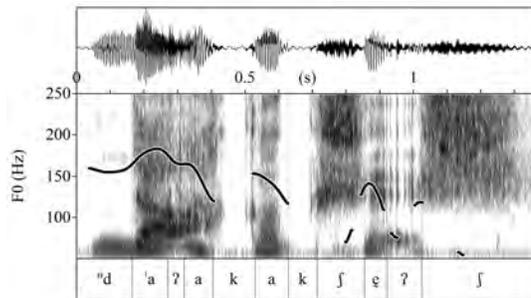


The example above in Figure 2.5 highlights an important and overlooked fact about /ʔ/ in Mandan: phonetically, glottal stops have a large variation in how they are realized. They can be realized as the expected complete closure at the glottis, as exemplified in Figure 2.6 above with the word *ní'ro'sh* ‘he climbed.’ In this word, the first glottal stop is a complete closure. The second glottal stop, however, is shorter in the duration of its closure, so some of the phonation from the preceding vowel carries through, creating an echo vowel.

Other possible realizations of /ʔ/ appear in the word *rá'kakshe'sh* ‘you met him,’ shown below in Figure 2.7. Like in Figure 2.6 above, there is an instance of underlying /Vʔ/ manifesting as [VʔV]. However, the glottal stop itself has a low degree of closure. The second /ʔ/ similarly is not a complete stop, but it has the added effect of causing the preceding /e/ to become creaky voiced do to anticipatory co-articulation of the adducting glottal folds.

Other possible realizations of /ʔ/ appear in the word *rá'kakshe'sh* ‘you met him,’ shown below in Figure 2.7. Like in Figure 2.6 above, there is an instance of underlying /Vʔ/ manifesting as [VʔV]. However, the glottal stop itself has a low degree of adduction. The second /ʔ/ similarly is not a complete closure, but it has the added effect of causing the preceding /e/ to become creaky voiced do to anticipatory co-articulation of the glottal gesture.

Figure 2.7: Glottal stops in rá'kakshe'sh (OS)



Pierrehumbert & Talkin (1992:94) state that the variations in the realization of /ʔ/ in other languages they have investigated are unsurprising, noting that a complete obstruction of airflow at the glottis for a glottal stop is quite unusual. Their analysis shows that it is typologically expected that languages feature this degree of variation in the production of /ʔ/, so Mandan is not typologically unusual with respect to its treatment of glottal stops.<sup>4</sup>

### 2.1.3 Affricates

Mandan has been described as having a single affricate, /tʃ/, in three previous works: Will & Spinden (1906), Kennard (1936), and Mixco (1997a). Hollow (1970:14) does not mention this sound in his description of Mandan phonology in the first chapter of his dissertation and does not address why he omits it, given that he frequently cites Kennard's (1936) interpretations of what functions particular pieces of morphology play. The /tʃ/ is sparsely-attested within Kennard's (1934) texts, and Will & Spinden (1906:190) even note that this sound is seldom heard. Despite this sound being described in other works, I argue here that there is no /tʃ/ in Mandan, though a heterosyllabic [t.ʃ] cluster is possible.

Will & Spinden (1906:190) list /tʃ/ in their sketch of Mandan, using the digraph ⟨tc⟩, as was convention for Americanist transcription at the time. The words they compiled consist of those they personally collected from Mandan consultants while doing archeological fieldwork on the reservation, as well as several words copied from Maximilian's (1839) wordlist. While they do state that this sound is poorly attested, upon further analysis, we can see that all instances of ⟨tc⟩ in their survey of Mandan vocabulary are typically the result of the failure to hear a word break or mistaking adjacent /k/ and /ʃ/ segments for /tʃ/.

<sup>4</sup>Of particular note are Mayan languages, which likewise can have /ʔC/ clusters that have a wide variation of realizations (Baird 2010, Bennett 2016).

(2.2) Examples of ⟨tc⟩ in Will & Spinden (1906)

Original	Underlying	Surface	Gloss
⟨cantcuke⟩	/füt-kfuk=E/	[füt.kfu.ke]	‘muskrat’
⟨Mantaktcuka⟩	/wā:tah-kfuk=E/	[mā:.tah.kfu.ke]	‘Little Missouri River’
⟨hirutcote⟩	/hrut-foʔ=E/	[h <sup>i</sup> rut.fo.te]	‘grey fox’
⟨antcihc⟩	/ãʔt fi=oʔf/	[ãʔt 'fiʔf]	‘it is good’ (to a male)

Kennard (1936) is the first researcher to accumulate large amounts of Mandan data, depositing around three hundred typed pages of Mandan narratives and English free translations at the American Philosophical Society. He is also the first to describe the grammar of Mandan at any length. In his grammar, he refers to the suffix /-tʃ/ as the intensitive marker. Like Will & Spinden (1906), he uses the digraph ⟨tc⟩ to mark the affricate /tʃ/, though it is also unclear when ⟨tc⟩ is an affricate and when it is a sequence of /t/ followed by /ʃ/.

For the most part, /tʃ/ is found almost only in what Kennard (1936:19) calls the intensitive marker ⟨-tc⟩: e.g., ⟨ma'maʔkoc⟩ ‘I’ll be there’. I suggest that this intensitive marker Kennard was hearing was not actually [tʃ], but some casual speech phenomenon where the sequence of the modal =kt and the allocutive marker =o’sh were sometimes not clearly articulated at the end of an utterance. In the recordings I have, it is very common for speakers to cease phonation leading up to sentence-final morphology like the male-addressee declarative marker =o’sh or its female-addressee counterpart =o’re. In fact, since there are no instances of /tʃ/ found in any of the recordings I have personally collected or in recordings collected by others, I discount the notion that there is an affricate /tʃ/ in Mandan and furthermore claim that all such instances of it in Kennard (1934, 1936) are all instances of misanalysed consonant clusters or typographic error.

To demonstrate this, I appeal to Kennard’s (1934) set of 28 narratives, which he elicited and transcribed in the early 1930s. Hollow (1973b) later re-elicited 24 of those same texts in the late 1960s and early 1970s. The fact that we have two sets of texts that are mostly identical provides us with an excellent means to evaluate which transcription is more faithful to the spoken Mandan each researcher was recording. In every instance where Kennard marks this sound, Hollow’s re-elicitation has the potential marker =kt plus the masculine indicative marker =o’sh instead. Examples of the relationship between Kennard’s /tʃ/ and Hollow’s potential mood marker =kt followed by the male-addressee declarative marker =o’sh appear below. The original translations from Kennard remain as-is, and the relevant segments are shown in bold.<sup>5</sup>

---

<sup>5</sup>I have altered the transcription from Hollow (1973b) to fit the Mandan orthography used throughout this work due to the fact that Hollow’s work is much more thoroughly transcribed than Kennard’s, as well as the fact that the point of this portion is to demonstrate that all of Kennard’s ⟨tc⟩ are really typographic or perception errors.

(2.3) Kennard's ⟨tc⟩ as /=kt=oʔf/

a. ⟨wahu:ki kahó:nihàrani mánanòtkisotc.⟩

‘If anyone comes, fall over and strike me.’ (Kennard 1934:257)

b. Wahuuki                      kahóoniharani                      manárootkikto’sh.  
 wa-huu=ki                      ka-hoo-r̥i-hrE=r̥i                      w̥a-ra-rootki=kt=o’sh  
 UNSP-come.here=COND    INS.FRCE-fall-2S-CAUS=SS    1S-2A-hit=POT=IND.M  
 ‘If someone comes, you fall and you should hit me.’ (Hollow 1973b:62)

The ⟨-kisotc⟩ in (2.3a) is probably a misperceived =kt=o’sh. Other instances in which we see /tʃ/ in Kennard (1934) are when there is a typographic error, as seen in the case below where a /t/ that should follow after the /ʃ/ is written as if they were an affricate. The passage below presents an excerpt from Kennard’s (1934) elicitation of the tale “Old Woman’s Grandson,” followed by Hollow’s (1973b) re-elicitation.<sup>6</sup> Kennard’s free translation is preserved, though I have altered Hollow’s. Relevant segments are shown in bold.

(2.4) a. ⟨iwahu’re rátirika ciherek úka tákaha kiwáratcũki úka orúsanakereròmakoc⟩

‘The bones were scattered. After they burned to ashes again, they left it.’ (Kennard 1934:275)

b. iwahuure                      rá’tirika                      shiherek,                      ú’ka                      hékaraani  
 i-wa-huu=E                      ra’-trik=E=∅                      shi-hrE=ak                      ú’ka                      hE=krE=r̥i  
 3POSS-UNSP-bone=SV    INS.FIRE-be.powdery=SV=CONT    good-CAUS=DS    be.farther    see=3PL=SS  
 kiwará’shũtki,                      ú’ka                      órusanahkereromako’sh  
 ki-wra’-shũt=ki                      ú’ka                      o-ru-sr̥ak=krE=oow̥ak=o’sh  
 MID-fire-tail=COND    be.farther    PV.LOC-INS.HAND=short=3PL-NARR=IND.M  
 ‘His bones having been nicely burnt to a fine powder, they then looked at it, and when it [his bones] became ashes, they then left it there.’ (Hollow 1973b:136)

In the data above, Kennard’s (1934) ⟨kiwáratcũki⟩ is really *kiwára’shũtki* ‘when [his bones] became ashes,’ where ‘ash’ is literally ‘fire’s tail.’ At the boundary between the two words in the compound *wára* ‘fire’ + *shũt* ‘tail,’ we see a heterosyllabic [ʔ.ʃ] cluster. This cluster is misperceived by Kennard as [tʃ]. All instances of ⟨tc⟩ in Kennard (1934, 1936) can thus be explained as a surface cluster of [tʃ] stemming from morphologically complex word, misperceptions of a voiceless stop followed by [ʃ], or misperceptions of the modal =kt followed by the male-addressee indicative marker =o’sh.

Mixco (1997a:26) gives only one example sentence with /tʃ/ in his grammar, and it is not clear if it is from his own field work or from Kennard (1934). Furthermore, there simply are no examples of it in any of the recordings analyzed for this dissertation, which includes speakers born between the 1860s and the 1960s. Given the fact that

<sup>6</sup>There is only a single word difference (i.e., *hékaraani* ‘they looked at it and’) between these two versions, but the material relevant to demonstrating that there is no /tʃ/ in Mandan still stands.

every instance of ⟨tc⟩ in Kennard (1934, 1936) equates with either =*kt* plus =*o'sh* in the Hollow (1973b) re-elicitations, a cluster consisting of /t/ and /ʃ/, or simply a misperception of a voiceless stop followed by /ʃ/, it is just not the case that /tʃ/ is present in Mandan, despite being reported in previous works. Mandan has no affricates.

## 2.1.4 Fricatives

While Proto-Siouan had two different fricative series, a plain fricative and a glottalized fricative, Mandan has only one (Rankin, Carter & Jones 1998). Previous phonetic work on Mandan consonants has focused solely on the supralaryngeal stops (i.e., Torres 2013a), and as such, the fricatives merit additional attention, which is given here.

### 2.1.4.1 Supralaryngeal fricatives

All published sources that give a description of the sound system of Mandan agree on the inventory of supralaryngeal fricatives: /s ʃ x/. The singleton supralaryngeal fricatives can appear in the onset or coda within a syllable or word. This distribution is visible in Table 2.6.

Table 2.6: Supralaryngeal fricatives

	/s/		/ʃ/		/x/
Initial:	[si] <i>sí</i> ‘feather’		[ʃi] <i>shí</i> ‘foot’		[xih] <i>xíh</i> ‘old’
Intervocalic:	[o.su] <i>ósu</i> ‘hole’		[o.ʃ <sup>o</sup> rop] <i>ósherop</i> ‘swallow’		[o:.xa] <i>óoxa</i> ‘fox’
Final:	[pus] <i>pús</i> ‘cat’		[tkuʃ] <i>tkúsh</i> ‘real, true’		[kox] <i>kóx</i> ‘buzz’

Root- and affix-internally, supralaryngeal fricatives can be elements in consonant clusters, either as the first or second segment in the cluster. To demonstrate this distribution, instances of /x/ will be given for all five possible positions: word-initial, word-final, intervocalic, cluster-initial, and cluster-final. As was the case in §2.1.2.1, the purpose of showing these segments likewise do not display any voicing assimilation, regardless of their environment.

In the example in Figure 2.8, we see *xíko'sh* ‘it is bad (male addressee)’. This figure shows that /x/, like all fricatives, is able to appear word-initially. In addition, this figure visibly shows the fact that the /x/ is voiceless. We see a similar behavior for word-final /w/ in the word *miníx* ‘play’ in Figure 2.9 below.

Figure 2.8: #x in *xiko'sh* (OS)

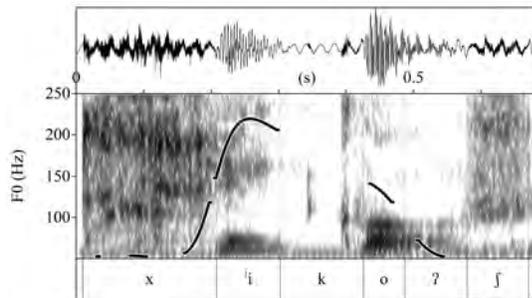
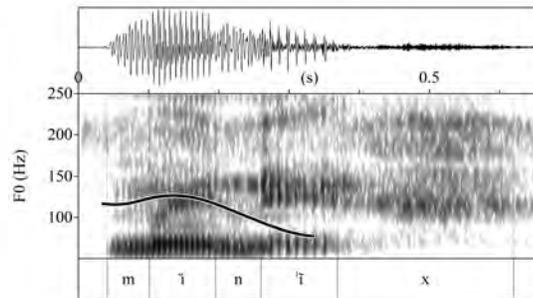
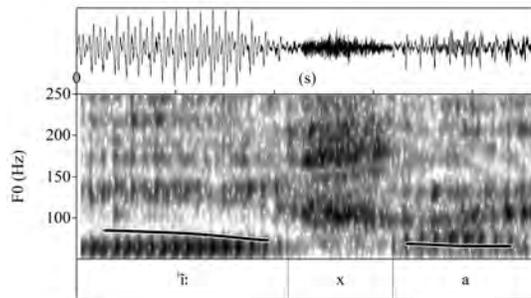


Figure 2.9: x# in *minix* (EB)



Even in non-peripheral positions, /x/ maintains its voicelessness. Intervocally, the /x/ in *ixxa* ‘alone’ does not undergo voicing assimilation, as shown in Figure 2.10.

Figure 2.10: \_x\_ in *ixxa* (EB)



The /x/ is a common element in consonant clusters, as we can see in the word *xtáqte* ‘thunderbird’ in Figure 2.12 and the word *ixkqhta* ‘laugh!’ in Figure 2.11 both exemplify that /x/ retains its characteristic lack of voicing, a behavior shared with other supralaryngeal fricatives.

Figure 2.11: /xC/ in *xtáqte* (AE)

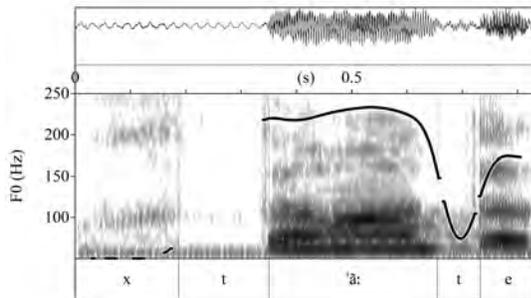
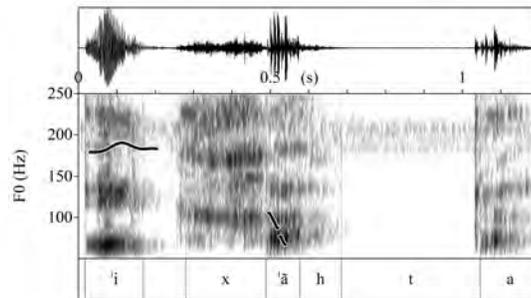


Figure 2.12: /Cx/ in *íkxqhta* (EB)



### 2.1.4.2 Glottal fricative

The glottal fricative /h/ is a common coda element in Mandan, though it can appear in the onset of words as well. The /h/ is able to appear in consonant clusters, but never within a lexical root. Any clusters involving /h/ are always due to affixation or compounding. In this respect, the distribution of /h/ differs from that of other fricatives.

#### (2.5) Distribution of /h/

Underlying form	Surface form	Orthographic form	Gloss
/xãh/	[ˈxãh]	<i>xq̄h</i>	‘grass’
/hũ:/	[hũ:]	<i>hı̄u</i>	‘yes’
/rE:h=ta/	[ˈnda:.hta]	<i>ráahta</i>	‘go there!’ (to a male)
/istũh/	[i.ˈstũh]	<i>istı̄h</i>	‘night’

Hollow (1970:43) states that /h/ is deleted word-finally and optionally before a consonant. However, in the recorded data being analyzed, instrumentation shows this claim to be false. We have already seen the /h/ in *ráahta* ‘go there!’ earlier in Figure 2.4, and we can see that word-final /h/ is likewise preserved in *míih* ‘woman’ in Figure 2.13. One major issue with Hollow’s interpretation of Mandan phonology is that he did not discern short versus long vowels. In addition to this issue, he worked with elderly speakers whose normal cadence tended to be more creaky or breathy, which can obfuscate these coda glottal segments. However, using instrumentation, we can see evidence that these elements are not deleted word-finally, but are always present.

Figure 2.13: Realization of h# in *míih* (OS)

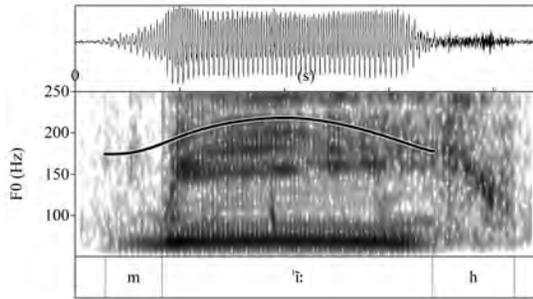
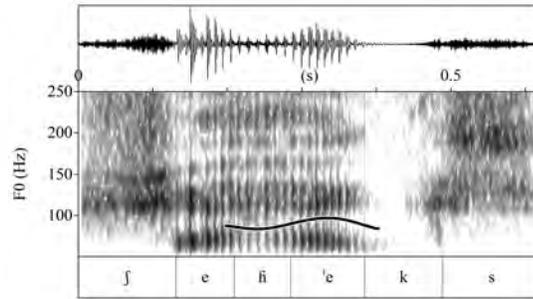


Figure 2.14: Intervocalic /h/ voicing in *shehéks* (EB)



The /h/ is unique in Mandan as being the only segment that becomes voiced intervocalically. An example of this appears above in Figure 2.14 for the word *shehéks* ‘the coyote.’ However, this voicing assimilation only happens when /h/ precedes a syllable bearing primary stress. This behavior even takes place across word boundaries, as seen in Figures 2.15 and 2.16, where we have two examples with intervocalic /h/: *míih éxixte’na* ‘a pregnant woman’ and *máatah íwokahqq* ‘along the river edge.’ In both examples, we have a word-final /h/ that is voiced. For both of these examples, this /h/ precedes an onsetless syllable bearing primary stress. In Figure 2.16, we see an intervocalic /h/ in *íwokahqq* ‘along the edge.’ Here, the /h/ does not precede an onsetless syllable with primary stress and as such, it does not undergo voicing.

Figure 2.15: /h/ voicing in *míih éxixte’na* (OS)

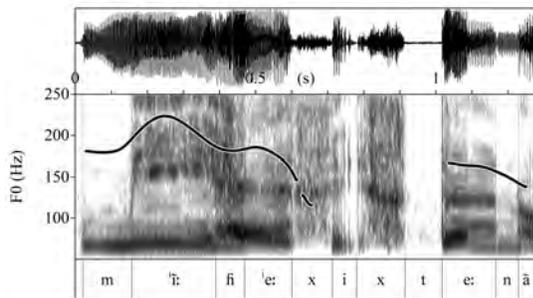
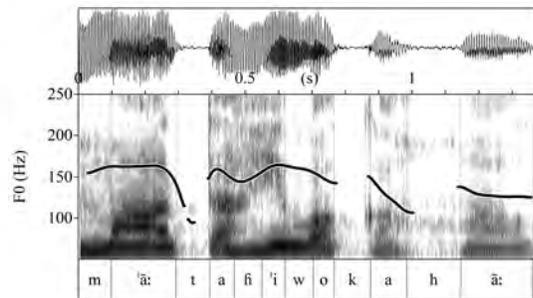


Figure 2.16: /h/ voicing in *máatah íwokahqq* (OS)



### 2.1.5 Sonorants

Of all the consonants in Mandan, the sonorants /r w/ are among the most common. Both Will & Spinden (1906:190) and Kennard (1936:2) list /w m r n/. Hollow (1970:18) later argues that all surface nasal consonants are the result of

nasal harmony with a following nasal vowel. Any operation that might syncopate such an underlying nasal vowel results in /r w/ on the surface instead of /n w/. Subsequent researchers such as [Coberly \(1979\)](#), [Carter \(1991a,b\)](#), and [Mixco \(1997a,b\)](#) all adopt this analysis. I likewise adopt this analysis and assume that all sonorants in Mandan are ultimately oral and are realized as nasal only due to the regressive nasal harmony that affects all voiced segments. Nasal harmony is discussed in greater detail in §2.5.3.

With this analysis in mind, nasal consonants are treated as allophones of their oral sonorant equivalents. We can see examples of oral sonorants becoming nasal sonorants in the data below, where the first person active prefix /wa-/ and second person active prefix /ra-/ become nasalized due to the following nasal segments.

(2.6) Examples of complementary distribution of oral and nasal sonorants

- a. *waráko'sh*  
**wa**-rak=o'sh  
**1A**-bury=IND.M  
 'I buried it'
- b. *íraheko'sh*  
 i-**ra**-hek=o'sh  
 PV.INS-**2A**-know=IND.M  
 'you knew it' ([Hollow 1970:71](#))
- c. *maná'ko'sh*  
**wa**-raḡkE=o'sh  
**1A**-sit.AUX=IND.M  
 'I always manage [to do it]' ([Hollow 1973a:54](#))
- d. *ónana'ke'sh*  
 o-**ra**-raḡkE=o'sh  
 PV.IRR-**2A**-sit.AUX=IND.M  
 'you will be [one]' ([Hollow 1973a:187](#))

In (2.6) above, we see [mā-] and [nā-] where we should otherwise expect [wa-] and [ra-]. This change is not allomorphic in nature, but is purely phonological, owing to the fact that these prefixes precede a syllable that contains a nasal vowel. The nasality spreads leftward, causing /w/ to become [m] and /r/ to become [n]. Thus, all instances of nasal consonants are due to the influence of following vowels bearing underlying nasality. These sounds are predictable and are best described as being in complementary distribution to one another.

In addition to its nasal allophone, /r/ has a word-initial allophone where it fortifies to a prenasalized voiced stop, [ʳᵈ]. [Hollow \(1970:52\)](#) describes this allophone, but does not transcribe any differences between [r] and [ʳᵈ] in his dictionary or the narratives he recorded. Only [Kennard \(1936:3\)](#) records [r] versus [ʳᵈ] in his grammar and his transcribed narratives.

(2.7) [r] versus [ʳd] in Kennard (1936)

- a. ⟨'ʉc do'pxani ma'hiseks 'ʉc dapi'tka<sup>'ehe</sup>⟩

*ʉ'sh, róopxaani máah íseks, ʉ'sh, rapjítka'ehe*  
*ʉ'sh roopxE=rj wəəh i-sek=s ʉ'sh ra-pjít=ka'ehe*  
 be.thus enter=SS arrow PV.INS-make=DEF be.thus INS.FOOT-be.scattered=QUOT

‘thus, he entered and made the arrows, so he scattered them with his foot, it is said’ (Kennard 1936:38)

- b. ⟨oma'papi'rək si:'rena ε'na na'tka dukci'cka<sup>'ehe</sup>⟩

*óo máapapirak síreena, éena nátká rukshishka'ehe*  
*oo wəəpapirak sii=ee=rə ee=rə rət=ka ru-kshish=ka'ehe*  
 DEM.MID weasel be.yellow=DEM.DIST=TOP DEM.DIST=TOP be.in.middle=HAB INS.HAND-worry=QUOT

‘That yellow weasel, that one worried him, it is said’ (Kennard 1936:38)

Each ⟨d⟩ above appears only word-initially, while ⟨r⟩ occurs word-internally. This behavior is consistent with the phonological rule in Hollow (1970:52). This rule is not completely consistent, however, as in rapid speech, this word-initial [ʳd] can be realized as [r].<sup>7</sup> For speakers born before the twentieth century, there is also an analogous [ᵐb] for word-initial /w/. Maximilian (1839) and Will & Spinden (1906) both transcribe this sound as ⟨b⟩.

(2.8) Example of word-initial [ᵐb] in older Mandan in the word ‘charcoal’<sup>8</sup>

- a. ⟨báchchä⟩ (Maximilian 1839:236)

[ᵐbe.xe]

- b. wéxe (Hollow 1970:285)

[we.xe]

In Maximilian’s (1839) description of Mandan, the oldest recorded source of Mandan language, there this allophony is not consistent. Most words that begin with /w/ are transcribed with ⟨w⟩ instead of ⟨b⟩. One possibility is that this variation was optional, or perhaps more closely associated with one subgroup or dialect of the Mandan. Maximilian does not elaborate on how he collected his data and specifically from whom, so the context for which he writes forms beginning with ⟨b⟩ versus those with ⟨w⟩ are left to conjecture. His word lists and paradigms only contain notes of what villages the speakers came from when there was a lexical or grammatical difference (i.e., Nuú’etaa

<sup>7</sup>While working with Mr. Edwin Benson to elicit recordings for the Level 1 Mandan textbook, I would ask him to say an item three times in a row. Typically, the first time Mr. Benson would say a word beginning with /r/, he would pronounce it with a [ʳd], but subsequent iterations often vacillated between word-initial [r] and [ʳd].

<sup>8</sup>A note on Maximilian’s orthography: Being a native German speaker, he transcribes what he hears using German orthographic principles. For example, he writes ⟨ch⟩ for [x], and switches between ⟨e⟩ and ⟨ä⟩ to express [e]. The doubling of the ⟨ch⟩ here indicates that he perceives the initial vowel to be short, which conforms to the same length this root has in modern Mandan.

versus Ruptaa). He did not comment on whether there was any difference in the pronunciations of words by one group versus another.

In the corpus, the distribution of [ᵐb] parallels utterance-initial /w/, or at least /w/ when said after a long pause. This variant of /w/ is not fully productive nor fully predictable in speakers born during the twentieth century and as such, the present work does not treat [ᵐb] as a full allophone of /w/ in contemporary Mandan, with its status marginal at best. This variant does appear sporadically in spontaneous speech, so it may be treated as a possible variant of /w/ in word- or utterance-initial environments, though [ᵐb] seems to be dispreferred by the speakers for whom we have recordings.

The phonemes /w/ and /r/ can also appear as [m] and [n] without an accompanying nasal vowel if they are utterance-initial. This is discussed further in §2.4.2.

When compared to other consonants in Mandan, the distribution of sonorants within the syllable is much more restricted. A sonorant can only appear as the sole segment in the syllable onset. This behavior is described in greater detail in §2.2.3. For the purpose of taking historical data into account, the [ᵐb] variant of /w/ is included, though its status as a true and conditioned allophone is marginal at best in modern Mandan.

Table 2.7: Distribution of /w/ and /r/

	Initial			Intervocalic		
[w]	[wi:pe]	<i>wiipe</i>	‘cornball’	[ä:we]	<i>áqwe</i>	‘all’
‡[ᵐb]	[ᵐbe.xe]	<i>wéxe</i>	‘charcoal’	—	—	—
[m]	[m̄ni]	<i>m̄ini</i>	‘water’	[i.m̄.jut]	<i>ímashut</i>	‘clothing’
[r]	—	—	—	[w <sup>a</sup> raʔ]	<i>wáraʔ</i>	‘fire’
[ <sup>n</sup> d]	[ <sup>n</sup> de:sik]	<i>réesik</i>	‘tongue’	—	—	—
[n]	[nät.ka]	<i>nátka</i>	‘heart, middle’	[i.nāk]	<i>inák</i>	‘again’

## 2.2 Vowels

The Mandan vowel system is quite similar to that of other Siouan languages in that there are five vowels that contrast by length: two high vowels, two mid vowels, and a low vowel. In addition to these oral vowels, there are three nasal vowels, all of which also contrast by length. The vowel inventory of Mandan is identical to that of Proto-Siouan in this respect (Rankin, Carter & Jones 1998).

## 2.2.1 Monophthongs

The distribution of oral and nasal vowels in Mandan appears in Figures 2.17 and 2.18 below. All the vowels shown below have long counterparts. Minimal and near-minimal pairs and quadruplets for vowel length and nasality likewise appear below in Table 2.8. The cells for nasal mid vowels have been left blank, since Mandan does have underlying nasal mid vowels nor does it permit nasal spreading onto mid vowels. This restriction against nasal mid vowels is shared by many other Siouan languages and is thought to be a holdover from Proto-Siouan, though Rood (1983:27) posits that Pre-Proto-Siouan could have had nasal mid vowels, which later merged with an oral vowel later in the development of the language.

Figure 2.17: Mandan oral vowels

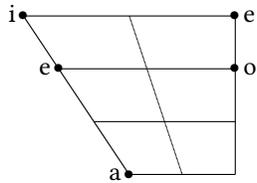
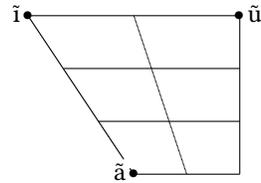


Figure 2.18: Mandan nasal vowels



As Figures 2.17 and 2.18 above show, Mandan only has cardinal vowels, even for nasal vowels. The distribution of these vowels appears below.

Table 2.8: Contrastive vowel qualities

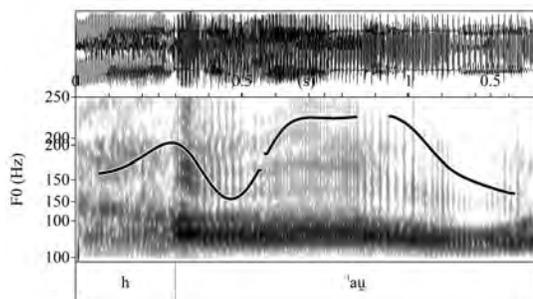
	Oral Short	Oral Long	Nasal Short	Nasal Long
a	<i>raké'he</i> 'be angry with someone' [ <sup>n</sup> da.keʔ.he]	<i>ráakana</i> 'hail' [ <sup>n</sup> da:k <sup>ã</sup> nã]	<i>naké</i> 'breechcloth' [nã.ke]	<i>naake</i> 'be alive' [nã:ke]
e	<i>éreh</i> 'want' [e.reh]	<i>réeh</i> 'go there' [ <sup>n</sup> de:h]		
i	<i>pí'</i> 'liver' [piʔ]	<i>píi</i> 'eat up' [pi:]	<i>pĩ'xe</i> 'be scattered' [pĩʔ.xe]	<i>píit</i> 'be scattered, spilled' [pi:t]
o	<i>kók</i> 'pronghorn antelope' [kok]	<i>kóo</i> 'squash' [ko:]		
u	<i>húpinih</i> 'soup' [hu.p <sup>ɨ</sup> nih]	<i>húu</i> 'bone, stem, stalk' [hu:]	<i>hũ</i> 'many' [hũ]	<i>húy</i> 'yes' [hũ:]

As Table 2.8 shows, these monophthongs have no restriction preventing them from appearing in any kind of syllable or position. The one restriction placed upon the distribution of vowels in Mandan is that there can be no VV sequences: i.e., hiatus is forbidden in Mandan.

## 2.2.2 Diphthongs

Mandan has no native lexical items containing a diphthong, and in cases where two vowels would otherwise come into contact due to compounding or affixation, there is some epenthetic process to prevent hiatus. The sole exception to this restriction on diphthongs is the word *háu* [‘hau̯] ‘hello, yes.’

Figure 2.19: Diphthong /au̯/ in *háu* (OS)



This word is not native to Mandan, and it is found in many other languages of the Plains.<sup>9</sup> No diphthong is otherwise permitted in Mandan, so the acceptability of this diphthong is due to either its status as a loan word borrowed wholesale or its status as an interjection. With respect to the latter, it is typologically common for interjections to have anomalous phonology or morphology (Ameka 1992:105), and it is for this reason that *háu* can have two differing vowels in a syllable nucleus while other lexical items cannot.

## 2.2.3 Dorsey’s Law exrescent vowels

There have been certain vowels represented in phonetic notation throughout this work in superscript. These vowels represent exrescent vowels due to Dorsey’s Law. Dorsey’s Law inserts a copy vowel in between two consonants.

<sup>9</sup>The use of this item is not restricted to Plains peoples, but has been attested in the Great Lakes region as early as 1636, as the French Jesuit missionary and martyr Saint Jean de Brébeuf notes that the Wyandot (also known as the Huron or the Wendat, an Iroquoian-speaking people who historically occupied the land on the northern shores of Lake Ontario in what is now Canada) use this interjection to express approval or affirmation, as well as to punctuate that a speaker is through speaking or to affirm that one has heard the speaker finish speaking (Axtell 1981:146). The former is identical to how it is used in Mandan, though it is not clear that this term originated in Wyandot either, as this language likewise has no diphthongs (Julian 2010:325).

In Mandan, this behavior is seen whenever a cluster has a sonorant as its second element.

For (2.9a) through (2.9e), we have simplex words with an excrescent vowel that shares certain features with a following vowel. For example, the data in (2.9a), /wrã/ ‘tree, wood’, undergoes nasal harmony and then an intrusive vowel interrupts the cluster that contains a sonorant, yielding [m<sup>ã</sup>nã]. This vowel is not syllabic: i.e. not \*[mã.nã]. For further elaboration on how these vowels in Mandan are not syllabic, see §2.5.4.

The data below show that this excrescent vowel is triggered whenever the conditions are created where a consonant cluster has a sonorant as its second element. This intrusive vowel appears both within a lexical root as well as when enclitics are added, as seen in (2.9h), where a Dorsey’s Law vowel occurs both within the lexical root /srãh/ ‘leave’ and the cluster created with the same-subject switch reference marker /=rĩ/ encliticizes onto the stem. Dorsey’s Law vowels are produced within a root and across affix and enclitic boundaries. However, the data in (2.9i) through (2.9k) show that no intrusive vowels appear across a word boundary in the case of compounds.

(2.9) Dorsey’s Law vowels in Mandan

- a. /wrã/ → [m<sup>ã</sup>nã] ‘tree, wood’
- b. /wraʔ/ → [w<sup>a</sup>raʔ] ‘fire’
- c. /ʃruk/ → [ʃ<sup>i</sup>ruk] ‘be wise, well-behaved’
- d. /ʃre:k/ → [ʃ<sup>e</sup>re:k] ‘warhoop’
- e. /paxru:k/ → [pa.x<sup>i</sup>ru:k] ‘corn silk’
- f. /ra-rE:h=rīt=oʃ/ → [n<sup>a</sup>da.ra.h<sup>i</sup>nī.toʃ] ‘you all went there’
- g. /kfãt=rã/ → [kfã.t<sup>ã</sup>nã] ‘watch out!’
- h. /ro-ra-ru-srãh=rĩ/ → [n<sup>a</sup>do.ra.ru.s<sup>ã</sup>nã.h<sup>i</sup>nī] ‘you leave us and...’
- i. /suk#ruwãʔk/ → [suk.nū.mãʔk] ‘young man, boy’
- j. /wĩ-hãp#wãʔk/ → [mĩ.hãp.mãʔk] ‘today’
- k. /i:h#wrĩ/ → [i:h.m<sup>i</sup>nī] ‘saliva’

Hall (2006:388) takes a look at the typology of excrescent vowels and argues that excrescent vowels behave very differently from epenthetic vowels in that excrescent vowels are extrametrical and are restricted to the gestural layer without adding an additional segment to the surface representation. The phasing of tautosyllabic consonants is altered slightly to increase perceptibility of the constituent consonants in a cluster (Silverman 1995, Wright 1996, Chitoran, Goldstein & Byrd 2002). This behavior differs from that of epenthesis, which is phonological in nature and serves to repair an illicit sequence of segments.

In languages featuring Dorsey's Law vowels, speakers are sometimes aware of the intrusive vowels. Other Siouan languages that have Dorsey's Law vowels reflect these sounds differently in their orthographies.

(2.10) Orthographic treatment of Dorsey's Law vowels in other Siouan Languages

- a. *wagl * [Lakota]  
[wa.'g le] 'I am going back' (Ullrich 2011:122)
- b. *hakewe* [Hoocak]  
[ha.'k we] 'six' (Miner 1979:26)

Lakota speakers routinely produce Dorsey's Law vowels when speaking, but speakers are not typically aware of this fact (Mirzayan p.c.). The most widely-used orthography for Lakota and Dakota used in Ullrich's (2011) dictionary follows on the tendency of earlier orthographies such as that used in Boas & Deloria's (1941) grammar of the Dakota language to not transcribe the intrusive vowel.<sup>10</sup> In Hoocak, speakers generally are aware of these copy vowels, and this fact is reflected in the orthography used by the Wisconsin Hoocak (Lundquist p.c.).

Mandan speakers appear to uniformly be aware of these vowels, as we can look at orthographies used by native speakers and see that we do not have surface clusters involving sonorants, but a sequence of graphemes with vowel written between a consonant and a sonorant. We can see this in the data below, which are taken from textbooks created by L1 speakers for use in classrooms around the Fort Berthold Reservation.

(2.11) Vowel excrescence in *min s* /w r s/ [m n s] 'horse'

- a. ⟨ma-nees⟩ (Benson 2000:28)
- b. ⟨men ss⟩ (Little Owl & Rhod 1992:4)

(2.12) Vowel excrescence in *h pinih(e)* /hupr h=E/ [hu.p n h~'hu.p n .he] 'soup'

- a. ⟨who pe ne hea⟩ [hu.p n .he] (Benson 1999:2)
- b. ⟨h pi'ni⟩ (Little Owl & Rhod 1992:23)

The Dorsey's Law vowels in Mandan are more centralized than their phonemic counterparts, so the production of these vowels varies between utterances of particular tokens. Some speakers more strongly centralize their Dorsey's Law vowels, which has led some researchers and learners to transcribe these sounds as [a~ ]: e.g., ⟨man s⟩ for 'horse' (Park p.c.).

---

<sup>10</sup>Boas & Deloria (1941:5) do note that certain clusters contain a weak copy of the following vowel, and this intrusive vowel is typically represented by a period between the consonants in their orthography: e.g., ⟨g.li⟩ [g'li] 'to have come back here.'

This variability in the realization of Dorsey’s Law vowels has led to inconsistencies in past transcriptions of Mandan. Hall (2006:391) notes that exrescent vowels typologically have a highly variable duration and the quality of these vowels is influenced by a nearby vowel or consonant. These factors differ from the typological behavior of epenthetic vowels, whose phonetic properties are more predictable. Furthermore, these exrescent vowels are not visible to phonological processes like syllabification and stress assignment. The blindness of phonological processes to these vowels demonstrates their extraphonologicality, which is addressed further in §2.5.4.

## 2.3 Orthography

The orthography used throughout this dissertation follows the orthography used in Kasak (2014a), which is adapted from the orthography used by the Nu’eta Language Initiative at that time. This orthography differs from those used in Hollow’s (1970) dictionary and Hollow, Jones & Ripley’s (1976) textbook, as well as from Mixco (1997a,b). Other orthographies exist for Mandan, such as home orthographies used by speakers to record their own language or share it with others. Previous Mandan teachers in Twin Buttes or New Town have also employed their own orthographies. Efforts to promote a consensus Mandan orthography on the Fort Berthold Indian Reservation are ongoing.

The graphic representation of Mandan utilized here is ultimately a mix of Americanist and English-oriented notation. Unlike Hollow (1970) or Mixco (1997a), the orthography herein is not phonemic, nor is there a one-to-one relationship between phones and graphemes. Previous orthographies were tailor made to reveal as much about the underlying morphology and phonology as possible, such as Hollow’s (1970) dictionary recording entries with assumed underlying forms, which are not immediately useful to learners if they do not read the chapter of his dictionary on how to convert the underlying representation into a surface one. The orthography used herein represents the surface form of each word, given that being able to immediately say a word is of the highest priority to heritage learners.

How to read the present orthography is summarized below:

### (2.13) Overview of Mandan orthography

- Vowel length is marked with digraphs: e.g., [a] is ⟨a⟩, while [a:] is ⟨aa⟩.
- The postalveolar fricative [ʃ] is written as the digraph ⟨sh⟩.
- The nasalized allophones of /w/ and /r/ are written as ⟨m⟩ and ⟨n⟩, respectively, and the following vowel is assumed to be nasal unless otherwise stated: e.g., *maná* is [m<sup>ã</sup>nã] and not \*[m<sup>a</sup>na].
- Word-initial [n<sup>d</sup>] for /r/ is written as ⟨r⟩: e.g., *ráhta* for [n<sup>d</sup>da.hta] ‘go.’

- Nasal vowels not preceded by ⟨m⟩ or ⟨n⟩ are marked by an ogonek: e.g., [ã:we] ‘all’ is ⟨ąąwe⟩, but [mã:nã] ‘winter, year’ is ⟨máana⟩.
- The glottal stop [ʔ] is represented with an apostrophe: i.e., ⟨ʔ⟩.
- Remaining consonants are equivalent to the IPA: i.e., [x] is ⟨x⟩, [s] is ⟨s⟩, etc.
- An apostrophe appears between ⟨s⟩ and ⟨h⟩ to distinguish between ⟨sh⟩ as [ʃ] e.g., *tashká'sha?* [taʃ.kaʔ.ʃa] ‘how are you?’ and ⟨s'h⟩ as the cluster [s.h] (e.g., *kapús'here'sh* [ka.pus.h'e.reʔʃ] ‘he made it streaked.’)
- An acute accent marks primary stress; for stressed long vowels, the the acute accent is placed on the first vowel in the digraph: e.g., *áakitaa* [a.ki.ta:] ‘above.’
- The underlying ablaut vowel is written as /E/ in underlying representations or in dictionary entries but is written with its surface form in the orthography: e.g., /rE:h=ta/ ‘go!’ is *ráahta*, but /rE:h=oʔʃ/ ‘he goes there’ is *réeho'sh*. The default value of /E/ is [e], but it can become [aa] if triggered by any of the conditions discussed in §2.4.3.

Throughout this work, two different orthographies may be used in examples relating to underlying form: the Mandan orthography above and the IPA. IPA will only be used when in the context of explanations of phonological and phonetic matters. In glossed examples, underlying representation of lexical items will be given in Mandan orthography.

## 2.4 Boundary-independent morpho-phonology

The vast majority of the study of Mandan has been spent translating texts and breaking down its morphology. Very little attention has been paid to the interaction between its morphology and its phonology. In looking at the morpho-phonological processes present in Mandan, we can divide all attested phenomena in this language into two categories: phenomena that are boundary-independent (i.e., phenomena that occur regardless of whether they occur in the environment of a morphological word boundary) versus those that are boundary-dependent (i.e., phenomena that only happen at a morphological word boundary). The data present here are descriptive in nature and is not intended to introduce a theoretical claim. As such, this section utilizes a rules-based account of these phenomena for the sake of parsimony.

The aim of this section is to describe the processes below and demonstrate that they are unaffected by morphological word boundaries. This lack of boundary-sensitivity is important to the case built in §2.5 and the overall case against a phonological motivation for affix ordering in Mandan.

### 2.4.1 Pseudo-geminate dissimilation

Mandan features numerous examples of consonant clusters, but  $[C_iC_i]$  clusters are forbidden. Hollow (1970:37) notes that instances of /tt/ clusters dissimilate to [st], but otherwise states that all other instances of  $/C_iC_i/$  involve the deletion of the first consonant in the cluster to simplify potential

Both the processes of adding postverbal morphology to a word and compounding often creates environments where such clusters are underlyingly present. In examples (2.14a) through (2.14e) below, we see  $/C_iC_i/$  environments involving stops. While (2.14f) through (2.14m) involve fricatives, each datum is accompanied by an example that does not feature a  $/C_iC_i/$  environment to demonstrate the normal distribution of the obstruent and juxtapose how pseudo-geminate dissimilation occurs for stops versus fricatives: i.e., stops lenite the first segment while fricatives delete the first segment.

(2.14)  $/C_iC_i/$  resolution

- a. *náthaa*  
rət=haa  
middle=LOC  
'to be between two' (Hollow 1970:170)
- b. *manástaa*  
wə-rət=taa  
1s-middle=LOC  
'I am in the middle' (Hollow 1970:37)
- c. *súknuma'k*  
suk#ruwə'k  
child#man  
'boy' Hollow 1970:220
- d. *súhkeres*  
suk=krE=s  
child=3PL=DEF  
'the children' (Hollow 1973a:178)
- e. *Warápepasqhs*  
wrap(E)-pasəh=s  
beaver#creek=DEF  
'Beaver Creek' (Hollow 1973a:67)
- f. *máataawerexs*  
wəqataa#wrex=s  
clay#kettle=DEF  
'the clay kettle' Hollow 1973b:266

- g. *minís*  
 wɾɪs=s  
 horse=DEF  
 ‘the horse’ (Hollow 1973b:251)
- h. *ísekanashoomaks*  
 i-sek=rəsh=ooʷək=s  
 PV.INS-make=TYP=NARR=DEF  
 ‘that which he kind of made’ (Hollow 1973a:10)
- i. *éheenashka’nik*  
 e-hee=rəsh=shka’rɪk  
 PV-say=TYP=DISJ  
 ‘even though he said it’ (Hollow 1973a:41)
- j. *páxshowok*  
 pax#showok  
 dish#be.deep  
 ‘bowl’ (Hollow 1970:138)
- k. *páxte*  
 pax#xte  
 bowl#big  
 ‘dishpan’ (Hollow 1973a:52)
- l. *rého’sh*  
 rEEh=o’sh  
 go.there=IND.M  
 ‘he went there’ (Hollow 1970:175)
- m. *réherek*  
 rEEh#hrE=ak  
 go.there#CAUS=DS  
 ‘having put it on [himself]’ (Hollow 1973a:16)

Three patterns emerge in the data above. Firstly, there are no /C<sub>i</sub>C<sub>i</sub>/ clusters involving bilabial stops. Torres (2013a:10) notes that /p/ does not occur in word-final position in the narrative she examines, and I can corroborate that /p/ is indeed rare in word-final positions from my own personal experience and fieldwork. Mandan word with stem-final /p/ seem to vacillate between ending in [p] or with [pe] in the corpus, and this variability is not conditioned by any environment.

Modern Mandan stems ending with /p/ often feature a final [e] when uttered in isolation, but when placed within the context of a sentence, both variants appear with no reported change in meaning. Below are some examples from the corpus that vary between forms ending with [p] and [pe].

(2.15) Alternation between stem-final [p] and [pe] in nouns

- a. *Húpwara're*  
 hup(E)#wra'=E  
 shoe  
 'Fire Shoe' (Hollow 1973a:155)
- b. *Húpewara're*  
 hup(E)#wra'=E  
 shoe  
 'Fire Shoe' (Hollow 1973a:168)

(2.16) Alternation between stem-final [p] and [pe] in verbs

- a. *máana'pe'sh*  
 waa-raꞤp(E)=o'sh  
 UNSP-dance=IND.M  
 'he dances' (Hollow 1970:167)
- b. *máana'po'sh*  
 waa-raꞤp(E)=o'sh  
 UNSP-dance=IND.M  
 'he dances' (Hollow 1970:167)

Since speakers seem to produce both forms without a change in meaning, one explanation is that there is a trend in Mandan that disfavors bilabial stop codas. Historically, the stem vowel determiner /=E/ has likely been reanalyzed as part of the root for such words. With the passing of the last L1 speaker in 2016, there is no way to definitively rule out the possibility of such a cluster being possible, but in the entire corpus, no /pp/ cluster is attested. I posit that this lack of /pp/ clusters arises from language change rather than some synchronic phonological conspiracy to prevent such clusters, as all lexical stems in the corpus that end in /p/ have a variant that also ends in [pe]. Given time, it is possible that Mandan would have shifted to make word-final /p/ illicit, since instances of variants ending in [pe] are more common than those with just [p] in the corpus.<sup>11</sup>

The second pattern to emerge from (2.14) is that the other stops fricativize the initial element in the /C<sub>i</sub>C<sub>i</sub>/ cluster. Just as Hollow (1970:37) describes, /tt/ clusters become [st]. However, Hollow does not notice that /kk/ clusters become [hk], as shown in (2.14d), though in Hollow (1973a), he does transcribe /kk/ clusters as [hk] in a plurality of cases. The third and final pattern that we see in (2.14g) through (2.14m) regarding the spellout of /C<sub>i</sub>C<sub>i</sub>/ is that in clusters where C<sub>i</sub> is a fricative, the cluster is simplified to a singleton: i.e., /S<sub>i</sub>S<sub>i</sub>/ → [S<sub>i</sub>], where S is any fricative.

Given these three patterns, we can make an overall observation regarding the realization of /C<sub>i</sub>C<sub>i</sub>/ clusters: the first element in such clusters undergoes lenition. The main distinction between the three patterns described above

<sup>11</sup>This dispreference for word-final /p/ may be restricted to Nuu'etaa variety, as Maximilian (1839) does not show this same variation between stem-final /p/ and [pe] in the Ruptaa variety. There are insufficient data, however, to conclusively say if preference for adding the stem vowel /E/ onto /p/-final stems was not also present in Ruptaa.

is that the first element in underlying stop clusters is spirantized, while the first element in underlying underlying fricative clusters are elided. Clearly, there is a conspiracy in Mandan to prevent pseudo-geminates. This conspiracy seems motivated by the Obligatory Contour Principle (OCP) in the sense of McCarthy (1986): i.e., certain adjacent identical elements are prohibited at the surface level. It is preferable to increase the sonority of the first element of a pseudo-geminate (e.g., through fricativizing or eliding it) than it is to have identical obstruents come into contact.

We can summarize instances of pseudo-geminate dissimilation by appealing to the rules below.

(2.17) Rules for pseudo-geminate dissimilation

- a. /t/-lenition: /t/ → [s] / \_\_t
- b. /k/-lenition: /k/ → [h] / \_\_k
- c. fricative deletion: /S<sub>i</sub>/ → ∅ / \_\_S<sub>i</sub>, where S is a fricative

## 2.4.2 Initial sonorant fortition

Sonorants have already been discussed in §2.1.5, but there is an additional set of realizations for sonorants independent of the description above. Mandan sonorants are also sensitive to prosodic boundaries.

The sonorants in Mandan are the phonemes that have the highest degree of variability in terms of allophony. In §2.1.5, we saw that sonorants are sensitive to their position within a word or phrase: e.g., Hollow (1970) notes that /r/ is realized as a flap word-internally, but word-initially, it fortifies to a [ʳd] when followed by an oral vowel. The /r/ will never become a prenasalized stop when before a nasal vowel. This word-initial fortition pattern for /r/ is optionally mirrored in /w/, which can turn to [ʳwb] at the left edge of a word when preceding an oral vowel, though [w] is much more common in recordings of speakers born in the twentieth century.

In each of the examples below, it is not possible for a prenasalized stop to appear anywhere other than word-initially. The data in (2.18a) and (2.19a) show that sonorants fortify word-initially when followed by an oral vowel, but in (2.18b) and (2.19b), sonorants remain sonorants intervocalically. When a sonorant is followed by a nasal vowel, nasal harmony takes place according to the rules described in §2.5.3, as we see in (2.18c) and (2.19c).

(2.18) Word-initial fortition for /r/

- a. *raskápo'sh* [ʳda.'ska.poʔ], \*[ra.'ska.poʔ]  
 ra-skap=o'sh  
 INS.MTH-be.wet=IND.M  
 'he tasted it'

- b. *óraskapo'sh* ['o.ra.ska.poʔʃ], \*[<sup>n</sup>o.<sup>n</sup>da.ska.poʔʃ]  
 o-ra-skap=o'sh  
 PV.IRR-INS.MTH-be.wet=IND.M  
 'he will taste it'
- c. *nuráskapo'sh* [nũ.'ra.ska.poʔʃ], \*[<sup>n</sup>dũ.'ra.ska.poʔʃ]  
 ru-ra-skap=o'sh  
 1A.PL-INS.MTH-be.wet=IND.M  
 'we tasted it'

(2.19) Word-initial fortition for /w/

- a. *wáarehe'sh* ['wa:.re.heʔʃ ~ <sup>m</sup>ba:.re.heʔʃ]  
 waarehe=o'sh  
 understand=IND.M  
 'he understands it'
- b. *ówaarehe'sh* ['o.wa:.re.heʔʃ], \*[<sup>m</sup>o.<sup>m</sup>ba:.re.heʔʃ]  
 o-waarehe=o'sh  
 PV.IRR-understand=IND.M  
 'he will understand it'
- c. *mawáarehe'sh* [mã.'wa:.re.heʔʃ], \*[<sup>m</sup>bã.'wa:.re.heʔʃ]  
 wa-waarehe=o'sh  
 1S-understand=IND.M  
 'he understands me'

Nasal stops, however, are possible when a sonorant appears utterance-initially, or when there is some intonational break, such as when a sonorant is the initial element in a right dislocated phrase, as seen below.

(2.20) Utterance-initial fortition for /r/ and /w/

<i>Néħaq</i>	<i>nihúpo'sh,</i>	<i>néħaq</i>	<i>nihúyshi'sh,</i>
re=ħaq	r̥i-hup=o'sh	re=ħaq	r̥i-huyshi=o'sh
DEM.PROX=PSNL.STND	2POSS-moccasin=IND.M	DEM.PROX=PSNL.STND	2POSS-leggings=IND.M
<i>ínimashuto'sh,</i>	<i>manániho'sh,</i>	<i>maráraapininu'sh,</i>	
i-w̥i-w̥ashut=o'sh	wa-ra-r̥ih=o'sh	wa-ra-raapri=r̥u=o'sh	
PV.INS-2S-clothe=IND.M	UNSP-2A-wrap=IND.M	UNSP-2A-wear.around.neck=DEM.ANT=IND.M	
<i>móorakaské'sh,</i>	<i>móorakiru'sh,</i>	<i>ní'takorashiipo'sh.</i>	
wa-o-ra-ka-skE=o'sh	wa-o-ra-kru=o'sh	r̥i-ij̥take#o-ra-shiip=o'sh	
UNSP-PV.IRR-2A-INS.FRCE-tie=IND.M	UNSP-PV.IRR-2A-coil=IND.M	2POSS-forehead#PV.IRR-2A-be.rough=IND.M	

'These are your moccasins, these are your leggings, it's your shirt, it's your blanket, it's your necklace, it's your earring, it's your head ornament, they are your face-pendants.' (Lowie 1913:358)

In data obtained from the early twentieth century from Kennard (1936), Densmore (1923), and especially Lowie (1913) (i.e., from speakers born in the middle of the nineteenth century before the Reservation period), utterance-

initial fortition is more common but still not entirely consistent. Data collected by [Hollow \(1970\)](#) and [Trechter \(2012a\)](#) show that utterance-initial fortition varies by speaker, but this fortition is less common overall to the point of being negligible in some speakers.

We can contrast utterance-initial fortition with word-initial fortition, where /r/ to [ʳd] is obligatory with /w/ to [ʷb] being optional and uncommon. This contrast in fortitions suggests a change had taken place from the nineteenth to the twentieth century with respect to how strictly these fortitions took place. A similar process can be seen in contemporary Hidatsa, where older sources state that /r/ and /w/ undergo identical fortitions to [n] and [m] after an intonational break ([Boyle 2007:26](#), [Park 2012:22](#)), though my own fieldwork and that of [Park](#) note that speakers born after the middle part of the twentieth century spontaneously produce [n] and [w] as word-initial fortition or even at affix boundaries word-internally.<sup>12</sup> I have argued that Mandan and Hidatsa, along with Crow, are more closely genetically related to each other than to other Siouan languages ([Kasak 2015a](#)), but it is unclear if this sonorant fortition is a feature inherited from a common ancestor or an innovation that was transmitted from one to another.<sup>13</sup> Given that all speakers of Mandan for the past century have also been fluent in Hidatsa, and both groups had been bilingual by tradition for at least a century prior to the Reservation period, the directionality of such a feature is unclear. The more articulated types of fortition found in Mandan suggests that this areal feature was transmitted from Mandan to Hidatsa and Crow, but without older data, this position is conjectural.

What is not conjecture is that the two kinds of fortition in Mandan have different triggering conditions. These conditions are dependent on where within the prosodic hierarchy sonorant-initial words fall ([Selkirk 1986, 2011](#); [Nespor & Vogel 1986](#); [Beckman & Pierrehumbert 1986](#); *inter alios*). The prosodic hierarchy appears below.

(2.21) The prosodic hierarchy

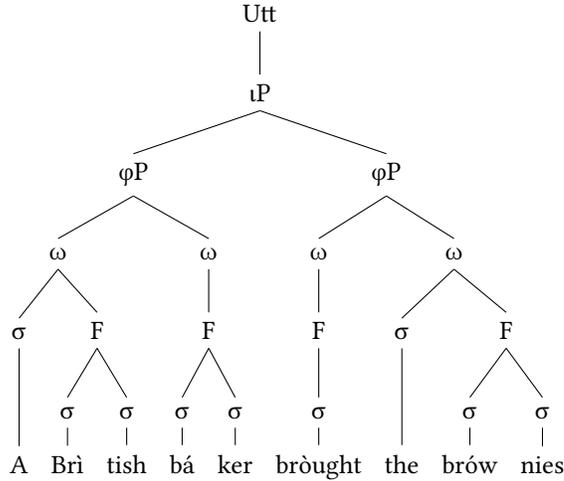
Utterance (Utt) ≫ intonational phrase (iP) ≫ phonological phrase (φP) ≫ prosodic word (ω) ≫ foot (F) ≫ syllable (σ) ≫ mora (μ)

(2.22) Example of the prosodic hierarchy

---

<sup>12</sup>[Lowie \(1913:183\)](#) remarks that Hidatsa speakers occasionally produce [β] for /w/ before /i/, which is something not otherwise observed in Mandan. Personal fieldwork corroborates that certain speakers from the *Xóshga* band of Hidatsa will produce a more approximant-like [β] to a simple [b] instead of /w/ at times, though there does not appear to be any conditioning environment.

<sup>13</sup>[Graczyk \(2007\)](#) notes that Crow also has two sonorants that have differing allophones depending on their position within a word. During [Lowie \(1942:3\)](#) writes in his Crow grammar that word-initial sonorants are “weakly nasalized” to the point of having the quality of [ʷb] and [ʳd], respectively. [Lowie](#) had been working with Crow speakers since 1907, and many of his consultants had been born in the early- to mid-nineteenth century. My own fieldwork among contemporary speakers reveals that word-initial sonorants are plain voiced stops without any prenasalized quality with strongly positive VOTs. It is interesting to note that both these Siouan languages on the Upper Missouri have been gradually losing allophonic prenasalized stops over the course of the twentieth and twenty-first centuries. Crow has shifted towards plain voiced stops, while Mandan only retains the prenasalized coronal allophone [ʳd] word-initially, while /w/ remains [w].



As previously discussed, /r/ becomes [ʀd] word-initially, but can optionally become [n] after an intonational break. For this reason, we can say that one kind of fortition works on the level of the prosodic word, while the other works on the level of the intonational phrase. For speakers born before the twentieth century, /w/ becomes [m] after an intonational break, but seems to be optional among speakers born after the beginning of the twentieth century. A summary of the rules for initial sonorant fortition appear below.

(2.23) Rules for initial sonorant fortition

- a. Word-initial /r/-fortition: /r/ → [ʀd] / #\_
- b. Word-initial /w/-fortition (archaic): /w/ → [m] / #\_
- c. Intonational phrase-initial /r/-fortition: /r/ → [n] / iP[\_
- d. Intonational phrase-initial /w/-fortition: /w/ → [m] / iP[\_

Initial sonorant fortition is a kind of boundary sensitivity, but it is not discussed in the boundary-sensitive morpho-phonology section because this sensitivity is strictly prosodic; there is no interaction between the phonology and the morphology in these words. The main contribution of this description is that it clarifies the distribution of these allophones for sonorants and allows us to make predictions about the prosodic and narrative structure of Mandan sentences by pointing to where word-initial [m] and [n] appear without an accompanying nasal vowel within an utterance versus their word-initial counterparts.

### 2.4.3 Ablaut

The final morpho-phonological process that is not boundary-sensitive is vocalic ablaut. As Rood (1983) and Jones (1983a) note, ablaut is a morpho-phonological feature of all Siouan languages. This system involves apophonic

alternation of a stem vowel before certain enclitics or when an ablaut vowel is placed into a certain prosodic or syntactic environment. Across Siouan, there are three ablaut grades: e-grade, a-grade, and i-grade. Mandan only possesses the e-grade and a-grade distinction. The Dakotan branch of Mississippi Valley Siouan and Biloxi of Ohio Valley Siouan both have all three grades, though the i-grade is much more limited in Biloxi. An example of this three-way apophony in Lakota appears below.

(2.24) Three-way ablaut distinction in Lakota (Ullrich 2011:754)

a. a-grade

*Šúŋka waŋ sápa čha waŋbláke.*  
 šúŋka =waŋ sápa =čha waŋ-w-yákA  
 dog =INDF be.black =REL PV.INDF-1A-see  
 ‘I saw a black dog’

b. e-grade

*Šúŋka kiŋ hé sápe.*  
 šúŋka =kiŋ hé sápa  
 dog =DEF DEM.PROX be.black  
 ‘The dog [here] was black’

c. i-grade

*Šúŋka kiŋ hé sápiŋ na tháŋka.*  
 šúŋka kiŋ hé sápa =na tháŋka  
 dog =DEF DEM.PROX be.black =and be.big  
 ‘The dog [here] was black and big’

Throughout this work, the underlying ablaut vowel has been represented by /E E:/. The default realization of the ablaut vowel is [e e:], depending on its underlying length. It should be noted that there are very few instances where the ablaut vowel is long, with the common motion verb /rE:h/ ‘go there’ being the most frequent example. It is important to identify whether a root contains an ablaut vowel or not whenever encountering a novel word with [e e:], as there is a set of enclitics that will trigger ablaut and cause the /E E:/ to be realized as [a:] instead. That set of enclitics is listed below.

#### 2.4.3.1 Morphologically-conditioned ablaut

There are two conditioning factors for ablaut: one factor involves whether an ablaut vowel is followed by an ablaut-triggering enclitic or undergoes reduplication, and the other is when the ablaut vowel is in certain syntactic environments. The following enclitics all trigger ablaut.

(2.25) Ablaut-triggering enclitics

/=ashka/	possible modal enclitic
/=awɨ/	continuous aspectual enclitic
/=a't/	hypothetical complementizer
/=ta/	male-directed imperative marker
/=ra/	female-directed imperative marker
/=raʔE/	prospective aspectual enclitic
/=ri/	same-subject switch-reference marker
/=riitE/	celerative aspectual enclitic
/=rit/	second person plural
/=rix/	negative
/=rik/	iterative complementizer
/=skee/	iterative aspect
/=xi/	negative
/=∅	continuous aspectual enclitic

The trend we see in (2.25) is that the overwhelming majority of enclitics that trigger ablaut involve an underlying nasal. Rood (1983:28) posits that those enclitics that do not have an overt nasal may have at one time in Pre-Proto-Siouan had such an element. For example, the reflexes of the Proto-Siouan future enclitic \*ktE in Lakota and Biloxi triggers ɨ-grade ablaut, so Pre-Proto-Siouan may have had \*\*inktE or \*\*iktE to condition this apophony. Mandan only has e- and a-grade ablaut, however, where e-grade is the default realization. We can see examples of ablaut in Mandan at work below.

(2.26) Examples of e-grade and a-grade ablaut

- a. /hE/ 'see'
  - i. /hE=o'sh/ → *hɛ'sh* 'he sees it'
  - ii. /hE=ta/ → *háata* 'look!'
- b. /ru-shE/ 'take [by hand]'
  - i. /ru-shE=o're/ → *rushɛ're* 'she took it'
  - ii. /ru-shE=ra/ → *rushána* 'take it!'
- c. /ptEh/ 'run'

- i. /ptEh=ak/ → *ptéhak* ‘he ran and...’
- ii. /ptEh=rj̄tE=o’re/ → *ptáhiniito’re* ‘she quickly ran’
- d. /rEEh/ ‘go there’
  - i. /rEEh=o’re/ → *rého’re* ‘she went there’
  - ii. /rEEh=∅/ → *ráhaha* ‘while going’

Whether a vowel ablauts or not is lexically determined. It is not the case that all /e e:/ vowels ablaut to [a:] when followed by the enclitics in (2.25).

(2.27) Stems with /e e:/ without ablaut

- a. /e-reh/ ‘want to’
  - i. /e-reh=o’sh/ → *érehosh* ‘he wanted to’
  - ii. /e-reh=rj̄/ → *érehini* ‘he wanted to and...’
- b. /tee/ ‘die’
  - i. /tee=o’re/ → *téero’re* ‘he died’
  - ii. /waa-tee=rj̄x=o’re/ → *wáateenixo’re* ‘he didn’t die’

(2.28) /e-he/ ‘say’

- a. /e-he=o’sh/ → *éhesh* ‘he said it’
- b. /e-rj̄-he=rj̄/ → *éniheni* ‘he said to you and...’

In the data above, there is not a single instance of /e e:/ ablauting to [a:]. These data, along with many others, demonstrate that this apophony does not apply to all stems involving /e e:/, but only a subset. These verbs must be learned, and are not intuitive as these ablauting verbs are inherited from stems that also ablauted in Proto-Siouan. Furthermore, not all speakers have the same set of ablauting enclitics. For example, the negative enclitic triggers ablaut for some speakers, but not for others.

(2.29) Negation-triggered ablaut

- a. /waa-wa-ruutE=xi=ka=rj̄/ (OS) →  
*wáawaruutexikani* ‘I didn’t eat any and...’ (Hollow 1973a:46)
- b. /wa-ruutE=rj̄/ (AE) →  
*warúutaani* ‘he was hungry and...’ (Hollow 1973a:20)

Mrs. Annie Eagle consistently ablauts /E/ to [a:] throughout the corpus, while this is not the case that Mrs. Otter Sage. Both consultants are descended from different bands of Mandan, so it is not possible to tell if this tendency to ablaut before negation is a characteristic of one variety of Mandan or another, or if this linguistic variation at the level of the individual.

(2.30) Iterative-triggered ablaut

- a. /ki-suk i' -hrE=skee-oowaḱ=o'sh/ (WF) →  
*kisúk i'h<sub>er</sub>eskeeroomako'sh* 'he became a child again' (Hollow 1973b:150)
- b. /ra-ku'=krE=skee=rjt=o'sh/ (AE) →  
*rakú'k<sub>ra</sub>askeenito'sh* 'you (pl.) are giving it to them again' (Hollow 1970:453)
- c. /k-ra-tax=E=∅ waḱE=skee=ki/ (EB) →  
*karátaxaa máak<sub>aa</sub>skeeki* 'when he continued crying' (Trechter 2012b:244)
- d. /wa-ruutE=skee=rj/ (EB) →  
*warúut<sub>e</sub>skeeni* 'he was hungry again and... ' (Trechter 2012b:101)

Mr. Walter Face (1890-1965) consulted with Kennard (1936) on the later's Mandan grammar sketch, and the iterative /=skee/ does not trigger ablaut for him. Mrs. Annie Eagle consistently ablauts before /=skee/, while Mr. Edwin Benson vacillates between ablauting and not ablauting, as seen in (2.30c) and (2.30d) above. All nasal enclitics in (2.25) otherwise trigger ablaut.

One enclitic with an underlying nasal that never triggers ablaut is the typifier /=rašh/.

(2.31) Lack of ablaut before a nasal enclitic

- a. /raḱE=rašh=rj/ (EB) →  
*náakenashini* 'he was sitting and...' (Trechter 2012b:110)
- b. /i-ru-shE=rašh=oowaḱ=si/ (OS) →  
*írush<sub>e</sub>nashoomaksi* 'he was kind of holding him' (Hollow 1973a:45)

The fact that immediately preceding a nasal enclitic does not automatically trigger ablaut signifies that this process is rooted in more than just a simple phonological rule.<sup>14</sup> As Rankin, Carter & Jones (1998) point out, Proto-Siouan featured the same three apex nasal vowels that Mandan possesses: i.e. /\*<sub>a</sub> \*<sub>i</sub> \*<sub>u</sub>/. Rood (1983) posits that

<sup>14</sup>The topicalizer /=ra/ likewise seems to not trigger ablaut, but it is difficult to say whether this is the case or not due to the fact that the topicalizer is almost always accompanied by some deictic demonstrative, which all feature a mid vowel.

(2.i) *pkéseena*  
pke=s=ee=r<sub>a</sub>  
snapping.turtle=DEF=DEM.DIST=TOP

Pre-Proto-Siouan may have also had nasal mid-vowel or nasal segments that disappeared but left the nasal feature behind on preceding vowels, and that some merger of these nasal mid-vowels with oral vowels is what has caused the ablaut reconstructed in Proto-Siouan and in its daughter languages. These former nasal elements may have formerly been part of enclitics that caused nasalization of a mid-vowel, but then those nasal mid-vowels were lost to subsequent mergers by the time of early Proto-Siouan.

Jones (1983a) agrees that ablaut might be explained historically as remnants of a formerly regular phonological system. One piece of evidence to support the notion that nasality was a key component in creating this ablaut system can be seen with Mandan, where the overwhelming majority of ablaut-triggering enclitics are inherited from Proto-Siouan. These same enclitics were either enclitics or became encliticized during the development into Mandan. For example, the negative */=rix/* is a cognate of */=šni/* in Lakota (Rankin et al. 2015), and */=šni/* is also triggers ablaut in Lakota and Dakota (Ullrich 2011:754). The enclitics that bear nasals that do not trigger ablaut seem to have been innovated from some element that is not clearly attributable to Proto-Siouan: e.g., */=raqsh/* does not have any other cognates in Siouan (Rankin 2010). These innovations have not become incorporated into what was a formerly regular morpho-phonological process since the conditions for creating ablaut had long since grammaticalized. More work is needed to flesh out this idea of ablaut being conditioned by nasality in Proto- and Pre-Proto-Siouan.

The other morphologically conditioned environment where ablaut occurs is when a sequence containing an ablaut vowel is reduplicated.

---

'the turtle'

(2.32) Reduplication-induced ablaut

- a. /kxE~kxE/ AUG~be.spotted=IND.M →  
*kxáakxe'sh* 'it is spotted [in color]'
- b. /wə-sE~sE/ UNSP-AUG~be.red →  
*Masáase* 'Red Butte'
- c. /waa-i-kxE~kxE=ka/ NOM-PV.INS-AUG~be.spotted=HAB →  
*wíikxaakxeka* 'magpie'
- d. /ra-shkE~shkE=o'sh/ INS.FOOT-AUG~jump=IND.M →  
*rashkáashke'sh* 'he tiptoed'
- e. /xkəh~xkəh=o'sh/ AUG-move=IND.M →  
*xkaxkəho'sh* 'she is ambitious'
- f. /ra-ru-ksj̥i~ksj̥i=o'sha/ 2A-INS.HAND-AUG~tickle=INT.M →  
*rarúksiksij̥ro'sha?* 'did you tickle her?'

In (2.32a) through (2.32d), we see the expected behavior for the ablaut vowel when reduplicated. The reduplicated (i.e., prefixed) version of the verb undergoes ablaut, turning /E/ to [a:], while the original verb remains [e]. This prefixal reduplication indicates some kind of intensity or augmented quality of a state or action, and is quite productive. However, we can see a possible additional variety of ablaut occurring in (2.32e) and (2.32f) whenever a formative with an underlying nasal is reduplicated. When prefixal reduplication takes place, only the onset and a single mora are reduplicated. No nasal quality is reduplicated onto the new prefix, so an underlying nasal vowel becomes an oral vowel. Similarly, a long vowel will become a short vowel. We can see this demonstrated in (2.32e) where the stem /xkəh/ 'move' is reduplicated as [xka], with the vowel lacking its original nasal feature. In the case of (2.32f), we see a long nasal vowel become a short oral vowel.<sup>15</sup>

#### 2.4.3.2 Syntactically-conditioned ablaut

Enclitics are not the sole cause of ablaut in Mandan, as several auxiliary verbs can likewise serve as triggers. As is the case with enclitic-conditioned ablaut, the ablaut occurs in the environment where the auxiliary verb that immediately follows an underlying /E E:/ is nasalized. The following auxiliary verbs trigger ablaut.

---

<sup>15</sup>I assume throughout this dissertation that nasality is underlying present on vowels, rather than arguing for some kind of underlying floating [+nasal] or underspecified /N/ that triggers regressive nasal harmony: i.e., \*/ksiiN/ instead of /ksj̥i/ 'tickle.' I take this behavior for reduplication to mean that only certain articulatory gestures and their durations are truly copied to become reduplicated prefixally and not that some additional underlying feature is needed to allow such a pattern.

(2.33) Ablaut-triggering auxiliary verbs

- /hʌʌkE/ 'standing' positional auxiliary verb  
/rʌ'kE/ 'sitting' positional auxiliary verb  
/rʌ'kah/ 'sitting' habitual auxiliary verb  
/wʌ'kE/ 'lying' positional auxiliary verb  
/wʌ'kah/ 'lying' habitual auxiliary verb

Examples of these auxiliaries appear below.

(2.34) Auxiliary-induced ablaut

- a. /wa-ki'kraa=E hʌʌkE=oowʌk=o'sh/ UNSP-look.for=SV stand.AUX=NARR=IND.M →  
*waki'karaara hʌʌkeroomako'sh* 'he was looking around' (Hollow 1973a:139)
- b. /pii=E rʌ'kE=rj/ devour=SV sit.AUX.=SS →  
*píira nʌ'kaani* 'he was sitting there eating it up and...' (Hollow 1973b:122)
- c. /ka-ra-tax=E rʌ'kah=oowʌk=o'sh/ INS.FRCE-INS.MTH-make.loud.noise=SV sit.AUX.HAB=NARR=IND.M →  
*karátaxaa ná'kahoomako'sh* 'he was sitting there crying' (Hollow 1973b:222)
- d. /i-ra'-resh#hrE wʌ'kE=haa/ PV.INS-INS.HEAT-be.hot#CAUS lie.AUX=SIM →  
*íra'reshharaa má'kahaa* 'while making him hot' (Hollow 1973b:204)  
item /i-kihE wʌ'kE=haa/ PV.INS-wait lie.AUX=SIM →  
*ikihaa má'kahaa* 'while they waited there' (Hollow 1973b:298)
- e. /ʉ'sh=ka#hrE wʌ'kah=rj/ be.thus=HAB#CAUS lie.AUX.HAB=SS →  
*ʉ'shkaharaa má'kahini* 'he did it that way and...' (Hollow 1973b:224)

These auxiliaries are often combined with a verb that bears the simultaneous aspectual /=ha/, and in fast speech, it is sometimes difficult to perceive [h] as part of a consonant cluster. As such, it is often not clear in Hollow's (1970) transcriptions whether he intends to mark a stem vowel /=E/ at the end of a verb or he cannot hear the juncture between the consonant and the [h] in /=ha/. Kennard's (1936) transcriptions fare better in this respect. As such, the majority of the examples above in (2.34) contain morphology such that we can distinguish between /=E/ and /=ha/.

The benefactive auxiliary *kú'* 'give' can also trigger ablaut, but it does not do so consistently, even for individual speakers. All speakers who have contributed to the corpus have multiple instantiations of *kú'* triggering ablaut as well as not triggering ablaut within the same narrative. However, the lack of before before *kú'* in Kennard, Kennard's (1934, 1936) transcribed narratives is much rarer than it is in Hollow, Hollow, Hollow's (1970, 1973a, 1973b). Both

of the examples in (2.35) come from Mrs. Annie Eagle, Hollow's (1970) primary consultant and the source for the plurality of the extant recorded sources of Mandan.

(2.35) Variability in benefactive-triggered ablaut

- a. *karúxu'he*                      *makú're*    *mikák*  
 ka-ru-xu'h=E                      wə-ku'=E    wɨk=ak  
 INS.FRCE-INS.HAND-plow=SV 1s-give=SV be.none=DS  
 'there was no one to plow for me' (Hollow 1973a:54)
- b. *áqwe rusháa*                      *makú'ta*  
 ąqwe ru-shE                      wə-ku'=ta  
 all    INS.HAND-take 1s-give=IMP.M  
 'take all of it for me' (Hollow 1973a:78)

Her own variability in ablauting before *kú'* underscores the instability of its productivity, especially since she ablauts before certain enclitics more consistently than other speakers who contributed data. This pattern suggests that *kú'* had begun being reanalyzed as an auxiliary that did not trigger ablaut, or at least optionally so, for speakers born around the turn of the twentieth century.<sup>16</sup>

The final syntactic environment that triggers ablaut is when the stem vowel is added clause-finally to indicate that the ablauted verb is the first in a sequence, with the following verb taking place afterwards. We can see this clause-final ablaut in data below.

(2.36) Sequence marking with ablaut

- a. *Ná'kaa inák wáherés*                      *waká'roomako'sh.*  
 rə́a'kE irək    wa-hrE=s                      wa-ka'=oowək=o'sh  
 sit.AUX again UNSP-CAUS=DEF UNSP-possess=NARR=IND.M  
 'He was sitting and then he asked for his food again' (Hollow 1973b:94)
- b. *Kxúhini máapsitaaraa*                      *inák ráahqmi*  
 kxuḥ=rɨ    wəapsi=taa=E=∅                      irək    rEEh=awɨ  
 lie.down=ss morning=LOC=SV=CONT again go.there=CONT  
 'She lay down and once it was morning she went along again' (Hollow 1973a:103)

This ablaut is reminiscent of the process by which certain conjunctions in Lakota trigger e-grade ablaut (Ulrich 2011:754). This ablaut serves to temporally connect one clause with the following clause, albeit with a phonetically null coordinator. Only the ablaut itself overtly conveys that there is a relationship between the two clauses.

<sup>16</sup>There are few instances of other auxiliaries not triggering ablaut in the corpus, but these examples can likely be attributed to a break in the prosody: i.e., these counterexamples are likely fragments or left dislocated elements.

Similar to initial sonorant fortition, ablaut is a process that does have a kind of boundary sensitivity, but its sensitivity has to do with certain enclitics triggering ablaut and certain syntactic constructions triggering ablaut. Ablaut is not sensitive to word-internal boundaries as described in §2.5 below.

## 2.5 Boundary-dependent morpho-phonology

In previous published descriptions of the phonology of Mandan, there has been minimal attention paid to fine details of the interaction between its phonology and morphology. Specifically, there are various phonological processes that are described as being regular, but several systematic exceptions appear throughout the corpus. [Hollow \(1970:35\)](#) and [Mixco \(1997a:12\)](#) likewise state that there are phenomena that they do not address and leave these questions open for future research.

This section serves to address these open questions and underdescribed phenomena and to demonstrate that they are not actually exceptions, but instances of regular phonological processes being blocked by word boundaries that are word-internal. As such, this section is theoretically-driven, initially describing these boundary-sensitive phenomena and then appealing to an OT-centric account to explain why these phonological processes are being blocked by non-featural conditions. The processes that are sensitive to word-internal boundaries are hiatus resolution (see §2.5.1), metathesis (see §2.5.2), nasal harmony (see §2.5.3), and primary stress assignment (see §2.5.4).

### 2.5.1 Hiatus resolution processes

Mandan does not permit [V.V] or [VY] sequences. This conspiracy to prevent hiatus or diphthongs results in several different strategies for resolving /VV/ sequences. In [Hollow \(1970\)](#) and [Mixco \(1997a\)](#), discussion of consonantal epenthesis is brief and restricted to showing a single example of a proposed phonological rule to insert glottal stops between two vowels. I elaborate upon the conditions under which this epenthesis occurs, as well as define a second kind of epenthesis that was first suggested by [Carter \(1991a\)](#): that the root-final /r/ that [Hollow](#) posits for a large amount of words is not really part of that root, but is in fact an epenthetic segment that separates a long vowel from an element in the postverbal field.

The argument that follows in §2.5.1.1 is that the [ʔ]-insertion described in [Hollow \(1970\)](#) is restricted to word-internal hiatus. In §2.5.1.2 and §2.5.1.3, I argue that virtually all postverbal morphology in Mandan is actually enclitic in nature, and that this linking [r] only occurs across phrasal boundaries from a lexical item onto a functional item that is an enclitic. When hiatus occurs across a phrasal boundary involving two short vowels, the final short vowel is deleted, while the linking [r] occurs in the environment of a long vowel at a phrasal boundary. The argumentation

for this interpretation of the structure of postverbal elements in Mandan can be seen in §3.4 in the following chapter.

### 2.5.1.1 Epenthetic [ʔ]

Hollow (1970:47) states that [V.V] sequences are illicit on the surface. To avoid hiatus, Mandan has an epenthetic [ʔ] that acts as the onset of the following syllable. One issue with Hollow's description of this process is that he does not distinguish between long and short vowels. As such, it is not clear whether this kind of epenthesis is exclusive to environments involving vowels of one particular length or must occur with both.

Several examples of this epenthesis at work appear below.

#### (2.37) Instances of [ʔ] epenthesis

- a. *psi'eshka*  
psi-eshka  
be.black-SMLT  
'just black' (Hollow 1973a:74)
- b. *warú'uxo'sh*  
wa-ru-ux=o'sh  
1A-INS.HAND-be.broken=IND.M  
'I broke it with my hands' (Hollow 1970:47)
- c. *wa'ipteh*  
wa-i-ptEh  
UNSP-PV.INS-run  
'automobile' (Hollow 1970:338)
- d. *wáa'oshi*  
waa-o-shi  
NOM-PV.IRR-be.good  
'good things' Hollow (1973a:132)
- e. *wa'áhuuroomako'sh*  
wa-aa-huu=oowək=o'sh  
UNSP-PR.TR-come.here=NARR=IND.M  
'he brought them some' (Hollow 1973a:177)
- f. *wáa'aahuuki*  
waa-aa-huu=ki  
NEG-PV.TR-come.here=COND  
'if he brings it' (Hollow 1973a:120)

Each instance of [ʔ]-insertion occurs regardless of whether the surrounding vowels are long or short. Furthermore, this kind of epenthesis can occur pre- or post-tonically. As such, [ʔ]-insertion is purely arises in underlying

/V.V/ sequences. The very fact that epenthesis is permitted indicates that the DEP constraint is ranked lower than the \*HIATUS constraint. Another possible solution to the hiatus problem is to re-parse heterosyllabic vowel-vowel sequences as tautosyllabic ones in the form of diphthongs. Since diphthongs are robustly proscribed against in Mandan, we can therefore assume that \*DIPHTHONG must dominate DEP.

One explanation for why the glottal stop is selected is due to the fact that this place of articulation is the least marked on the global Place hierarchy. Lombardi (2001:29) claims that the hierarchy is {\*DOR, \*LAB} ≫ \*COR ≫ \*PHAR, where coronals are less marked than either dorsals or labials, but pharyngeals (i.e., consonants that are not supralaryngeal) are the least marked. This hierarchy is based on the one in Prince & Smolensky (1993) and Smolensky (1993), where the notion of coronal unmarkedness holds that {\*DOR, \*LAB} ≫ \*COR, without consideration to laryngeal consonants.

These constraints are defined below in (2.38) and a tableau demonstrating this appears below in (2.39). Ultimately, all the above constraints play into a conspiracy to prevent tautosyllabic [V<sub>1</sub>V<sub>2</sub>] sequences. There is no restriction on the kinds of syllables this process applies to (i.e., light or heavy) or whether this epenthesis can be pre- or post-tonic. Furthermore, the choice of [ʔ] over other elements is conditioned by the fact that glottal consonants are the least marked on Lombardi's (2001) hierarchy, which makes epenthetic [ʔ] preferable to epenthetic [ɾ] (or any other coronal consonant for that matter).

(2.38) Constraints relating to [ʔ] epenthesis

- a. DEP-C: Assign one violation for each instance where a consonant is present in the output where it is not present in the input (i.e., no consonant epenthesis).
- b. MAX-V: Assign one violation for each instance where a vowel is present in the input where it is not present in the output (i.e., no vowel deletion).
- c. \*DIPHTHONG: Assign one violation for each tautosyllabic VV sequence, where V<sub>1</sub> ≠ V<sub>2</sub>.
- d. \*HIATUS: Assign one violation for each instance of non-tautosyllabic vowels coming into contact.

(2.39) [ʔ] epenthesis in *psi'eshka* 'just black'

/psi-ɛfka/	NO-DIPH	NO-HIATUS	MAX-V	DEP-C	*COR	*PHAR
a. 'ps̥jɛf.ka	*!					
b. 'psi.ɛf.ka		*!				
c. 'psif.ka			*!			
d. 'psi.rɛf.ka				*	*!	
e.  'psi.ʔɛf.ka				*		*

When observing the distribution of where this epenthesis is most likely to occur, it is most commonly associated with the prefix field. Very rarely will a postverbal element participate in [ʔ]-insertion. In fact, the only morphological item following a verbal root that triggers [ʔ]-insertion is the similitive suffix *-eshka* and its alternative form *-esh*.

There has been some debate among Siouanists regarding whether we can demonstrate that modern Siouan languages have true underlying onset glottal stops (Larson p.c., Mirzayan p.c., Ullrich p.c.), since there is clear evidence for certain Proto-Siouan root being reconstructed with word-initial \*ʔ (Rankin et al. 2015). A number prefixes have allomorphs that are specific to vowel-initial stems and as such, we can point to these instances of allomorphy as evidence that we do not have underlying /ʔ/ or epenthetic [ʔ] to satisfy an ONSET constraint.

The examples below demonstrate that there are special allomorphs in Mandan for consonant-initial stems versus vowel-initial stems. In (2.40a), the vowel first person active plural prefix /rV-/ copies the following vowel, creating a single long vowel, while the integrity of the underlying vowel in /rɥ-/ is maintained when the stem is consonant-initial in (2.40b). Similarly, the alienable possession prefix /ta-/ is fully realized in (2.40c), but when prefixed onto a vowel-initial stem, the allomorph /tV-/ harmonizes with the initial vowel of the stem to produce a long vowel like in (2.40d). There are other allomorphic alternations that behave similar to the prefixes above, which are explained more thoroughly in the following chapter. The point still stands, however, that we cannot make a case for these intervocalic glottal stops manifesting due to the fact they are present in the underlying representation. As such, their presence can be directly ascribed to epenthesis.

(2.40) Vowel-initial stems and allomorphy

- a. *rīsehka'sh*  
rV-i-sek=ka=o'sh  
1A.PL-PV.INS-make=HAB=IND.M  
'we [always] made it' (Lowie 1913:356)
- b. *nuhé'sh*  
rɥ-hE=o'sh  
1A.PL-see=IND.M

‘we see it’ (Hollow 1970:71)

- c. *tami'ti*  
ta-wi'ti  
3POSS.AL-village  
‘his village’ (Hollow 1970:482)
- d. *tóominike*  
tV-owri:k=E  
3POSS.AL-beans=SV  
‘her beans’ (Hollow 1970:482)

We can deduce from the data above that Mandan does not have word-initial /ʔ/, given the presence of allomorphy for prefixes that select for consonant-initial and vowel-initial stems. As such, these [ʔ] segments are not underlying and are being added epenthetically when hiatus occurs within the domain of a morphological word. This [ʔ]-insertion is not the only kind of epenthesis in Mandan, as [r] also appears in certain conditions to prevent hiatus.

### 2.5.1.2 Epenthetic [r]

Carter (1991a) is the first to propose that all instances of what Hollow (1970) interprets as underlying root-final /r/ in Mandan are really just due to the fact that those roots contain long vowels, though Mixco (1997a) includes Hollow’s stem-final /r/ in his grammar. Hollow does not record long vowels, and as such proposes that there exist minimal pairs between lexical items where some forms seem to have an [r] that appears in certain conditions, while others do not. When word-final, Hollow states that these flaps undergo apocope, but can otherwise be realized with the addition of post-verbal morphological material.

(2.41) Examples of what Hollow (1970) proposes are root-final [r]

Hollow’s proposed form	Actual phonetic form	Gloss
⟨sí⟩	[si]	‘to hire someone, to command someone’
⟨sír⟩	[si:]	‘to be yellow’
⟨pé⟩	[pe]	‘head louse’
⟨pér⟩	[pe:]	‘to break something off’

Subsequent fieldwork yields an explanation for why certain lexical items seemingly feature this root-final sonorant: all words that Hollow analyzes as having an underlying root-final ⟨r⟩ actually contain long vowels. These long vowels, when followed by vowel-initial enclitic morphology, trigger an epenthetic [r] to prevent hiatus between a long vowel and another vowel post-verbally.

The distinction between this kind of epenthesis and the one described above in §2.5.1.1 is the domain in which each epenthesis is active. For [ʔ]-epenthesis, the relevant domain is that of the morphological word; any prefix or derivational suffix will result in [ʔ]-insertion to prevent hiatus. For [r]-epenthesis, the overall prosodic word is its designated domain. Namely, [r]-insertion only occurs to prevent hiatus between a long vowel and another vowel at the boundary of a lexical item and a functional item. Similar to r-intrusion in certain English varieties (Gick 1999), this [r]-epenthesis in Mandan occurs at the right boundary of a lexical item to prevent hiatus. However, it is not the case that [r]-insertion appears merely between two words.

All three of the examples in (2.42) below highlight the fact that [r]-epenthesis is not simply triggered to prevent hiatus across a word boundary. In (2.42a) and (2.42b), each word has a vowel-vowel contact with an adjacent word, and yet no [r]-insertion takes place. In particular, we see no [r]-epenthesis in (2.42b), even though the word *Núu'etaa* 'Mandan' ends in a long vowel. Similarly, even within a postpositional phrase, we do not see intrusive [r] appear between the final vowel of a noun and the first vowel of a postposition, which can be seen in (2.42c). As such, it is not enough to state that [r]-epenthesis occurs at the right edge of a word boundary, but that its presence is motivated by the underlying syntagmatic structure of a phrase.

(2.42) Lack of [r]-epenthesis with word-boundary hiatus

- a. *Matéwe íresekini éerereho'sha?*  
 watewe i-ra-sek=rɨ ee-ra-rEh=o'sha  
 what PV.INS-2A-make=SS PV-2A-want=INT.M  
 'What do you want to do?' (Hollow 1973b:3)
- b. *Núu'etaa ǰ'ksahe íwarooni éewereeho'sh.*  
 ruu'etaa ǰ'-ksah=E i-wa-roo=rɨ ee-wa-rEEh=o'sh  
 Mandan PV.RFLX-ways=SV PV.INS-1A-speak=SS PV-1A-want=IND.M  
 'I want to talk about the Mandan ways.' (Hollow 1973a:47)
- c. *miní íku'shtaa*  
 wɨ i-ku'sh=taa  
 water DIR-inside=LOC  
 'under water' (Hollow 1973b:10)

This notion of postverbal material as enclitics is expanded upon throughout Chapter 3, but to provide a brief illustration of where we can see that the epenthetic [r] is only spelled out to prevent hiatus between a long vowel and some postverbal element with a vowel on its margin where said element is prosodically dependent on the verb. More specifically, [r] appears to prevent hiatus between a long vowel and another vowel at an enclitic boundary. The ordering of these enclitics reflects the underlying syntactic structure, making these enclitics simple clitics per

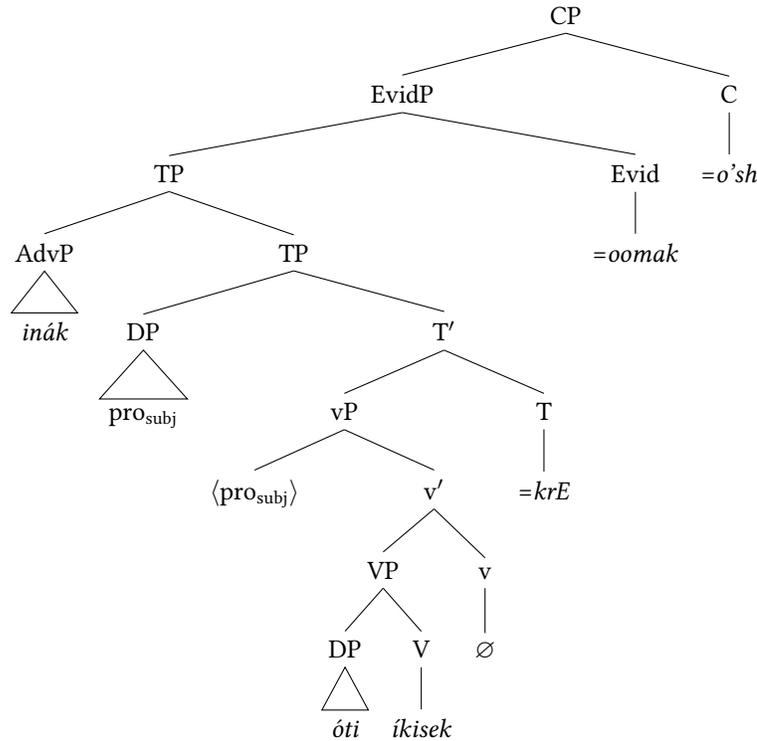
Anderson’s (2005) definition, where each clitic is an element that is prosodically dependent upon an adjacent word to be realized.

In the example in (2.43) and its syntactic structure in (2.44), the enclitic associated with the number of the subject appears in T, which is plural in this case. Plural marking for objects appear in v, though the singular object in the example above causes no such marker to be realized. The narrative evidential appears after subject marking, and the allocutive agreement marker appears in C, where it is in complementary distribution with other complementizers.

As such, this [r]-intrusion takes place not merely at an enclitic boundary, but at a phrasal boundary. Hollow (1970) argues that this [r] is an underlying element of the coda of specific roots, but if that were so, the flap should not be expected in the example above, because the third person plural marker is underlyingly /=krE/, morphologically speaking. Hollow does not posit that this formative has an underlying root-final flap, but instead argues that the narrative evidential =oomak has an allomorph =roomak when added to a vowel-final stem. Rather than adhering to Hollow’s multiple stipulations regarding the appearance of [r], we can take a more parsimonious approach and conclude that all instances of [r] appearing intervocalically are due to the same motivating factor: to prevent hiatus at the right edge of a phrase that involves a long vowel.

- (2.43) *inák óti íkisehkereromako’sh*  
 irək o-ti i-ki-sek=krE=ooɰək=o’sh  
 again PV.LOC-live PV.INS-ITR-make=3PL=NARR=IND.M  
 ‘they fixed the house again’ (Hollow 1973a:157)

(2.44) Structure for *inák óti ikisehkereromako'sh*



[CP [EvidP [TP *inák* [TP  $\text{pro}_{\text{subj}}$  [vP [VP *óti* [V *íkisek* ] ] [v  $\emptyset$  ] ] [T =*kere* ] ] ] [Evid =*oomak* ] ] [C =*o'sh* ] ]

Further evidence that this flap is truly epenthesis rather than some underlying morphological element that is realized in particular conditions comes from Maximilian (1839). His notes explicitly state that there are a variety of differences between the grammar of the Ruptaare village and Like-A-Fishhook, the village where he has taken up residence and whose population consists of Nuu'etaare speakers.

Carter (1991a) is the first to sift through Maximilian's data and attempt to reconstruct what the modern Mandan forms might look like. In doing so, there is a clear pattern that emerges: in instances where Nuu'etaare involves an intrusive [r], this sound does not appear in Ruptaare. All instances of underlying /V:V/ sequences are realized with the shot vowel being deleted. Furthermore, in cases where Nuu'etaare would avoid hiatus by deleting a vowel from an enclitic in the case of /VV/ sequences, Ruptaare simply inserts a glottal stop. These differences can be seen in (2.45) below.

(2.45) Dialectal differences in Maximilian's (1839) grammar from Carter (1991a:486)

Nuu'etaare	Ruptaare	Morphology	Gloss
<i>wahé'sh</i>	<i>wahé'o'sh</i>	/wa-hE=o'sh/	'I saw'
<i>šijho'sh</i>	<i>šijho'sh</i>	/šijh=o'sh/	'he begged'
<i>téero'sh</i>	<i>tée'sh</i>	/tee=o'sh/	'he died'

As shown above, the Ruptaare dialect treats the male-addressee indicative marker =*o'sh* differently than the Nu'u'etaare dialect. Specifically, when a stem ends in a short vowel or a consonant, both forms end in =*o'sh*, with the short stem getting an epenthetic glottal stop. A stem ending in a long vowel will delete the initial /o/ in =*o'sh*, creating a [VV?] sequence. In Nu'u'etaare, when a stem ends in a short vowel, the /o/ in =*o'sh* is deleted to avoid hiatus across a phrasal boundary, but remains when the stem ends in a consonant. However, when the stem ends in a long vowel, the epenthetic [r] appears to prevent hiatus. It seems that Ruptaare did not permit /V:V/ sequences and preferred to have [VV?] sequences instead. For Nu'u'etaare, the standard dialect addressed throughout this work, instead of a [VV?] or [VV?V] sequence, a [VVrV] sequence is preferred instead.

The overall takeaway here is that this [r] is not just the case of an underlying coda surfacing when in an intervocalic environment. It is conditioned by two factors. Firstly, a stem must undergo the addition of some postverbal element. Secondly, either the stem or the postverbal element must involve a long vowel that would otherwise cause hiatus.

The two competing systems for resolving hiatus that we see in Maximilian (1839) have collapsed in present-day Mandan, where modern Ruptaare speakers make exclusive use of the epenthetic [r] like in Nu'u'etaare: e.g., Little Owl & Rhod (1992:10) realizes /si:=oʔ/ 'it is yellow' as *síiro'sh* rather than the †*síi'sh* we would expect in the Ruptaare found in Maximilian's notes. Given this work's focus on modern Mandan and the apparent dialect coalescence that took place following the last smallpox epidemic, we can appeal to a single system for dealing with phrasal-boundary epenthesis versus the dueling systems of older Ruptaare and Nu'u'etaare.

We have already seen instances of glottal stop epenthesis occurring word-internally in the environment of a long vowel, so we cannot simply say that [ʔ] epenthesis involves short vowels and [r] epenthesis merely involves long vowels. The glottal stop epenthesis described in §2.5.1.1 and the flap epenthesis described herein take place in different environments: i.e., the intrusive [ʔ] occurs to prevent hiatus within a morphological word, while the intrusive [r] takes place to prevent hiatus involving a long vowel at the right margin of a phrase. Due to the fact that these two types of epenthesis have different motivating factors, we must amend the constraints discussed in §2.5.1.1 and come up with a constraint hierarchy that can account for the data presented here. The previously-discussed constraints for [ʔ] epenthesis are reiterated in (2.46) below.

(2.46) Constraints for [ʔ] epenthesis

{\*DIPHTHONG, \*HIATUS} ≫ MAX-V ≫ DEP-C ≫ \*COR ≫ \*PHAR

If we attempt to evaluate an item involving [r] epenthesis using these constraints, we realize that these constraints alone cannot account for the selection of [r] over [ʔ].

(2.47) [r] epenthesis in *siiro'sh* 'it is yellow'

/si:=oʔf/	*DIPH	*HIATUS	MAX-V	DEP-C	*COR	*PHAR
a. 'si:qʔf	*!					
b. 'si:oʔf		*!				
c. 'si:ʔf			*!			
d.  'si:roʔf				*	*!	
e.  'si:ʔoʔf				*		*

The constraints above incorrectly select candidate E as the winning candidate, despite the fact that candidate D is the correct output. Furthermore, the markedness hierarchy that [Lombardi \(2001\)](#) proposes would always filter out non-glottal epenthetic consonants, leaving little possibility for how any kind of glide or obstruent epenthesis can be preferred over a segment such as [ʔ]. [Uffmann \(2007\)](#) offers a possible remedy to this quandary: restrict the kinds of epenthesis to specific environments. Specifically, word-internal epenthesis has a hierarchy of markedness with respect to margin segments that are not found in the input. Thus, instead of just appealing to the notion that coronals are marked (i.e., \*COR), we qualify that coronals are marked at margins (i.e., \*MARGIN/COR). [Uffmann](#) appeals to the proposal by [Prince & Smolensky \(1993\)](#) that a set of scalar markedness constraints pertaining to margins are ordered as followed:

(2.48) Segmental prominence scales per [Prince & Smolensky \(1993\)](#)

a. Margin-specific prominence hierarchy

\*MARGIN/V ≫ \*MARGIN/r ≫ \*MARGIN/l ≫ \*MARGIN/nas ≫ \*MARGIN/obs ≫ \*MARGIN/lar

b. Peak-specific prominence hierarchy

\*PEAK/lar ≫ \*PEAK/obs ≫ \*PEAK/nas ≫ \*PEAK/l ≫ \*PEAK/r ≫ \*PEAK/V

If we look at the hierarchy in (2.48a), these constraints are line line with the approach taken in [Lombardi \(2001\)](#), with the additional caveat that they are operating only on the margin of syllables. In order to justify why [r] is

used at phrasal boundaries, this same scalar hierarchy does not apply. Uffmann (2007:472) posits that glottal stop epenthesis is really a matter of onset repair, versus true hiatus repair. He even goes so far as to conclude that glottal stop epenthesis is restricted to word- or foot-initial positions, while glides are used intervocalically. As has been demonstrated so far in this chapter, Mandan unequivocally employs [ʔ] to prevent hiatus. The fact that we cannot have glottal stop epenthesis in all instances of hiatus means that there must be some restriction against [ʔ] appearing in the environment that [r] does.

This restriction can be seen below, where both feature stems that end in a heavy syllable: i.e., a syllable that contains a long vowel or a coda glottal stop.

(2.49) Instances of [r] epenthesis in Kennard (1936:17)

- a. *kixée* ‘to quit’ → *kixéero’sh* ‘he quit’
- b. *kiná* ‘to tell’ → *kiná’ro’sh* ‘he told it’

In the examples above, we have a the same structure, where a verbal stem [ X ] involves the morphological adjunction of an enclitic =Y, giving the structure [ [ X ] =Y ]. If we were to apply [ʔ] epenthesis to resolve hiatus above, we would wind up with *\*kixée’o’sh* for (2.49a), and technically we should not need epenthesis for (2.49b), since the stem ends in a glottal stop, so any enclitic added onto such a stem should be satisfy the NO-HIATUS constraint with *\*kiná’o’sh*. A likely reason why *\*kiná’o’sh* is unacceptable is that syllabifying that word would result in the underlying glottal stop shifting from a coda to an onset: i.e., the [ʔ] is aligned to the left edge of the right edge of a phrase. I propose that Mandan has a restriction on glottal stops appearing in this position, which is handled by the following constraint:

(2.50)  $*]_{XP}ʔ$ : Assign one violation for each instance where a glottal stop is aligned to the left edge of the right edge of a phrase (i.e., when a glottal stop acts as an onset at a phrasal boundary).

According to this constraint, it is so dispreferred to have a glottal stop aligned to the left of a right boundary edge. This constraint is ranked more highly than DEP-C because a [r] that is not present in the input is preferable to permitting a glottal stop to appear in an illegal position. We can appeal to the hierarchy in (2.48) to account for why we wind up with an epenthetic rhotic instead of an obstruent. The  $*PEAK/r$  constraint reflects that rhotics are nearly the least-marked element to be involved between syllable peaks: i.e., syllable nuclei. The  $*PEAK/V$  constraint places glides as the optimal intervocalic epenthetic segment, but Mandan only possesses a single glide, [w]. Uffmann (2007) attempts to explain why a markedness hierarchy like  $\{*DOR, *LAB\} \gg *COR \gg *PHAR$  is insufficient by itself to explain the motivations for why languages utilize certain segments epenthetically, but Lombardi’s (2001) version of Prince

& Smolensky's (1993) original markedness hierarchy ultimately is what we must appeal to in order to motivate the choice for epenthetic [r] over other a glide. Uffmann deems glides to be the optimal intervocalic epenthetic elements, but Mandan clearly does not utilize [w] as its preferred phrase-boundary epenthetic segment. This preference for [r] over [w] is due to the status of the flap as a coronal segment, while [w] is both dorsal and labial, which are both more marked than a coronal element. Quite clearly, we can see that we do not have to resort to fine-tuning the constraints proposed thus far.

A tableau demonstrating how the candidate with [r] epenthesis is chosen over [ʔ] epenthesis appears below.

(2.51) [r] epenthesis in *siro'sh* 'it is yellow' (updated constraints)

[ [ si: ] =oʔf ]	*DIPH	*HIATUS	*]XPʔ	MAX-V	DEP-C	*LAB	*COR	*PHAR
a. 'si:ɔʔf	*!							
b. 'si:oʔf		*!						
c. 'si:ʔoʔf			*!		*			*
d. 'si:ʔf				*!				
e. 'si:woʔf					*	*!		
f.  'si:roʔf					*		*	

Candidate F wins out over candidate C due to the fact that [ʔ] is strongly dispreferred in a post-phrasal position. Similarly, candidate E is ruled out because even though a glide would be preferred under Uffmann's (2007) analysis. Uffmann notes that glides are preferred hiatus breakers intervocalically in a large number of languages: e.g., Dutch (Booij 1995), Japanese (Kawahara 2002), and Korean (Kang 1999). This preference for glides leads that author to conclude that glides are the optimal epenthetic segments in intervocalic environments. The fact that Mandan employs glottal stop epenthesis in intervocalic environments demonstrates that Uffmann's claim is not universal.

One caveat to the above claim is that Mandan has a single word seems to optionally take the glide [w] instead of [r]: 'mother.'

(2.52) Variable realization phrasal boundary epenthesis

*kohúyure* ~ *kohúywe*  
 ko-húy=E  
 3POSS.PERS-mother=SV

'his mother' (Hollow 1970:83)

The variant with [r] is the only lexical item found in the corpus that behaves in this manner, and modern speakers will only use this form in spontaneous speech. Likewise, Maximilian (1839) only gives *kohúyure* for ‘his mother,’ so it is unclear if employing [w] instead of [r] represents a holdover from a non-Nuu’etaare variety of Mandan, or if it is a fossilized lexical alternative to *kohúyure*. Other Siouan languages, such as Lakota, employ glides intervocalically to avoid hiatus. Thus, it is possible that what began as an excrescent process of glide insertion that depended on the previous vowel to determine their quality: i.e., back vowels are followed by [w] and front vowels followed by [j]. All other instances of hiatus are resolved by a glottal stop (Mirzayan p.c.).

(2.53) Hiatus resolution in Lakota

- a. *iyáph̃a* [i.j̃a.p̃\*<sup>a</sup>]  
i-a-ph̃a  
PV.INS-PV.SUPE-strike  
‘to strike someone unintentionally’ (Ullrich 2011:249)
- b. *owóškate* [o.wo.ʃka.te]  
o-o-škata  
PV.LOC-PV.ILL-play  
‘playground, park, recreation area’ (Ullrich 2011:442)
- c. *waáiyē* [wa.ʔa.ʔi.je]  
wa-a-iyA  
UNSP-PV.SUPE-speak  
‘to gossip about people’ (Ullrich 2011:579)

However, this system appears to be in flux in many varieties of Lakota and Dakota. There are words that seem to categorically resist glide insertion like in (2.54a) below. To wit, there are also words that allow for either the expected glide or glottal stop to avoid hiatus, such as (2.54b). Quizzically, there are also words that permit any epenthetic segment and are considered valid for all speakers as in (2.54c) below (Mirzayan p.c.).

(2.54) Unexpected epenthesis in Lakota

- a. *iúnšila* [i.ʔũ.ʃi.la, \*i.jũ.ʃi.la]  
i-unšila  
PV.INS-take.pity.on  
‘to take pity on someone by means of something’ (Ullrich 2011:241)
- b. *oihaŋke* [o.ʔwi.hã.ke ~ o.ʔi.hã.ke]  
o-i-haŋke  
PV.LOC-PV.DIR-portion  
‘to come to an end’ (Ullrich 2011:413)

- c. *huókaǰmi* ~ *huyókaǰmi* [hu.'ʔo.ka.x³mi ~ hu.'wo.ka.x³mi ~ hu.'jo.ka.x³mi]  
 hu-o-ka-ǰmi  
 bone-PV.LOC-INS.FRCE-be.crooked  
 ‘popliteal fossa’ (Ullrich 2011:177)

The variability in the epenthetic consonant utilized in Lakota appears to be a more extreme than the one-word variation in epenthesis we see in Mandan with /hũ:/ ‘mother.’ The system of hiatus resolution in Lakota is more strongly informed by the quality of the vowel preceding the hiatus, and as such, more closely aligned with its phonetic characteristics. Mandan, on the other hand, seems to have a system of hiatus resolution that is independent of the features of its surrounding vowels (i.e., phonetically motivated) and reliant on a system of a single, specific consonant being inserted to avoid hiatus at phrasal boundaries (i.e., phonologically motivated). The existence of *kohúywe* raises the question of whether this doublet is evidence of an older system more similar to that in Lakota, where hiatus is resolved by inserting a glide that shares features with non-low vowels, or whether it is part of an innovation by way of an incomplete phonological change where the different kinds of epenthetic segments were possible, but the collapse in the population of Mandan speakers and the leveling of dialects reversed this change. This work argues in favor of the latter scenario. This particular topic is addressed further in §3.3.5.4, and does not detract from the overall point of the argumentation above: modern Mandan has a productive and predictable process of inserting [ɾ] to break hiatus involving long vowels at phrasal boundaries involving enclitics.

Given what Maximilian (1839) writes about the Ruptaare variety of Mandan, which only has [ʔ] epenthesis and no [ɾ] epenthesis, the most likely scenario is that Ruptaare completely lost any kind of sonorant epenthesis that was part of a Pre-Mandan language by the time the Mandan had settled into two villages in the early 1800s, while Nuú’etaare had a robustly established epenthetic [ɾ] by that same time period. Aside from ‘mother,’ there could have been more doublets that survived into modern Mandan, but current speakers have been unable to recall any others.

The data presented thus far regarding the status of epenthetic [ɾ] refutes Hollow (1970) and Carter’s (1983) hypothesis that there are stems in Mandan that end in the coronal flap. This [ɾ] is a predictable epenthetic element that occurs due to the hiatus caused by certain enclitics: e.g., the narrative evidential *-oomak*, which Hollow (1970) analyzes as having an allomorph *-roomak*. Instead of attributing the numerous instances of stems and postverbal elements that appear with [ɾ] in some environments and lack it in others to phonology and allomorphy, we can accurately pin this elusive flap solely on phonology, keeping these constraints in mind:

(2.55) Epenthesis constraints

{ \*DIPHTHONG, \*HIATUS, \*]XP? } ≫ MAX-V ≫ DEP-C

We have two distinct epenthetic processes in Mandan that act on two different domains: [ʔ]-insertion prevents

hiatus within the domain of a morphological word, while [r]-insertion prevents hiatus between the domain of a morphological word and an enclitic. However, [r] epenthesis is triggered by the presence of long vowels; a different process resolves hiatus between two short vowels between the domain of a morphological word and an enclitic, which is described below.

### 2.5.1.3 Short vowel elision

While the preferred method of resolving hiatus in Mandan is to produce an epenthetic consonant, there are instances where hiatus is resolved by vowel deletion, as exemplified below, where each of the examples in (2.56) features clause-final morphology that begins with an onsetless formative. Furthermore, the short vowel in these formatives is elided when following a stem with an open syllable that also contains a short vowel. This environment differs from the one previously described in §2.5.1.2 in that epenthetic [r] occurs to prevent hiatus a phrasal boundary involving a long vowel or a stem ending in a glottal stop, whereas the deletions above all involve hiatus featuring only short vowels.

(2.56) Examples of hiatus resolution via vowel deletion

- a. *q'skere tú'sh*  
 ʌ's=krE tu=o'sh  
 horn=3PL be.some=IND.M  
 'there were some horns' (Trechter 2012b:20)
- b. *Réma'k wátéwe'na?*  
 re=wʌ'k watewe=o'ra  
 DEM.PROX=PSNL.LIE what=INT.F  
 'What is this?' (Kasak 2014a:7)
- c. *kixéekerek*  
 ki-xee=krE=ak  
 MID-be.quiet=3PL=DS  
 'them having quit' (Hollow 1970:430)

If we apply the constraints utilized thus far to resolve hiatus between two short vowels, we can see that they cannot account for short vowel elision. The hierarchy of epenthesis constraints discussed so far are repeated in (2.57). In the tableau in (2.58), candidate E wins, despite candidate D being the actual output. In the Ruptaare variety of Mandan during Maximilian's (1839) time, this type of hiatus was resolved by inserting a glottal stop: e.g., *shí'osh* /shi=o'sh/ 'it is good' versus *shí'sh* in the Nuú'etaare of that time and in modern Mandan. As such, nineteenth century Ruptaare would select candidate C as the winning candidate, as the glottal stop was the sole epenthetic segment. This historical evidence, along with the data presented above in (2.56), demonstrates that modern Mandan morpho-phonology prioritizes retaining long vowels over deleting them more than it does for short vowels. This

conspiracy to protect long vowels over short vowels indicates that the MAX-V constraint is insufficient to account for this behavior. Instead, we must acknowledge that Mandan ranks preserving long vowels higher than it does short vowels: i.e., MAX-V:  $\gg$  MAX-V.

(2.57) Epenthesis constraints

{ \*DIPHTHONG, \*HIATUS, \*]XP? }  $\gg$  MAX-V  $\gg$  DEP-C

(2.58) Short vowel elision in *shí'sh* 'it is good'

[ [j] =o? ]	*DIPH	*HIATUS	*]XP?	MAX-V	DEP-C	*COR	*PHAR
a. 'ji <sub>o</sub> ?f	*!						
b. 'ji.o?f		*!					
c. 'ji.ʔo?f			*!		*		*
d.  'ji?f				*!			
e.  'ji.ro?f					*	*	

Bearing in mind that long and short vowels are treated differently with respect to MAX, we must also account for the fact that it is preferable to delete a short vowel than it is to insert an epenthetic consonant. Based on this fact, we can assume that the hierarchy can be modified as follows: MAX-V:  $\gg$  DEP-C  $\gg$  MAX-V. Splitting MAX-V into two specific constraints allows us to rank preserving long vowels above preserving short vowels. We can see below how this ranking yields the expected output of the data in (2.58).

(2.59) Hiatus resolution constraints (revised)

{ \*DIPHTHONG, \*HIATUS, \*]XP? }  $\gg$  MAX-V:  $\gg$  DEP-C  $\gg$  MAX-V

(2.60) Short vowel elision in *shí'sh* 'it is good' (updated constraints)

[ [j] =o? ]	*DIPH	*HIATUS	*]XP?	MAX-V:	DEP-C	MAX-V	*COR	*PHAR
a. 'ji <sub>o</sub> ?f	*!							
b. 'ji.o?f		*!						
c. 'ji.ʔo?f			*!		*			*
d.  'ji?f						*		
e.  'ji.ro?f					*!		*	

While this new set of constraints produces the expected output for (2.60), this hierarchy fails to do so for (2.61) below. Candidate D is chosen as the output, even though the actual output is candidate E. Furthermore, these constraints as is will always result in elision for vowel-initial enclitics, even for stems ending in long vowels. Such environments will always trigger [r] epenthesis between the stem and the enclitic, but that is not what we see above.

(2.61) [r] epenthesis in *siiro'sh* 'it is yellow' (updated constraints)

[ [ si: ] =oʔf ]	*DIPH	*HIATUS	*]XPʔ	MAX-V:	DEP-C	MAX-V	*COR	*PHAR
a. 'si:qʔf	*!							
b. 'si:oʔf		*!						
c. 'si:ʔoʔf			*!		*			*
d.  'si:ʔf						*		
e.  'si:roʔf					*!		*	

A word like *\*sii'sh* is wholly ungrammatical in Mandan. Coda glottal stops are only permitted after short vowels. This restriction is due to the fact that coda glottal stops add to syllable weight, which is explained further in §2.5.4. As such, a [Vʔ] syllable is already heavy, so a long vowel plus a [ʔ] results in a superheavy syllable. Mandan clearly does not permit trimoraic syllables, so the  $\sigma_{\mu\mu\mu}$  constraint must be highly ranked.

(2.62)  $\sigma_{\mu\mu\mu}$ : Assign one violation for each syllable bearing three morae (i.e., syllables are maximally bimoraic).

With  $\sigma_{\mu\mu\mu}$  having such a high ranking, we can see how the output for (2.61) is correctly selected for in the tableau below. The place hierarchy that favors glottals over coronals for epenthetic segments is assumed to be the same as in previous tableaux, but the constraints are omitted for the sake of simplicity. Examples of enclitics beginning with both short and long appear below.

(2.63) [r] epenthesis in *siiro'sh* 'it is yellow' (re-updated constraints)

[ [ si: ] =oʔf ]	$\sigma_{\mu\mu\mu}$	*DIPH	*HIATUS	*]XPʔ	MAX-V:	DEP-C	MAX-V
a. 'si:qʔf	*!	*!					
b. 'si:oʔf			*!				
c. 'si:ʔoʔf				*!		*	
d. 'si:ʔf	*!						*
e.  'si:roʔf						*	

(2.64) [r] epenthesis in *siiroote'sh* 'it must be yellow' (re-updated constraints)

	[ [ [ si: ] =o:te ] =oʔf ]	*σ <sub>μμμ</sub>	*DIPH	*HIATUS	*]XPʔ	MAX-V:	DEP-C	MAX-V
a.	'si:q̣:teʔf		*!					*
b.	'si:o:teʔf			*!				*
c.	'si:ʔo:teʔf				*!		*	*
d.	'si:teʔf					*!		*
e.	ʔs̄ 'si:ro:teʔf						*	*

In (2.64), the actual output is correctly chosen as the output form. Candidate E wins out over the other candidates because it is preferable to insert an epenthetic consonant than it is to delete the long vowel in the indirect evidential *=oote* in candidate D, and candidates A through C likewise are ruled out by violated highly-ranked constraints such as \*DIPHTHONG, \*HIATUS, and \*]XPʔ. Each of the candidates also violated MAX-V due to the fact that the vowel in the male-directed allocutive agreement marker *=o'sh*, so candidate E is ultimately wins out based on violating DEP-C.

In items like in (2.63), the directionality of the elision for vowel-initial enclitics is obvious, since long vowels cannot be deleted, but short vowels can elide as a last resort. However, examples like (2.60) and (2.64) raise the question of the directionality of the elision: i.e., in /V<sub>1</sub>=V<sub>2</sub>/ environments, why must V<sub>2</sub> be elided while V<sub>1</sub> must always remain? When hiatus occurs due to an enclitic beginning with a short vowel adjoining onto a stem ending in a short vowel, one hundred percent of the data examined in the corpus involves elision of the second short vowel. Previous researchers who have looked into the directionality of elision, such as Casali (1997, 2011), note that languages exhibiting this behavior have a highly ranked MAXLEX constraint. Casali's (1997) definition of this constraint appears below.

(2.65) MAXLEX: Assign one violation for every input segment in a lexical word or morpheme that does not have a corresponding segment in the output (i.e., preserve segments in roots and in content words).

The constraint MAXLEX is ranked higher than MAX-V in languages where /V<sub>1</sub>-V<sub>2</sub>/ results in the deletion of V<sub>2</sub>. Having a highly-ranked MAXLEX constraint allows for the preservation of root-final vowels in Mandan, but does not factor in the effect of having multiple formatives concatenate to form a stem beyond just a bare root: i.e., a root plus an enclitic plus another enclitic. The wording of the constraint states that any time a segment that is part of any lexical item does not appear in the output, that candidate incurs a violation. As such, not only would deleting a root-final V<sub>1</sub> garner a violation, but the formative-initial V<sub>2</sub> would violation MAXLEX as well. In this respect, violating either V<sub>1</sub> or V<sub>2</sub> are treated equally under this definition of MAXLEX.

It is clear that Mandan robustly elides short vowels in short vowel-initial enclitics that follow short vowel-final stems, as the example below shows.

(2.66) Elision of multiple short vowels to avoid hiatus

<i>Tewét</i>	<i>tú'xere'sha?</i>
t-we=t	tu=o'xrE=o'sha
WH-INDF=LOC	be.some=DUB=INT.M

'Where would there possibly be any?' (Mixco 1997a:34)

The root *tú* 'to be some' ends in a short vowel, and the epistemic modal *=o'xere* begins in a short vowel. The short vowel in *=o'xere* is deleted, yielding a stem of *tú'xere*. This new stem likewise ends in a short vowel, so the male-directed allocutive interrogative enclitic *=o'sha* must in turn lose its initial /o/, yielding the proper output: *tú'xere'sha*. This process can be visualized below. Stem 1 represents the root *tú*, while Stem 2 is the result of concatenating *tú* plus *=o'xere*, onto which *=o'sha* must cliticize.

(2.67) Structural composition of *tú'xere'sha*

[ [ [ *tu* ]<sub>Stem 1</sub> *=o'xere* ]<sub>Stem 2</sub> *=o'sha* ]

As each postverbal element cliticizes onto its stem, the enclitic maximizes the segments already present in the stem and elides its initial vowel to avoid hiatus. As such, there is a conspiracy to maximize the segments in the stem, not necessarily a specific lexical item: e.g., a root or formative. Once an enclitic is properly realized with its accompanying stem, it forms a new stem, and any ensuing enclitics must be realized with that new stem in mind.

We can justify this process of  $V_2$  elision by attributing it to a constraint very similar to MAXLEX, but constrained to maximizing the faithfulness to a stem, rather than a root or a formative itself. That is to say, this constraint is sensitive to the compositional nature of the cliticization at work in (2.66) and (2.67) above. Instead of MAXLEX, I propose that what is really motivating the elision of  $V_2$  vowels is a constraint with a slightly different scope.

(2.68) MAXSTEM: Assign one violation for every input segment in a stem that does not have a corresponding segment in the output (i.e., preserve segments in stems over segments concatenated with stems).

In order to account for how the final vowels of a stem are always retained at the expense of the initial vowel on enclitics being elided, this MAXSTEM constraint must be highly ranked. Given the constraints discussed so far, we can relegate the allomorphy of postverbal elements described in Hollow (1970) fully to the phonology of Mandan rather than appealing to true allomorphy, which is divorced from any synchronic phonological process. Prefixal allomorphy is discussed further throughout Chapter 3.

The following tableaux contain examples of the three kinds of stems that necessitate hiatus repair mechanisms: the short vowel-final root *shí* ‘to be good,’ the long vowel-final root *síi* ‘to be yellow,’ and the glottal stop-final root *sé* ‘to ooze.’

(2.69) Hiatus resolution in *shí*’*sh* ‘it is good’

[ [ʃi] =oʃ ]	MAXSTEM	*σ <sub>μμ</sub>	*DIPH	*HIATUS	*]XP?	MAX-V:	DEP-C	MAX-V
a. ʃi <sub>o</sub> ʃ			*!					
b. ʃi.oʃ				*!				
c. ʃi.ʔoʃ					*!		*	
d.  ʃiʔʃ								*
e. ʃi.roʃ							*!	
f. ʃoʃ	*!							*

For the tableau in (2.69), the same hierarchy of constraints is able to produce the actual output given the three different stem types that trigger hiatus repair. Candidate D is chosen in (2.69) because it avoids short vowel-short vowel hiatus with a single violation of the lowest-ranked constraint, MAX-V, which deletes the vowel in =oʃ*sh* but preserves the vowel in the stem *shí*. This set of constraints and their rankings with respect to one another is able to account for the directionality of short vowel elision without having to resort to ad hoc constraints that specifically target the second vowel in a /V<sub>1</sub>=V<sub>2</sub>/ environment. The pattern of eliding the V<sub>2</sub> is due to the highly-ranked faithfulness constraint MAXSTEM, which rules out any deletion of stem-internal segments at the expense of stem-external ones in order to circumvent epenthesis. As such, V<sub>2</sub> elision is preferable to epenthesis, which appears to be an operation of last resort in order to avoid hiatus.

#### 2.5.1.4 Summary of hiatus resolution processes

In §2.5.1, I have argued that the following constraints are necessary to account for the observed resolution of /V<sub>1</sub>=V<sub>2</sub>/ in Mandan.

(2.70) Hierarchy of hiatus resolution constraints

$$\text{MAXSTEM} \gg \{ \sigma_{\mu\mu}, *DIPH, *HIATUS, *]XP? \} \gg \text{MAX-V} \gg \text{DEP-C} \gg \text{MAX-V}$$

Not only does the hierarchy above account for short vowel elision in Mandan, but also the appearance of epenthetic [ʔ] and [r]. The main difference between these two kinds of epenthesis is that glottal stops are used

for stem-internal epenthesis, while the flap is for stem boundary epenthesis. The markedness hierarchy (i.e., \*COR ≫ \*PHAR) was omitted for the sake of space above, but is included in the tableaux below sans \*LAB, as I am not including any candidates with labial epenthetic consonants due to the fact they will never win.

(2.71) Hiatus resolution in *síiro'sh* 'it is yellow'

[ [ si: ] =oʔf ]	MAXSTEM	*σ <sub>HHH</sub>	*DIPH	*HIATUS	*]xpʔ	MAX-V;	DEP-C	MAX-V	*COR	*PHAR
a. 'si:qʔf			*!							
b. 'si:oʔf				*!						
c. 'si:ʔoʔf					*!		*			*
d. 'si:ʔf		*!						*		
e.  'si:.roʔf							*		*	
f. 'soʔf	*!					*				

(2.72) Hiatus resolution in *se'ro'sh* 'it oozes'

[ [ seʔ ] =oʔf ]	MAXSTEM	*σ <sub>HHH</sub>	*DIPH	*HIATUS	*]xpʔ	MAX-V;	DEP-C	MAX-V	*COR	*PHAR
a. 'seʔʔf	*!		*							
b. 'se.ʔoʔf					*!					
c. 'seʔ.ʔoʔf					*!		*			*
d. 'seʔ:f		*!					*	*		*
e.  'seʔ.roʔf							*		*	
f. 'soʔf	*!*							*		

Candidate E is chosen in (2.71) due to the fact that deleting the vowel in the enclitic =o'sh would yield a highly-marked trimoraic syllable, and long vowel deletion likewise not permitted, so the last resort is to insert an epenthetic [r] between the stem and the enclitic. Finally, candidate D wins in (2.72) because of similar reasons to those in (2.71), as well as due to the fact that the coda glottal stop reduces the amount of variable outputs to select from because it is not a vowel itself, which results in a higher rate of highly-ranked constraint violations.

The above tableaux both deal with resolving hiatus at the right edge of a phrasal boundary. The tableau below

demonstrates how word-internal hiatus is resolved using the same constraint hierarchy. Using the word *wáa'oshi* /waa-o-shi/ 'good things' as an example, we can see below that these constraints yield the actual output.

(2.73) Hiatus resolution in *wáa'oshi* 'good things'

[ wa:-o-ʃi ]	MAXSTEM	*σ <sub>μμ</sub>	*DIPH	*HIATUS	*]XP?	MAX-V:	DEP-C	MAX-V	*COR	*PHAR
a. 'wa:ɔ.ʃi		*!	*!							
b. 'wa:o.ʃi				*!						
c. 'wo.ʃi	*!					*				
d.  'wa:ʔo.ʃi							*			*
e. 'wa:ro.ʃi							*		*!	
f. 'wa:ʃi	*!							*		

In (2.73), vowel deletion is highly marked, regardless of whether the vowel is short or long. This restriction against word-internal vowel deletion is due to the fact that these prefixes are more closely associated with the lexical stem, more so than the enclitics we have seen in the previous two tableaux. Eliding the vowel from the nominalizer *waa-* or the irrealis preverb *o-* would both violate MAXSTEM. This restriction on word-internal vowel deletion renders epenthesis as the only other repair mechanism for hiatus. Since there are no word-internal constraints conspiring to prevent word-internal manifestations of [ʔ], the deciding factor in what segment is chosen to be the epenthetic hiatus-breaker is the markedness hierarchy Prince & Smolensky's (1993) that Lombardi (2001) amends to include pharyngeals (i.e., sublaryngeal consonants like glottals). Glottals are less marked than coronals, and as such, candidate E incurs a fatal violation of \*COR, leaving \*PHAR to determine the place of articulation for the epenthetic consonant that interrupts the hiatus in (2.73).

The efficacy of this constraint hierarchy is evident in its ability to handle the full range of situations in which hiatus occurs: word-internally and at phrasal boundaries. The three different tactics for hiatus resolution are predictable and dependent on the precise cause of the hiatus. Word-internal morphological concatenation involves [ʔ] epenthesis, as it is the least-marked segment according to Prince & Smolensky (1993) and Lombardi's (2001) markedness hierarchy. Hiatus caused by enclitics becoming prosodically linked to stems ending in vowels or glottal stops have two different strategies: short vowels outside of the stem are elided, while an epenthetic [r] breaks up hiatus between long vowels or stems ending in glottal stops and the following enclitics to avoid violating the \*]XP? constraint, rendering epenthetic [ʔ] at phrasal boundaries impossible, and the MAXSTEM constraint, disqualifying any

candidates that delete material from a stem in favor of preserving material in an enclitic.

## 2.5.2 Metathetical processes

In addition to having two different forms of epenthesis, Mandan also features two different kind of metathesis. Both processes repair mechanisms to avoid illicit clusters, and both of them are predictable synchronic processes. One metathetical process prevents glottal stops from being the final element of a consonant cluster (see 2.5.2.1), while the other process prevents surface realizations of [kp] sequences (see 2.5.2.2). Both processes are noteworthy in that they are restricted to preventing illicit clusters within a single morphological word. Metathesis does not occur across a word boundary because metathesis is sensitive to word boundaries.

### 2.5.2.1 Glottal stop metathesis

In §2.1.2.2, I have explained that glottal stops do not occur word-initially or root-initially. This restriction against word-initial glottal stops is rooted in a historical change where Proto-Siouan words that began with \*ʔ metathesized with a vowel, moving the glottal stop from the onset to the coda.

(2.74) Historical glottal stop metathesis

Proto-Siouan	Gloss	Mandan	Gloss
*ʔa + *-t(a)	DEM.DIST + LOC	q̣'t~á't	'that one (far away)'
*wa-ʔij̣-he	INAN.CLF-wear.around.shoulders-NMLZ	mi'he	'shawl, blanket'
*ʔoo	'be.PL'	ó'	'to be'
*xʔehe	'drip'	xé'he	'rain'

Mandan not only does not permit glottal stops in word-initial positions, it does not permit /ʔ/ to be part of an onset cluster. In each of the Proto-Siouan forms above, we can see a word- or root-initial glottal stop manifest as a coda glottal stop in Mandan. The distal demonstrative \*ʔa combines with the locative \*-ta to become q̣'t in modern Mandan. Similarly, the \*ʔ in PSI \*wa-ʔij̣-he metathesizes with the vowel in its syllable nucleus. The plural copula \*ʔoo transparently metathesizes with the vowel, producing ó' 'to be' in Mandan.

Mandan productively inserts glottal stops to prevent hiatus within a stem, as described in §2.5.1.1. This is a common source of surface glottal stops. Another major source of surface glottals are from the allophones of certain prefixes. These prefixes, such as the first person stative marker *ma-* /ẉa-/ or the second person possessive *ni-* /ṛj̣-/, are alternatively realized as underlying /Cʔ-/ clusters instead of /CV-/ sequences: i.e., /ẉa-/ has the allomorph /wʔ-/ and /ṛj̣-/ has the allomorph /rʔ-/ before vowel-initial stems. These /Cʔ-/ clusters are not permitted in surface

representations in Mandan due to the \*C? constraint, so metathesis takes place as a repair mechanism.

(2.75) Synchronic [ʔ] metathesis

- a. *wá'ts*  
w'-at=s  
1POSS=father=DEF  
'my father'
- b. *rá're*  
r'-aa=E  
2POSS-arm=SV  
'your arm'
- c. *wá'kana'ko'sh*  
w'-aaki-rá'k=o'sh  
1S-be.above-PSNL.SIT=IND.M  
'I ride [on horseback]'
- d. *kú'he*  
k'-uh=E  
3POSS.PERS-wife=SV  
'his wife'
- e. *ko'áakis*  
ko-aaki=s  
REL-be.above=DEF  
'the one on top'

In (2.75a) through (2.75d), the prefixes involved have allomorphs that consist of a consonant and a glottal stop: e.g., the third person personal possessive *ko-* /ko-/ has the allomorph /k'-/ when before a nasal vowel. The phonetically identical relativizer *ko-* does not have any allomorphs, and as such does not trigger glottal stop metathesis. A similar argument can be made that this allomorphy occurs even when the prefix is added to a stem beginning with a long vowel, such as in (2.75c), where /wá-/ becomes /w'-/ before the stem *áakana'ko'sh*, yielding *wá'kana'ko'sh* 'I ride on horseback.' The long vowel contracts when followed by a coda glottal stop to avoid creating a trimoraic syllable: i.e., \*σ<sub>μμμ</sub>. This process of long vowel truncation is likewise seen in (2.74) above, such as in *mí'he* 'shawl', where the long vowel in \*ʔij 'to wear about the shoulders' becomes short when the glottal stop metathesizes to a coda position. While the data in (2.74) demonstrate that glottal metathesis is a diachronic sound change that occurred at a stage in development prior to modern Mandan, (2.75) shows that glottal stop metathesis is still a productive part of modern Mandan grammar.

As argued above, we can classify these differences in surface forms involving certain prefixes as allomorphic, and not some phonological process whereby the vowel in the prefix is syncope. While syncope may have been

part of a regular phonological rule at some point in the diachrony, this syncope became less regular over time and certain formatives came to be reanalyzed as having different forms when added to vowel-initial stems.

As we saw previously in (??), Mandan has a phonotactic restriction on glottal stops appearing as the second element in a consonant cluster. We can attribute this restriction to a highly-ranked \*Cʔ constraint, since it is preferable to metathesize the /ʔ/ rather than leave it in place. Furthermore, outputs that preserve the underlying /ʔ/ rather than delete it to avoid violating \*Cʔ are preferred over those that elide the glottal stop. Furthermore, the LINEARITY constraint must be ranked relatively low compared to \*Cʔ to account for the fact that segments in the input are able to appear in a different order in the output. The definition for LINEARITY appears below.

(2.76) LINEARITY: Assign one violation for each instance where an element in the input appears out of sequence in the output (i.e., no metathesis or movement).

The interaction between \*Cʔ and LINEARITY are demonstrated below, with the \*DIPHTHONG constraint removed from the tableau due to the fact it is not relevant to this example.

In the tableau in (2.78), Candidate A is ruled out due to the fact that it violates \*Cʔ, which is relatively highly-ranked because of the presence of the /wʔ/ cluster in the input not surfacing in that order in the output. This hierarchy eliminates candidate B due to the fact that the glottal stop is not present in the output, despite the fact that it is present in the input. This deletion of a segment from the stem incurs a violation of the MAXSTEM constraint. Thus, candidate C wins out on account of it preserving all the input segments, but metathesizing the /ʔ/ to avoid violating the \*Cʔ constraint. A summary of the constraints so far appears in (2.77).

(2.77) Hierarchy of constraints

MAXSTEM ≫ { \*σ<sub>μμμ</sub>, \*DIPHTHONG, \*HIATUS, \*]XPʔ } ≫ MAX-V: ≫ DEP-C ≫ { LINEARITY, MAX-V }

(2.78) /ʔ/ metathesis in wáʔts ‘my father’

		MAXSTEM	*σ <sub>μμμ</sub>	*Cʔ	*HIATUS	*]XPʔ	MAX-V:	DEP-C	LIN	MAX-V
	[ [ wʔ- at ] =s ]									
a.	'wʔats			*!						
b.	'wats	*!								
c.	ᵛᵛ 'waʔts								*	

A slightly more complicated situation arises when these underlying /Cʔ-/ allomorphs prefix onto stems that begin with long vowels. The noun áare ‘arm’ is one such stem, where the first person possessive marker mi- /wi-/ appears

as its allomorph /w'-/ due to its prefixing onto a vowel-initial environment. Metathesis must occur to avoid violating the \*C? constraint, but the metathesis sets up the condition for the syllable to contain a long vowel and a glottal stop coda. Such sequences are illicit in Mandan, due to the fact that [V:ʔ] syllables would be trimoraic and would thus violate \*σ<sub>μμμ</sub>. A demonstration of this vowel shortening process appears on the tableau below. This ranking assumes \*COR ≫ \*PHAR, though these constraints are not overtly present to conserve space.

The actual output of *áare* with first person possession marking is *wá're* 'my arm,' which is shown in (2.80). Any candidate with a surface [Cʔ] is not viable due to the \*C? constraint. Candidates A and C are ruled out for this reason. Candidates B and E are both eliminated from consideration due to the fact that they elide the underlying /ʔ/ and insert an epenthetic element between the stem and the utterance-final stem vowel /=E/. When /ʔ/ enters the coda to avoid violating \*C?, the long vowel truncates to avoid incurring a \*σ<sub>μμμ</sub> violation. Candidate D is disqualified for containing a trimoraic syllable, so the only possible output is candidate F. Candidate F features a short vowel instead of a long vowel as an act of last resort. In order for this long vowel to become a short vowel, there must be an IDENT(V:) constraint that is ranked lower than either of the two constraints heretofore mentioned, giving us the hierarchy shown below.

(2.79) Hierarchy of constraints (revised)

MAXSTEM ≫ ≫ { \*σ<sub>μμμ</sub>, \*C?, \*DIPHTHONG, \*HIATUS, \*]<sub>XP?</sub> } ≫ MAX-V: ≫ DEP-C ≫ { IDENT(V:), LINEARITY, MAX-V }

(2.80) /ʔ/ metathesis in *wá're* 'my arm'

[ [ wʔ- a: ] =E ]	MAXSTEM	*σ <sub>μμμ</sub>	*C?	*HIATUS	*] <sub>XP?</sub>	MAX-V:	DEP-C	IDENT(V:)	LIN	MAX-V
a. 'wʔa:.e			*!	*!						
b. 'wa:ʔe	*!				*		*			
c. 'wʔa:ʔe			*!		*!		*			
d. 'wa:ʔ.re		*!					*		*	
e. 'wa:.re	*!						*			
f.  'waʔ.re							*	*	*	

The primary driver of glottal stop metathesis is a highly-ranked markedness constraint, \*C?. It is thus preferable to metathesize the /ʔ/ with its following vowel than it is to preserve the underlying linearity. All glottal stop

metathesis is word-internal, and does not happen across word boundaries. No synchronic Mandan words begin with word-initial glottal stops due to the diachronic metathesis described in (2.74), so we are unable to test whether or not this metathetical process would take place across word boundaries, such as with compounds. Given the behavior of the other metathetical process in Mandan, it is likely that a word boundary would be a blocking mechanism for metathesis, as this is precisely the same condition that blocks velar-bilabial metathesis.

### 2.5.2.2 Velar-bilabial stop metathesis

The other instance of metathesis found in Mandan is likewise conditioned by the conspiracy in Mandan phonotactics to avoid a marked cluster. Instances of [kp] clusters on the surface are illicit, and when /k/ and /p/ come into contact through some morphological operations, the [p] must precede the [k] on the surface, as demonstrated by (2.81a) through (2.81c) below. This restriction on velar-labial clusters is restricted to velar and bilabial stops. Velar fricatives are permissible before bilabial stops, which (2.81d) shows. As such, this metathesis is specific to the combination of /k/ and /p/, rather than all velars followed by /p/.

(2.81) Examples of /kp/ metathesis

- a. *úpká*  
 ʊk-pá  
 hand-head  
 ‘thumb’ (Hollow 1970:35)
- b. *pka’úx*  
 k-pa-ux  
 SUUS-INS.PUSH-be.broken  
 ‘to break something of one’s own’ (Hollow 1970:263)
- c. *órapkakashinite*  
 o-ra-k-pa-kish=rít=E  
 PV.IRR-2A-MID-INS.PUSH-WIPE=2PL=SV  
 ‘that you wipe them out’ (Trechter 2012b:210)
- d. *maxpé*  
 wəxpé  
 nine  
 ‘nine’ (Hollow, Jones & Ripley 1976:21)

The ban on [kp] clusters can be motivated by a \*KP constraint, where such clusters are highly marked. This restriction on a particular cluster likewise implies that \*KP outranks LINEARITY. We can see the interaction between these two constraints on the tableau below. In (2.83), Candidate A is ruled out due to the fact it contains a [kp] cluster, as well as the fact that there is hiatus between the [a] and [u]. Candidate B fails for similar reasons, but the

\*KP violation alone is sufficient to disqualify it. Only candidate C, which violates LINEARITY to prevent a surface [kp] cluster, is a viable output for (2.83).

(2.82) Hierarchy of constraints (revised)

MAXSTEM  $\gg \gg$  { \*σ<sub>μμ</sub>, \*C?, \*KP, \*DIPHTHONG, \*HIATUS, \*]<sub>KP?</sub> }  $\gg$  MAX-V:  $\gg$  DEP-C  $\gg$  { IDENT(V:), LINEARITY, MAX-V }

(2.83) /kp/ metathesis in *pka'ux* 'to break one's own'

[ k- pa- ux ]	MAXSTEM	*σ <sub>μμ</sub>	*C?	*KP	*HIATUS	*] <sub>KP?</sub>	MAX-V:	DEP-C	IDENT(V:)	LIN	MAX-V
a. kpa.'ux				*!	*!						
b. kpa.'ux				*!				*			
c.  pka.'ux								*		*	

One exception to this generalization is that [kp] is possible in compounds when each segment is at a word boundary.

(2.84) Surface [kp] in compounds

- a. *manúuxikpa*  
warúuxik-pa  
ghost#head  
'skull' (Hollow 1973b:7)
- b. *Weróokpa*  
wrook-pa  
buffalo.bull#head  
'Buffalo Bull Head' (Densmore 1923:xviii)

The fact that [kp] is permissible in (2.84a) but not in (2.81) indicates that \*KP pertains to [kp] clusters within a single stem. For example, *pka'ux* 'to break one's own' cannot be \**kpa'ux* because its morphological structure is simplex: i.e., [ k- pa- ux ]. The word *manúuxikpa* 'skull' allows for [kp] due to the fact that it has a compound structure, which is [ [ warúuxik ] [ pa ] ]. As such, we cannot say that the \*KP constraint in Mandan rules out [kp] clusters across the board, but rather that it specifically considers stem-internal [kp] clusters to be illicit. A more specific definition of \*KP appears below.

(2.85) \*κP: Assign one violation for each surface [kp] cluster that appears within the domain of a single stem (i.e., not across word boundaries within a compound word).

This constraint differs from \*C? in that the restriction against [C?] clusters holds across the board, and is not specific to the domain of a single stem. The one compound where \*κP is active is the word *úpka* ‘thumb,’ which is comprised of the word *úk* ‘hand’ and *pá*. The most likely reason for the \*κP constraint applying across a word boundary is that this word is not interpreted by speakers as a compound, but it has been reanalyzed as a simple word. All other novel compounds involving *pá* ‘head,’ such as those seen in (2.84), permit surface [kp] clusters.

### 2.5.2.3 Summary of metathetical processes

Throughout §2.5.2, I have demonstrated that the following constraints are necessary to justify the outputs for inputs containing the two metathesis-triggering consonant clusters in Mandan: [C?] and [kp]. These constraints interact with the constraints governing hiatus resolution in §2.5.1,

(2.86) Hierarchy of constraints (updated)

$$\text{MAXSTEM} \gg \{ *σ_{μμ}, *C?, *DIPHTHONG, *HIATUS, *κP, ]_{XP?} \} \gg \text{MAX-V} \gg \text{DEP-C} \gg \{ \text{IDENT(V:)}, \text{LINEARITY}, \text{MAX-V} \}$$

The two constraints \*C? and \*κP are highly ranked, which rule out candidates that preserve any of the pertinent underlying clusters. The faithfulness constraints of IDENT(V:) and LINEARITY must be dominated by the aforementioned markedness constraints, which in turn are dominated by the MAXSTEM constraint in order to motivate a preference for metathesis over deletion when conditions for such clusters arise.

In both processes described in this section so far, we can see that word boundaries play an important role in blocking certain morpho-phonological processes. Having established that Mandan morpho-phonology is sensitive to word boundaries, we can now take this observation and apply a similar analysis to other

### 2.5.3 Nasal harmony

The nasal sonorants [m] and [n] are some of the most common surface segments in Mandan. In Kennard (1936), these two nasal consonants are listed as being phonemic: i.e., /m/ and /n/. However, Hollow (1970) demonstrates that all surface nasal consonants arise due to contact with an underlying nasal vowel. This lack of phonemic nasal consonants in Mandan is typologically rare, with perhaps fewer than two percent of languages sharing this gap in their phonemic inventories (Sampson 1999, Maddieson 2013a).

As previously discussed, [Hollow \(1970\)](#) and [Mixco \(1997a\)](#) state that [m] and [n] are allophones of /w/ and /r/, respectively, and are only realized as nasals when before a nasal vowel through regressive nasal assimilation, as seen below with the nasal spread underlined.

(2.87) Regressive nasal assimilation

- a. /ra:wri/ → [n̄ã:m̄ini] ‘three’
- b. /wa-rã:tE=ɔʔf/ → [m̄ã.n̄ã:te?f] ‘I stand up’
- c. /wa:-wa-ra-rũ:=rĩx=rĩt=kt=ɔʔf/ → [m̄ã:m̄ã.n̄ã.n̄ũ:n̄ĩ.x̄n̄ĩ.stoʔf] ‘thou shalt not commit adultery’

In (2.87a), the nasality from the underlying /i/ in *náamini* spreads leftward, adding [+nasal] to voiced segments. Since the only underlyingly voiced consonants in Mandan are sonorants, /w/ and /r/ are able to take on this nasal feature. Nasality is able to spread from a stem to a prefix, which (2.87b) demonstrates. In (2.87b), not only does nasality spread leftward from /ã:/ onto the /r/ to make it [n], but this harmony continues past the boundary of the stem and onto the /a/ in the first person active prefix /wa/, which then causes the /w/ to nasalize to [m]. The last example in (2.87c) illustrates that this nasal harmony can cause distant segments that are not in contact with a syllable bearing an underlying nasal vowel to pick up nasal features.

[Hollow \(1970:21\)](#) describes regressive nasal assimilation in Mandan as being optional across morpheme boundaries, but obligatory within a morpheme, which he codifies below:

(2.88) [Hollow’s \(1970:21\)](#) Regressive Nasal Assimilation rule

$$\left\{ \begin{array}{l} \text{Resonant consonants} \\ \text{Apex vowels} \end{array} \right\} \rightarrow [+nasal] / \_ [+nasal]$$

The apex vowels consist of non-mid vowels: i.e., /a i u/. [Hollow \(1970\)](#) classifies /w/ and /r/ as resonants, and also places /h/ in that category. [Hollow \(1970\)](#) does not elaborate on why he classifies /h/ as a resonant with the two sonorant consonants. One possibility is that /h/ can optionally become voiced intervocalically, and nasality only spreads along voiced segments: e.g., /paahĩ/ ‘porcupine’ can be realized as either [pa:hi] or [pã:fi].<sup>17</sup>

The rule given in (2.88) stipulates that leftward nasal harmony in Mandan spreads along voiced segments that are not mid-vowels. As such, any voiceless segment or mid-vowel will act as a blocking mechanism for nasal harmony. This behavior is demonstrated below, again with the nasal spread highlighted with an underline.

<sup>17</sup>The fully nasalized version of ‘porcupine’ is much more common in the corpus: i.e., [pã:fi].

(2.89) Blocking environments for regressive nasal harmony

- a. /ruwãʔk/ → [nũ.mãʔk]  
‘man’
- b. /istawĩʔ/ → [i.stã.mĩʔ]  
‘eye’
- c. /ĩ:tahrũ/ → [ĩ.ta.hĩnũ]  
‘neck’
- d. /ra-rĩh=oʔf/ → [nã.nĩ.hoʔf]  
2A-breathe=IND.M ‘you breathe’
- e. /wĩʔti=krE=s=e:rã/ → [mĩʔ.ti.k<sup>c</sup>re.se:nã]  
village=3PL=DEF=DEM.DIST=TOP  
‘the villagers [there]’
- f. /o:xa=e:rã/ → [o:xa.re:nã]  
fox=DEM.DIST=TOP  
‘the fox [there]’
- g. /wa:-wã-taʔi=xi=oʔf/ → [mã:mã.ta.ʔi.xiʔf]  
NEG-1S-like=NEG=IND.M ‘she doesn’t like me’

In (2.89a), (2.89d), and (2.89g), we see nasal harmony spread leftward from an underlying nasal vowel to the left edge of the word no differently than we saw in (2.87). However, we see in (2.89b) and (2.89c) that a voiceless segment is preventing the spread of the [+nasal] feature. The mid-vowels in (2.89e) and (2.89f) likewise prevent the leftward spread of nasality.

The behaviors thus far suggest that there are two different markedness constraints that promote nasal harmony. One constraint considers sequences where a voiced non-nasal segment that precedes a nasal segment to be marked, while the other treats nasalized mid-vowels as marked. Both these markedness constraints interact with a faithfulness constraint that allows the nasal feature of a segment to differ from that of its input. These three constraints appear below.

(2.90) Nasal harmony constraints

- a. \*Ê: Assign one violation for each mid-vowel that bears a [+nasal] feature.

- b. \*R $\tilde{V}$ : Assign one violation for each contiguous [+voice, –nasal] segment that precedes a [+nasal] segment (i.e., additional violations are incurred for each segment that should be nasalized through the iterative application of nasal spreading).
- c. IDENT(Nasal): Assign one violation for each segment in the output whose [ $\pm$ nasal] feature differs from that of its input form.

We can make ranking arguments for the constraints above in (2.90) and contextualize them within the greater hierarchy of constraints discussed so in this chapter. To demonstrate how these constraints can correctly predict the output forms for words bearing underlying nasal vowels, we shall use the data in (2.89f) and (2.89g) as exemplars.

In the tableau in (2.92) below, we see that \*R $\tilde{V}$  incurs multiple violations for each contiguous [+voice, –nasal] segment that precedes a segment bearing a [+nasal] feature. Both candidates A and B have three voiced segments before the /ã/, and as such incur three violations. These two candidates are ruled out, however, but highly-ranked constraints such as MAXSTEM-V and \*HIATUS. Candidates C through F are assigned progressively fewer violations of \*R $\tilde{V}$  as each segment left of the /ã/ becomes nasalized. Eventually, candidate F wins out because of the lack of \*R $\tilde{V}$  violations and in spite of the three violations of IDENT(Nasal). This example demonstrates that \*R $\tilde{V}$  can motivate long-distance nasal harmony in Mandan, but it does not show the effects of the two conditions for blocking the spread of nasality: mid-vowels and voiceless segments.

(2.91) Hierarchy of constraints (updated)

MAXSTEM  $\gg$  { \* $\sigma_{\mu\mu}$ , \*C?, \*DIPHTHONG, \* $\tilde{E}$ , \*HIATUS, \* $\kappa\text{P}$ , ] $\text{XP}$ ? }  $\gg$  \*R $\tilde{V}$   $\gg$  { DEP-V, MAX-V: }  $\gg$  { DEP-C }  $\gg$  { IDENT(Nasal), IDENT(V:), LINEARITY, MAX-V }

(2.92) Nasal harmony in *máamatašixi'sh* ‘she doesn’t like me’

wa:-wã-taʃi=xi=oʃ	MAXSTEM-V	*HIATUS	* $\tilde{E}$	*R $\tilde{V}$	MAX-V	Id(Nas)
a. 'wa:wã.ta.ʃi.xi.oʃ		*!		***		
b. 'wa:wã.ta.ʃi.xoʃ	*!			***	*	
c. 'wa:wã.ta.ʃi.xiʃ				*!*	*	
d. 'wa:mã.ta.ʃi.xiʃ				*!*	*	*
e. 'wã:mã.ta.ʃi.xiʃ				*!	*	**
f.  'mã:mã.ta.ʃi.xiʃ					*	***

Looking at short-distance nasal harmony, we can see the nasal harmony in (2.93) originates from the vowel in

the topic marker /=rã/ at the end of the word. Nasality spreads leftward onto the /r/, making it [n]. As we see in candidates E through G, there are still three more contiguous [+voice, –nasal] segments preceding the nasal vowel. Allowing the nasality to move onto the demonstrative enclitic /=e:/, however, causes a fatal violation of \*Ē, which rules all three of these candidates out, even though they have progressively fewer violations of \*R<sup>̃</sup>V. It is thus better to allow several violations of \*R<sup>̃</sup>V than a single violation of \*Ē, which accounts for why the winning candidate is D.

(2.93) Nasal harmony in *óoxareena* ‘the fox [there]’

o:xa=e:rã	MAXSTEM-V	*HIATUS	*Ē	*R <sup>̃</sup> V	DEP-C	MAX-V	ID(Nas)
a. 'o:xa.e:rã		*!		****			
b. 'o:xe:rã	*!			**			
c. 'o:xa.re:rã				****!	*		
d. 'o:xa.re:nã				***	*		*
e. 'o:xa.rẽ:rã			*!	**	*		**
f. 'o:xa.nẽ:rã			*!	*	*		***
g. 'o:xã.nẽ:rã			*!		*		****

Given what we have observed, we can incorporate these new constraints into our working hierarchy, shown below.

(2.94) Hierarchy of constraints (updated)

MAXSTEM  $\gg$  { \* $\sigma_{\mu\mu}$ , \*C $\zeta$ , \*DIPHTHONG, \*Ē, \*HIATUS, \* $\kappa\phi$ , ] $\chi\phi$ ? }  $\gg$  \*R<sup>̃</sup>V  $\gg$  { DEP-V, MAX-V: }  $\gg$  { DEP-C }  $\gg$  { IDENT(Nasal), IDENT(V:), LINEARITY, MAX-V }

These constraints have so far been able to accurately predict the actual output with respect to nasal harmony, even when several of the examples have shown that nasal harmony is able to spread across long distances, provided that the right featural environment exists: i.e., non-nasal voiced segments that are not mid-vowels. These constraints notwithstanding, there are a large number of words where nasal harmony does not occur where expected. Nasal spread is highlighted by an underline.

(2.95) Unexpected lack of nasal harmony

- a. /i-wãfut/  $\rightarrow$  [i.mã.fut], \*[i.mã.fut]  
 PV.INS-clothe ‘clothes, shirt, dress, coat’

- b. /i-wĩ-ka-watke/ [i.mĩ.ka.wa.tke], \*[ĩ.mĩ.ka.wa.tke]  
 PV.INS-1POSS-INS.FRCE-put ‘my driftwood doctor’
- c. /a-w-rĩ-rE:h=oʔf/ [a:mĩnĩ.re:hoʔf], \*[ã:mĩnĩ.re:hoʔf]  
 PV.TR-1A-2S-go.there=IND.M ‘I brought you, I went with you’
- d. /rV-i-wrĩx=oʔf/ → [ⁿdi:mĩnĩ.xoʔf], \*[ⁿĩ:mĩnĩ.xoʔf]  
 1A.PL-PV.INS-play=IND.M ‘we played’
- e. /rE:h=ha=awĩ:/ → [ⁿda:ha:mĩ:], \*[ⁿda:hã:mĩ]  
 go.there=SIM=CONT ‘while he was going along’
- f. /hu:=rĩ/ → [hu:nĩ], \*[hũ:nĩ]  
 ‘he came and...’
- g. /pxi=rã:tE=oʔf/ [pxi.nã:teʔf], \*[pxĩ.nã:teʔf]  
 sneeze=PRSP=IND.M ‘he almost sneezed’
- h. /rE:h#hrE=rĩ/ → [ⁿda:hªra.nĩ], \*[ⁿda:hªnã.nĩ]  
 go.there#CAUS=SS ‘he put it there and...’
- i. /rũ:ʔeta:#wĩ:h=s/ → [ⁿũ:ʔe.ta:mĩ:hs], \*[ⁿũ:ʔe.tã:mĩ:hs]  
 Mandan#woman=DEF ‘the Mandan woman’
- j. /rokã:ka wã-hE=oʔf/ → [ⁿdo.kã:ka mã.'heʔf], \*[ⁿdo.kã:kã mã.'heʔf]  
 old.woman 1S-see=IND.M ‘the old woman sees me’

In all of the words in (2.95), the featural conditions are met such that nasal harmony should occur. All feature an apex vowel that precedes a syllable containing an underlying nasal vowel, such as /hu:=rĩ/ ‘he came and...’, and nasal harmony resolves as predicted within the syllable containing /ĩ/, yielding [nĩ]. However, nasal harmony does not spread onto the /u:/, despite the fact that /u u:/ can participate in nasal harmony under normal circumstances: e.g., /ruwãʔk/ → [ⁿũ.'mãʔk] ‘man.’

There are three observations in (2.95) above for what blocks the spread of nasal harmony: preverbs, enclitic boundaries, and word boundaries. In (2.95a) through (2.95c), nasality spreads leftward from a morphological element towards the left edge of the word, but does not trigger nasal harmony past a preverb, even when that preverb is an apex vowel. Similarly, in (2.95d) through (2.95h), nasality spreads leftward from an enclitic and moves to the edge of the enclitic, but does not move onto its stem, regardless of whether that stem is a lexical root or another enclitic. The final observation is that nasal harmony is blocked from spreading past a word boundary. We see this blocking effect in compound nouns like the one in (2.95i) as well as in independent prosodic words like in (2.95j).

In all the examples in (2.95) above, there must be some morphologically-motivated reason for why nasal harmony does not occur. As such, we cannot attribute these non-featural blocking environments to the phonology alone. The position taken in §1 is that words in Mandan can have more articulated internal structure: i.e., composite words, where there is a morphological head and then other material within the domain of the overall word that is not a word itself, resulting in a structure like [ X [ Y ]<sub>Head</sub> ]. This argumentation is dealt with in greater detail in §4.3.2.3.1 and Chapter 4 in general.

With no featurally conditioning factor blocking the spread of nasality leftward onto a preverb, the interpretation of preverbs creating internal word boundaries within a morphological word would allow us to apply a generalization already observed in non-complex words and apply it to these cases of complex words: i.e., compounds and composites. The three processes described so far (i.e., hiatus resolution (see §2.5.1), metathesis (see §2.5.2), and now nasal harmony) are all sensitive to word boundaries, and the final boundary-sensitive morpho-phonological process patterns like those mentioned here.

#### 2.5.4 Stress

Mandan has a robustly predictable system of primary stress assignment. Primary stress is iambic and weight-sensitive, so primary stress typically appears on the second syllable, unless the first syllable is heavy, in which case the word has first-syllable stress. There is no primary stress on the third syllable or beyond. Words containing a single light syllable can still bear primary stress, so we can tell that footing for primary stress does not cross word boundaries: i.e., a poorly-formed iamb is preferable to a well-formed iamb that is footed across a word boundary.

This behavior for stress is not remarkable by itself. What is noteworthy, however, is that preverbs typically appear with primary stress, even though most preverbs are light syllables. Even if forming an iamb is possible, a word with a preverb with no preceding morphological material will always feature first-syllable stress, despite the fact that a well-formed iamb is possible. This stress assignment behavior seems unexpected at first, but if we analyze words with preverbs as having internal word boundaries, then this generalization about stress not being footed across word boundaries handily explains the presence of a light first syllable bearing stress over even a heavy second syllable.

##### 2.5.4.1 Previous descriptions of Mandan stress

One aspect of the sound system of Mandan that has been treated with the highest degree of inconsistency is that of word-level prominence marking. The aristocrat and adventurer Prince Maximilian (1839) uses German orthographic convention to transcribe Mandan, and typically marks where he hears primary stress with an acute accent mark.

(2.96) Accentuation in [Maximilian \(1839\)](#)

⟨tapsá⟩	/tapsa/	[(ta.'psa)]	<i>tapsá</i>	'ash tree'
⟨máhnũ⟩	/wã:rũ/	[('mã:).nũ]	<i>máanu</i>	'turkey'
⟨uihkchák-chäkä⟩	/waa-i-kxE~kxEka/	[('wi:).kxa:.kxe.ka]	<i>wiikxaakxeka</i>	'magpie'
⟨scháh-hä⟩	/ʃaʔh=E/	[('ʃaʔ).he]	<i>shá'he</i>	'hoof'

[Maximilian \(1839\)](#) is often able to discern vowel length, which he typically marks in the German custom by following a vowel with an ⟨h⟩. However, he does sometimes conflate vowel length and stress.

The second-oldest Mandan word list by the trader [Kipp \(1852\)](#), whose wife was Mandan, sparingly uses diacritics. When [Kipp](#) does include diacritic marks, an acute accent typically appears on a word-final ⟨e⟩, and it is unclear whether this acute accent mark is meant to indicate that the sound is not silent as in English, if it is to emulate the sound of the ⟨e⟩ with *accent aigu* as in French (i.e., [e] instead of [ɛ]), or if the acute accent mark indicates stress.

(2.97) Accentuation in [Kipp \(1852\)](#)

⟨warade⟩	/wraʔ=E/	[('w <sup>a</sup> raʔ).re]	<i>wará're</i>	'fire'
⟨wahe⟩	/waʔ=E/	[('waʔ).re]	<i>wá're</i>	'snow'
⟨xaxe⟩	/xãh=E/	[('xã).he]	<i>xáhe</i>	'grass'
⟨xooré⟩	/xo:=E/	[('xo:).re]	<i>xóore</i>	'ice'
⟨äapé⟩	/a:p=E/	[('a:).pe]	<i>áape</i>	'leaf'
⟨maniséroute⟩	/wriš#e:-rut=E/	[('m <sup>i</sup> nīs).e:.ru.te]	<i>miníseerute</i>	'dog'

In the case of the last two words above, 'leaf' and 'ice,' both words contain a heavy syllable followed by an unstressed final syllable. [Kipp \(1852\)](#) includes an ⟨é⟩ word-finally, even though that syllable should not bear any kind of stress, while he neglects to put any diacritic on the final vowel in 'fire.' Given this inconsistency throughout his wordlist, and given the lack of accentuation on any other vowel, we cannot surmise precisely what [Kipp](#)'s intentions are. This wordlist was created at the behest of [Schoolcraft \(1853\)](#), who was charged with creating a comprehensive survey of the indigenous peoples of the United States and their languages through the Bureau of Indian Affairs.

Following his fieldwork on the Fort Berthold Reservation, [Kennard \(1936\)](#) publishes a brief grammatical sketch of Mandan wherein he states that stress is not predictable and can shift along a stem when affixes are added. [Kennard](#) gives the following examples of how affixation affects stress placement.

(2.98) Accentuation in Kennard (1936)

⟨nu'maḵ⟩	/ruwãʔk/	[(nũ.'mãʔk)]	<i>numá'k</i>	'man'
⟨numa'kci⟩	/ruwãʔk#fi/	[(nũ.'mãʔk).fi]	<i>numá'kshi</i>	'chief'
⟨ki'numa'kci⟩	/ki-ruwãʔk#fi/	[(ki.'nũ).mãʔk.fi]	<i>Kinúma'kshi</i>	'Royal Chief'
⟨nu'maḵa'ki⟩	/ruwãʔk-a:ki/	[(nũ.'mãʔ).ka:ki]	<i>numá'kaaki</i>	'people, human'
⟨a'kinuma'kaki⟩	/a:ki#ruwãʔk-a:ki/	[('a:).ki.nũ.mãʔ.kɑ:ki]	<i>Aakinumá'kaaki</i>	'Native American'

Though Kennard's (1936) original orthography attempts to make note of primary and secondary stress, he is very inconsistent in where he marks stress. There are numerous instances where a the same word has stress on differing syllables within the same sentence. This wide discrepancy in stress marking largely comes from Kennard conflating stress and phrasal pitch accent.

The most divergent approach to dealing with Mandan stress is found in Hollow (1970), who states that Mandan does not have vowel length, contra Kennard (1936) and Maximilian (1839). Hollow proposes that stems in Mandan either have or lack underlying stress. Furthermore, Hollow (1970:50) proposes the following system for stress:

In two syllable roots with stress on the second syllable, and with stressed monosyllabic verb roots preceded by instrumental prefixes, stress may be moved to the first root syllable or to the instrumental prefix if the stress movement would result in the stress being placed on the second syllable of the derived form. Details of stress placement under these conditions have not be worked out.

This generalization is codified with two SPE-style rules: one to place primary stress, and another to remove the underlying stress from the remaining elements in a word.

(2.99) Stress assignment rules in Hollow (1970)

- a. Primary stress assignment:

$$V \rightarrow [+stress] / \#C_0\_C_0V^{[-stress]}$$

- b. Underlying stress deletion:

$$V \rightarrow [-stress] / V^{[+stress]}\Sigma_0\_\#$$

We can see the application of these stress rules at work below in an example that Hollow (1970:50) gives. The data here use Hollow underlying representation and phonetic interpretation of the words *wáaratookaxih* 'old man.'

(2.100) Stress assignment and deletion in [Hollow \(1970\)](#)

/wá-	+	ratór	+	-ka	+	xíh/	
wá-	+	ratór	+	-ka	+	xí	final resonant deletion
wá-	+	rató	+	-ka	+	xí	preconsonantal /r/ deletion
wá-	+	rato	+	-ka	+	xi	stress
<wáratokaxi>							

[Hollow \(1970\)](#) is generally correct in where he places primary stress in his transcribed narratives, but the application of these stress rules is inconsistent throughout his dictionary and grammar. Furthermore, he states that stress can fall on vowels he describes as epenthetic, which spectral analysis shows not to be the case. [Mixco \(1997a\)](#) largely follows [Hollow's \(1970\)](#) interpretation of some roots having underlying stress, but acknowledges that certain roots contain underlyingly long vowels.

Some contemporaries who have worked with Mandan have even described Mandan as having a pitch accent system rather than a stress accent system ([Boyle p.c.](#), [Park p.c.](#)). [Park \(p.c.\)](#) has even gone so far as to posit that Mandan has a pitch accent system whereby high tone can be found on multiple adjacent morae, with some long vowels having pitch contour differences.

(2.101) [Park's \(p.c.\)](#) pitch marking

<taxáráxe>	/ta-xrax=E/	[(ta.'x <sup>a</sup> ra).xe]	<i>taxaráxe</i>	'his chest'
<tóóp>	/top ~ to:p/	[('top) ~ ('to:p)]	<i>tóp</i>	'four'

The interaction between pitch and stress in Mandan is discussed in §2.5.4.4.1, wherein I explain that the perception of stress or high tone on Dorsey's Law vowels come from the physiological process of F0 undershoot on the way to the target vowel. The perception of a long rising vowel for *tóp* is an elicitation effect caused by one speaker emphasizing it when in isolation. More on the interaction of pitch and stress is dealt with in §2.5.4.4.1 below.

Overall, any researcher who has discussed stress in Mandan has stated that stress assignment is something that must be worked out in future. No author revisits the issue of stress in subsequent scholarships, and as such, it is left to this work to re-examine it. In this section, I discuss the overarching pattern for primary stress assignment in Mandan, as well as secondary stress, which a topic heretofore untouched by previous scholars. I argue that primary stress assignment is quite regular and generally predictable, with the exception of certain fossilized compounds where stress seems to be lexical synchronically but still adhere to regular stress placement rules if viewed diachronically.

#### 2.5.4.2 Default primary stress assignment

In their analysis of the sound system of Proto-Siouan, Rankin, Carter & Jones (1998) note that primary stress in Proto-Siouan is overwhelmingly on the second syllable, unless the first syllable bears a long vowel.<sup>18</sup> This pattern holds true even today for many Siouan languages across all branches of the Siouan language family: e.g., Hidatsa (Boyle et al. 2016), Lakota (Boas & Deloria 1941), Tutelo (Oliverio 1997), and Ioway-Otoe (Whitman 1947). With this family-wide pattern in mind, I have proposed that Mandan features a similar system of primary stress assignment (Kasak 2014b). Stress in Mandan is robustly drawn to the second syllable when a word begins with two light syllables, but the first when the word begins with a heavy syllable. This pattern is demonstrated below.

The first four items in (2.102) involve two initial light syllables. In such cases, stress falls upon the second syllable. Similarly, in cases where the second syllable is heavy (i.e., it contains a long vowel or coda [ʔ]), stress still falls on the second syllable. We can contrast this pattern with the one seen in (2.103), where an initial heavy syllable attracts stress, even if the word begins with two heavy syllables, as we see in *kóoxq'te* ‘corn.’ The vast majority of morphologically simple words in Mandan conform to this pattern.

#### (2.102) Second-syllable stress

/ifak/	[(i.'fak)]	<i>ishák</i>	‘he, she, they’
/taʃka/	[(ta.'ʃka)]	<i>tashká</i>	‘how’
/restā/	[( <sup>n</sup> de.'stā)]	<i>restá</i>	‘bullsnake’
/pasāh/	[(pa.'sāh)]	<i>pasáh</i>	‘creek, stream’
/arikra/	[(a.'ri).k <sup>a</sup> ra]	<i>Arikara</i>	‘Arikara’ (< Ar. <i>árikaraaru</i> ‘stag’)
/ihātu/	[(i.'hā).tu]	<i>Ihātu</i>	‘Yankton’ (< Dak. <i>Ihánktŕuŋwaŋ</i> ‘dwelling at the end’)
/iwā:=E/	[(i.'mā):.re]	<i>imáare</i>	‘a body’
/paxa:=E/	[(pa.'xa):.re]	<i>paxáare</i>	‘beloved’
/ta-wĩʔti/	[(ta.'mĩʔ).ti]	<i>tamí'ti</i>	‘his/her/their village’
/ru-pĩʔx=E/	[( <sup>n</sup> du.'pĩʔ).xe]	<i>rupí'xe</i>	‘to scatter (by hand)’

<sup>18</sup>We can reconstruct stress in Proto-Siouan through Carter’s Law, where a plain stop in Pre-Proto-Siouan becomes pre-aspirated in Proto-Siouan (Rankin, Carter & Jones 1998). Preaspirated stops have different reflexes than plain stops in daughter languages, so this former allophony in Pre-Proto-Siouan had become reanalyzed as being a phonemic difference in Proto-Siouan (Rankin p.c.). The one Siouan language that flouts this stress pattern in Crow, which developed a Japanese-style pitch accent system where high pitch originates on a mora and spreads towards the leftmost biomoraic syllable bearing a long vowel: /maa-ihulí#shoopé/ → [bááíihúlíshópé] ‘table,’ but /ana-maa-chimmi-uu=a/ → [ammááchím-múua] ‘school’ (cf. Graczyk 2007 and Wallace 1993).

(2.103) First-syllable stress

/pã:pi/	[(pã:).pi]	<i>páqpi</i>	‘thin’
/wa:xtik/	[(wa:).xtik]	<i>wáaxtik</i>	‘jackrabbit’
/a:ki=ta:/	[(a:).ki.ta:]	<i>áakitaa</i>	‘above’
/ko:xã?te/	[(ko:).xã?.te]	<i>kóoxq?te</i>	‘corn’
/wĩ?h=E/	[(mĩ?).he]	<i>mí?he</i>	‘robe’
/rã?=oʔf/	[(nã?).roʔf]	<i>ná?ro?sh</i>	‘it aches’
/wʔ-a:kup/	[(waʔ).kup]	<i>wá?kup</i>	‘war bonnet’
/seʔ=oʔre/	[(seʔ).roʔ.re]	<i>sé?ro?re</i>	‘it came apart’

One of the major phonetic cues for stress is a raised F0 value. We can see the increase in pitch for the third person pronoun *ishák* in Figure (2.20) and the interrogative *tashká* in Figure (2.21) on the spectrograms below. These two words are typical LL iambs. A similar behavior for F0 can be seen on the pitch contour for the HÍ iambs with *áakitaa* ‘above’ in Figure (2.22) and *ní?ni* ‘he climbed and...’ in Figure (2.23). We likewise see a noticeable drop in F0 after the primary stress in these words, a pattern likewise observed in LHÍ iambs, as seen in Figure (2.24) with *patáqta* ‘push!’ and in Figure (2.25) with *numá?k* ‘person.’ With the pitch curve in *numá?k*, we do not notice as drastic a rise and fall in pitch. This behavior will be discussed further in §2.5.4.4.

Figure 2.20: *ishák* 3.PRO

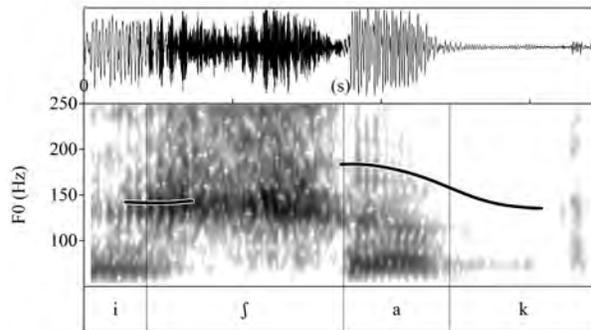
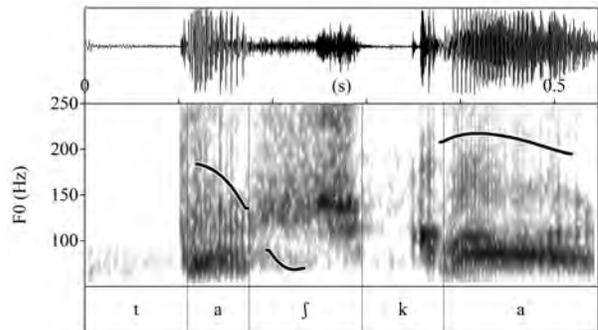


Figure 2.21: *tashká* ‘how’



With this stress assignment behavior in mind, we can appeal to the following OT constraints in (2.104) to justify the distribution of primary stress seen thus far by ordering them in the hierarchy seen in (2.105).

(2.104) Primary stress constraint definitions

- a. IAMB: Assign one violation for each foot whose head is not final (i.e., LL and LHÍ are well-formed iambs,

Figure 2.22: *áakítáa* ‘above’

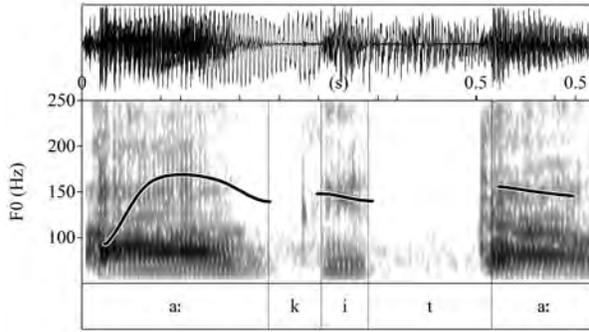


Figure 2.23: *ní'ni* ‘he climbed and...’

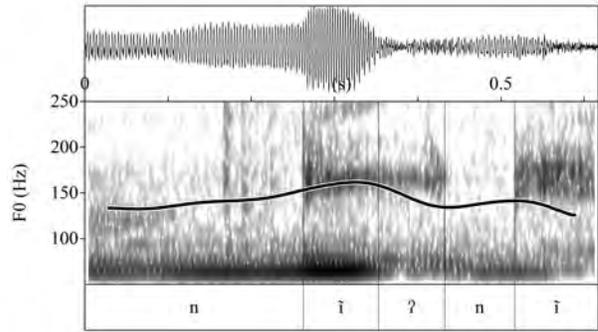


Figure 2.24: *patáqta* ‘push!’

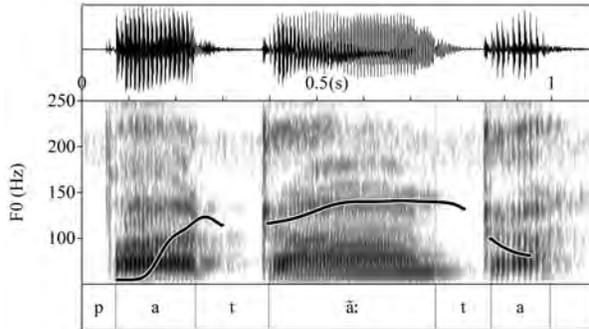
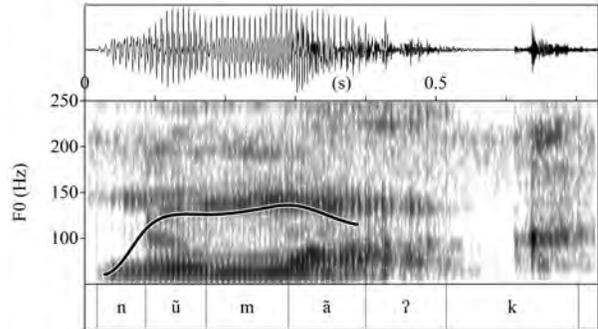


Figure 2.25: *numá'k* ‘man, person’



as is  $\acute{H}$ , since its head is technically final).

- b. ALIGN-LEFT(Head, Word): Assign one violation for each syllable intervening between the left edge of the foot bearing primary stress and the left edge of the word.
- c. PARSE: Assign one violation for each syllable that is unfooted.

(2.105) Mandan primary stress assignment

{ IAMB, ALIGN-LEFT(Head, Word) }  $\gg$  PARSE

The hierarchy in (2.105) accounts for the pattern seen thus far by ruling out stress that is not part of an iambic foot aligned to the left edge of a word. We can see these constraints at work below, where primary stress is drawn to the leftmost iamb in a word, even if the second syllable is also heavy (i.e., a possible iamb). The data (2.106) feature a typical second-syllable stress, while first-syllable stress appears in (2.107).

(2.106) Primary stress assignment for *Ihātu* ‘Yankton’

/ihātu/	IAMB	ALIGN-LEFT(Head, Word)	PARSE
a. (i.hã).tu	*!		*
b.  (i.hã).tu			*
c. i.(hã.tu)	*!	*!	*
d. i.(hã'.tu)		*!	*

(2.107) Primary stress assignment for *kóoxq'te* ‘corn’

/ko:xã?te/	IAMB	ALIGN-LEFT(Head, Word)	PARSE
a.  (ko:).xã?te			**
b. ko:.(xã?).te		*!	**
c. (ko:'.xã?).te	*!		*
d. ko:.(xã?'.te)	*!	*!	*

The hierarchy of constraints above accounts for primary stress placement for each item in (2.102) and (2.103). Furthermore, while Mandan primary stress assignment is weight sensitive, a heavy syllable will not drag stress rightward if preceded by two light syllables.

## (2.108) Stress in LLH words

/wa-ki-xe:=kt=o?f/	[(wa.'ki).xe:.kto?f]	<i>wakíxeekto'sh</i>	‘I’ll give up’
/ra-ru-xã:h=o?f/	[( <sup>h</sup> da.'ru).xã:.ho?f]	<i>rarúxqǫho'sh</i>	‘you reach for it’
/ko-ta-wĩ:h=E/	[(ko.'ta).mĩ:.he]	<i>kotámiihe</i>	‘his sister’
/wa-ka-tã?x=o?f/	[(wa.'ka).tã?.xo?f]	<i>wakátq'xo'sh</i>	‘I hammer at it’
/rũ-pa-sũ?=o?f/	[(nũ.'pa).sũ?.ro?f]	<i>nupásy'ro'sh</i>	‘we swim’
/ki-ruwã?k#fi=s/	[(ki.'nũ).mã?k.fis]	<i>Kinúma'kshis</i>	‘Royal Chief, First Creator’ (cultural hero)

In each of the examples above in (2.108), the presence of a heavy third syllable does not affect the placement of stress. Therefore, we can assume that the Prince’s (1990) Weight-to-Stress Principle (WSP) is ranked quite low when compared to ALIGN-LEFT(Head, Word).

## (2.109) WEIGHT-TO-STRESS (WSP): Assign one violation for every unstressed heavy syllable.

The WEIGHT-TO-STRESS constraint is active in languages with quantity-sensitive stress, such as Mandan, in that this constraint is satisfied when heavy syllables bear primary stress over light syllables. This constraint helps account for why a HL and LH sequence would both prefer for primary stress to fall on the H syllable. We can see this principle at work below, where candidate B wins out because it is better to have a light syllable bear primary stress over a heavy syllable if the left edge of the foot bearing the primary stress does not coincide with the left edge of the overall prosodic word.

(2.110) Primary stress assignment for *wakixeehto'sh* 'I'll give up'

/wa-ki-xe:=kt=oʔf/	IAMB	ALIGN-LEFT(Head, Word)	WSP	PARSE
a. ('wa.ki).xe.ktoʔf	*!		**	****
b. (wa.'ki).xe.ktoʔf			**	**
c. wa.(ki.'xe).ktoʔf		*!	*	**
d. wa.ki.(.'xe).ktoʔf		*!*	*	*
e. wa.ki.xe:(.'ktoʔf)		*!***	*	***

Even with two heavy syllables at the right edge of the word in (2.110), the winning candidate is selected despite its stressed light syllable because of how highly ranked ALIGN-LEFT(Head, Word) is. These four constraints allow us to predict the primary stress in the vast majority of simplex words.

### 2.5.4.3 Secondary stress assignment

In addition to primary stress, the constraints discussed above also play into the assignment of secondary stress. The directionality of all stress in Mandan is left-aligned, so a foot bearing secondary stress will align its left edge to the right edge of a foot bearing primary stress. We can see this pattern below.<sup>19</sup>

(2.111) Examples of secondary stress assignment

/wã-ʃka~ʃkap=ka/	[(mã.'ʃka).(ʃka.pka)]	<i>mashkáshkapka</i>	'rosehips, tomatoes'
/wã:reksuk/	[(mã:).(re.ksuk)]	<i>máareksuk</i>	'bird'
/xo:xixã:=ka/	[(xo:).(xi.xã:).ka]	<i>xóoxixq̄ka</i>	'crow'
/ru:xa:=E/	[( <sup>n</sup> du:).(ha:).re]	<i>rúuhaare</i>	'buzzard'

<sup>19</sup>Secondary stress is historically not marked in Mandan orthography, with the only researcher who attempts to do this being Kennard (1936). However, Kennard often conflates stress and vowel length, so his secondary stress marking is not reliable. In the orthography used by Mandan language learners on the Fort Berthold Indian Reservation, secondary stress is not recorded, and primary stress marking is often omitted as well.

In each of the examples above, we see instances of varying combinations of syllables with differing weights. Regardless of whether a word consists of only light syllables (e.g., *mashkápshkapka*) or mostly heavy syllables (e.g., *rúuhaare*), secondary stress always appears adjacent to the primary stress, even if this juxtaposition creates instances where a stressed syllable abuts another stressed syllable.

This preference for left-to-right foot-parsing can be couched within McCarthy & Prince's (1993a) system of gradient alignment constraints, namely as ALIGN(Ft, L, PrWd, L). This constraint is more commonly called ALL-FT-LEFT.

(2.112) ALL-FT-LEFT (AFL): Assign one violation for every foot in a prosodic word where the left edge of a foot does not align to the left edge of the prosodic word.

When the only footing being dealt with is primary stress, ALIGN-L(Head, Word) vacuously carries out the same function as ALL-FT-LEFT. However, once secondary stress comes into play, we must account for all footing, not just the footing of the head of the prosodic word (i.e., primary stress). The placement of ALL-FT-LEFT within the constraint hierarchy must be high in order to prevent any lapses in footing, as we can see in the example below.

(2.113) Primary and secondary stress assignment for *xóoxixqqa* 'crow'

/xo:xixã:=ka/	IAMB	AL-L(Head, Word)	AFL	WSP	PARSE
a. ('xo:).(xi,xã:).(ka)	*!		*****		
b.  ('xo:).(xi,xã:).ka			**		*
c. ('xo:).xi.(xã:).ka			***!		**
d. ('xo:).xi.(xã:).ka	*!		***		*
e. (xo:).(xi.xã:).ka		*!	**		*

Candidate B wins out over the next most viable candidate, C, because B incurs the fewest violations of ALL-FT-LEFT while still maintaining a left-aligned primary stress and maintaining iambic footing. A heavy syllable like [(xo:)] satisfies IAMB due to the fact that it is a bimoraic and stress falls on the final mora. Candidate C likewise has iambic feet, but it is ruled out by having one more violation of ALL-FT-LEFT than B does.

The fact that heavy syllables can occur adjacent to one another means that stressed syllables can also be adjacent, as we see in the word *rúuhaare* 'buzzard,' which has primary stress on the first syllable, but secondary stress on the second syllable. For these syllables to follow one after the other, Mandan must have a low-ranked \*CLASH constraint, which would otherwise assign violations for each stress-bearing syllable that is in contact with another stress-bearing syllable.

(2.114) Primary and secondary stress assignment for *rúuhaare* ‘buzzard’

/ru:ha:=E/	IAMB	AL-L(Head, Word)	AFL	*CLASH	WSP	PARSE
a.     (ˢdu:ˢha:).re	*!					*
b.     (ˢdu:)(ˢha:).re			*	*		*
c.     (ˢdu:)(ˢha:re)	*!		*	*		
d.     (ˢdu:)(ˢha:).re		*!	*	*		*
e.     (ˢdu:).ha:re					*	**

While the actual output in Candidate B is able to flout \*CLASH, thereby leaving the second syllable unfooted, it is able to avoid violating ALL-Ft-LEFT and Candidate E is thus the most optimal candidate given this constraint ranking. In order for the second syllable to be footed, we must move WEIGHT-TO-STRESS above ALL-Ft-LEFT to ensure that heavy syllables are always footed.

(2.115) Primary and secondary stress assignment for *rúuhaare* ‘buzzard’ (revised)

/ru:ha:=E/	IAMB	AL-L(Head, Word)	WSP	AFL	*CLASH	PARSE
a.     (ˢdu:ˢha:).re	*!					*
b.     (ˢdu:)(ˢha:).re				*	*	*
c.     (ˢdu:)(ˢha:re)	*!			*	*	
d.     (ˢdu:)(ˢha:).re		*!		*	*	*
e.     (ˢdu:).ha:re			*!			**

As we compare (2.114) and (2.115), we can see that the hierarchy in (2.115) is able to capture the observation that heavy syllables in Mandan will always bear some kind of stress, whether primary or secondary. Furthermore, this hierarchy selects for outputs where stresses can clash: i.e., adjacent syllables can bear stress. This pattern is likewise evident from Kennard’s (1936) tendency to mark long vowels in the right periphery of a word as having secondary stress even though he did not mark them as being long. There definitely is a correlation between stress-marking and vowel length, and even though most scholars do not consistently record this pattern, the pattern is generally a simple one with straightforward parameters: all footing goes from left to right, all footing is weight-sensitive, and the first foot bears primary stress. This generalization is captured in the hierarchy used in (2.115), which is repeated below.

(2.116) Stress assignment constraints

{ IAMB, ALIGN-LEFT(Head, Word) } ≫ WEIGHT-TO-STRESS ≫ ALL-Ft-LEFT ≫ { \*CLASH, PARSE }

#### 2.5.4.4 Unexpected stress assignment

Hollow (1970:35) notes that there are several phonological issues that remain to be dealt with in Mandan. Among those problems, understanding the motivation behind unexpected stress assignments is one of the most daunting. The material below tackles this issue of “unexpected” stress assignment, and explains the factors that yield the surface stress assignments that we see in Mandan and why the stress we see there is not unmotivated.

##### 2.5.4.4.1 Stress assignment and Dorsey’s Law vowels

As I have argued above, there is ultimately a single hierarchy of constraints that captures the pattern of stress assignment in Mandan. There is a large amount of words that seem to flout this pattern in Hollow’s (1970) transcriptions, however, that seemingly call this argument into question. The data below appear the same as Hollow transcribes them.<sup>20</sup>

(2.117) Exceptional first-syllable stress in Hollow (1970)

/wri/	⟨m <sup>i</sup> ni⟩	‘water’
/wro:k/	⟨w <sup>e</sup> rok⟩	‘buffalo bull’
/wrap/	⟨w <sup>a</sup> rap⟩	‘beaver’
/pre=oʔf/	⟨p <sup>e</sup> reʔš⟩	‘he licks it’
/hrãʔ=E/	⟨h <sup>a</sup> nãʔre⟩	‘to sleep’
/kra:ʃek=oʔf/	⟨k <sup>a</sup> raʃekoʔš⟩	‘it clears up [after a storm]’
/xwãh/	⟨x <sup>a</sup> mãh⟩	‘small’

These CVRV sequences in Hollow’s (1970) transcriptions raise cause for concern over whether there is a single phonological process for stress assignment in Mandan. Further complicating matters is how common such sequences are, with RVRV making up an enormous portion of the corpus due to most of the prefix field consisting of prefixes with a basic /RV-/ shape. RVRV words often manifest in Hollow’s transcriptions as having stress on either syllable in different places in his narratives: e.g., both ⟨m<sup>i</sup>ni⟩ and ⟨m<sup>i</sup>ni⟩ for /wri/ ‘water’ appear, indicating he perceived stress after the first and second consonant in different instances. Furthermore, he often writes this word without

<sup>20</sup>Hollow (1970) does not transcribe vowel length, instead postulating that certain syllables in Mandan bear underlying stress. This postulation is not borne out by the phonetic data; Mandan definitely has phonemic long and short vowels, and stress is predictable if one is familiar with the underlying morphology, as described in §2.5.4.2 and §2.5.4.3 above.

any accentuation at all, suggesting that he either could not determine where the primary stress should fall or might have considered the word to have no underlying stress whatsoever. Kennard (1936:5) likewise remarks that some words in Mandan seem to have an accent that is “evenly distributed.” These words are given below.

(2.118) Accentless words in Kennard (1936)

⟨manace⟩	/wrãf=E/	[( <sup>ã</sup> mã)nã].je]	<i>manáshe</i>	‘tobacco’
⟨natore⟩	/rato:=E/	[(“da.'to:).re]	<i>ratóore</i>	‘male’s father’s older brother (voc.), elder (voc.)’

There may have been more words Kennard (1936) considered to be accentless, but he only provides two in his grammar. With respect to ‘tobacco,’ it is a citation form where boundary tones and a Dorsey’s Law vowel are interfering with the perception of stress. For *ratóore*, it is a vocative form, so the intonational contour of the word will involve high tone at the right edge of the word, which is confounding the perception of the primary stress on the second syllable, which likewise will have a higher F0 than the first syllable.

Taking the first example of an accentless word from Kennard (1936) and combining it with the data in (2.117) in Hollow (1970), these exceptions all share one thing in common: they have word-initial CR clusters in their underlying representations. Furthermore, the stress is being marked on a vowel that Hollow (1970) describes as epenthetic: i.e., the Dorsey’s Law vowel. As previously discussed in §2.2.3, my interpretation is that these sounds are not epenthetic at all. Rather, Dorsey’s Law vowels in Mandan are intrusive sounds that are extraphonological in nature following the analysis of intrusive vowel by Hall (2006). That is to say, phonological processes like stress assignment do not take these sounds into account when evaluating syllables and morae for stress assignment because these extraneous vowels are a phonetic, post-phonological phenomenon.

Dorsey’s Law vowels are not treated phonologically as syllables in their own right, but acoustically they are vowel sounds that spill over between an articulatory gap between a consonant cluster involving a sonorant. As such, the intrusive vowel sound is really just an extension of the vowel that follows. Any intrusive vowel is tautosyllabic with the vowel whose features it shares. This tautosyllabicity is the reason for the varying perception of where stress falls in words beginning with underlying /CRV/ sequences. Primary stress places an articulatory target on a particular syllable in regards to pitch. Voiced consonants are articulatorily more conducive to the production of pitch, and the only voiced sounds in Mandan are sonorants.

This conduciveness of pitch production allows for speakers to more easily undershoot the F0 target. This process is observed in Figure 2.25. Peak F0 is reached within the [m], right as the vocal cavity opens to produce the [ã] in *numá’k*, which is the true target of this high pitch by virtue of it being the head of the iambic foot in [(nũ.'mã?k)].

In all the figures discussed so far, we see a clear pattern: peak F0 is highest on syllable bearing primary stress,

along with a higher average F0 over the duration of the stressed vowel. As such, it appears that the evidence presented herein points to F0 being a key component of primary stress marking in Mandan. With this pattern in mind, let us now compare these words with predictable stress manifesting on the expected syllable to those where stress seemingly appears sooner.

In the figures below, we can see a relatively small rise and fall in F0 from the start of the word that reaches its peak before the target vowel, such as in Figure 2.26, or a flat F0 that prematurely reaches its peak and maintains it until it reaches the target vowel, like in Figure 2.27.

Figure 2.26: *maná* ‘wood, tree’

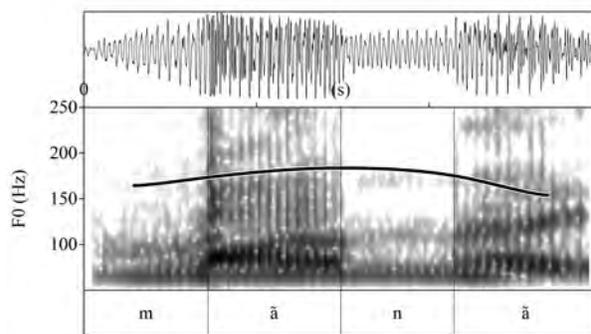
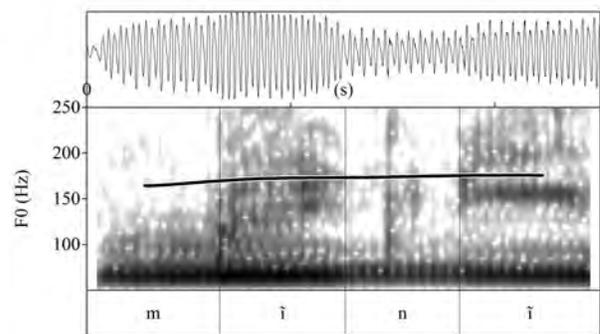


Figure 2.27: *miní* ‘water, liquid’



The data in the figures above represent typical behavior for F0 in words beginning with consonant clusters consisting of two sonorants. F0 behaves in a similar manner in words that begin with clusters that produce Dorsey’s Law vowels where the first element of the cluster is not a sonorant. In Figure 2.28, we see the word [(t<sup>e</sup>re).k<sup>e</sup>rek] /trE=krE=ak/ ‘them being big around’ with F0 starting high through the first vocal element until it peaks at the target vowel. The word [(x<sup>ã</sup>mã).he] /xwãh=E/ ‘small’ likewise begins with an early F0 peak that plateaus until the target vowel, then drops sharply.

Regardless of whether a word begins with a stop-sonorant, fricative-sonorant, or a sonorant-sonorant cluster, the behavior of F0 is identical: F0 approaches or achieves peak F0 during the first vocalic window and then begins to fall somewhere between the transition between the sonorant and the second vocalic window. Since Dorsey’s Law vowels are phonologically part of the same syllable as the following vowel, the phonetic correlates of stress apply to these excrescent vowels as well. As such, the heightened F0 associated with primary stress likewise affects Dorsey’s Law vowels. Past interpretations of first syllable stress come from this process; previous scholars write stress in words like *miní* ‘water’ and *maná* ‘tree, wood’ as having first syllable stress because they do have first syllable stress due to the fact that the excrescent vowels are not assigned syllables of their own.

Figure 2.28: *terékerek* ‘them being big around’

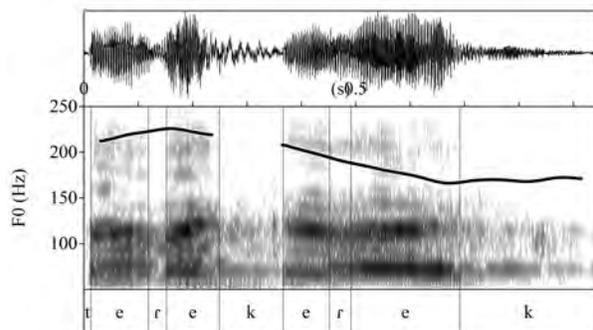
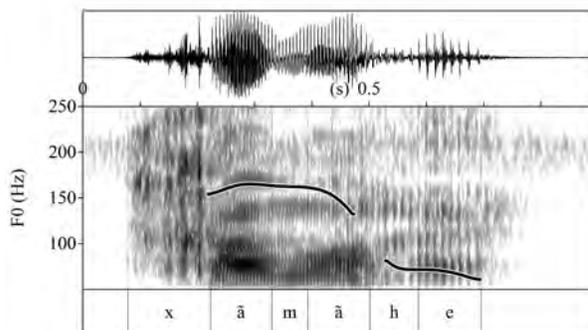


Figure 2.29: *xamáhe* ‘small’



We can likewise tell that these intrusive vowels are not treated like syllables phonologically because there are instances of third- or even fourth-syllable stress in [Hollow \(1970\)](#).

(2.119) Third- and fourth-syllable stress in [Hollow \(1970\)](#)

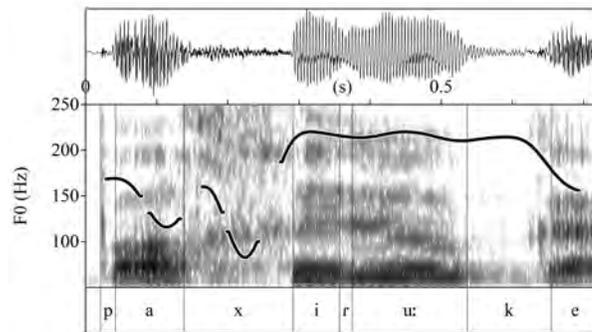
(pax <sup>i</sup> rúke)	/paxru:k=E/	[(pa.'x <sup>i</sup> ru:).ke]	<i>paxirúuke</i>	‘corn silk’
(m <sup>i</sup> nĭkúktoʔš)	/w-rĭ-kuʔ=kt=oʔf/	[(m <sup>i</sup> nĭ.'kuʔ).ktoʔf]	<i>minikú'kto'sh</i>	‘I will give it to you’
(k <sup>i</sup> nĭk <sup>i</sup> nĭk)	/krĭkrĭk/	[(k <sup>i</sup> nĭ.'k <sup>i</sup> nĭk)]	<i>kinikinik</i>	‘kinnikinnick’

(< PAlg \*kerek-en- ‘mix by hand’)

All of these words that deviate from the expected first- or second-syllable stress in (2.119) above are actually typical iambs that happen to have one or more clusters that trigger a Dorsey’s Law vowel. These excrescent vowels are tautosyllabic with the underlying vowel, and as such are not treated as belonging to different syllables for the purposes of footing. These words alternatively appear with stress on the Dorsey’s Law vowel in [Hollow’s \(1970\)](#) transcriptions. The spectrogram in [Figure 2.30](#) below illustrates why previous attempts to pin down Mandan stress placement have yielding varying results. The underlying cluster /xɾ/ in *paxirúuke* ‘cornsilk’ features a high F0 that peaks and levels out for the duration of both vocalic windows in the second syllable of [(pa.'x<sup>i</sup>ru:).ke] before falling steeply in the third syllable.

This misperceived stress is caused by the same factors that result in stress being perceived on Dorsey’s Law vowels as discussed above. There is a premature peak in F0 on the excrescent vowel, and this high pitch typically plateaus onto the target vowel. Since there is such a stark contrast between the high pitch on the excrescent vowel and the preceding vowel, listeners may interpret this change as the cue for primary stress and transcribe stress too early in the word (e.g., [Kennard 1936](#) and [Hollow 1970](#)). Alternatively, this pitch plateau can be taken as a sign that

Figure 2.30: *paxirúuke* ‘cornsilk’



there is some kind of pitch spreading along voiced segments for those scholars who have described Mandan as a language with pitch accent (e.g., Park p.c.).

As the data presented here demonstrate, stress in Mandan is predictable once one analyzes certain sequences as being underlying clusters that trigger excrescent vowel insertion due to Dorsey’s Law. This same pattern holds for other Siouan languages that feature Dorsey’s Law vowels such as Hoocąk and Dakota.<sup>21</sup>

(2.120) Iambic stress and Dorsey’s Law vowels in other Siouan languages

- a. Hoocąk (Hale & White Eagle 1980:128)

⟨hikorohó⟩ /hi-kro-ho/ [⟨hi>.(k°ro.ʔho)] ‘he gets dressed’

- a. Dakota (Boas & Deloria 1941:9)

⟨wab.lu’ǵa⟩ /wa-w-yuǵa/ [(wa.b°lu).ǵa] ‘I separate it from its outer covering’

In each of the examples in (2.120) above, we see left-aligned iambic footing for primary stress. Hoocąk leaves the first mora of a word unparsed, but otherwise we see that the Dorsey’s Law vowel in /kro/ is not taken into account for assigning counting morae for footing purposes. The Dakota example demonstrates that typical primary stress assignment in Dakota functions in the same way as in Mandan, where excrescent vowels are not treated as syllables when stress is assigned.

The overall takeaway from the data presented herein is that the wide variety of transcriptions for words in Mandan can be accounted for once the underlying structure of a word is considered. Namely, when an underlying

<sup>21</sup>The depiction of stress in Hoocąk takes into account that the first mora in a word is typically unfooted, and that primary stress falls on the third mora of a word. Stress skips over Dorsey’s Law vowels in this language. See Miner (1979, 1981) and Hale & White Eagle (1980) for further detail on iambic stress in Hoocąk.

consonant cluster ends with a sonorant, an excrescent vowel that copies features of the syllable nucleus will be inserted between the sonorant and the other consonant. This vocalic intrusion is not phonological in nature, as we can tell from the fact that the phonology of the language is blind to it. This excrescent Dorsey's Law vowel exhibits many of the same phonetic correlates of stress as the original syllable nucleus because for all intents and purposes it is actually the same vowel. Stress cannot be assigned to these vowels alone due to the fact that excrescent vowels are tautosyllabic with the vowels whose features they are copying.

#### 2.5.4.4.2 Stress assignment and pre- and post-verbal elements

While many of the inconsistent instances of stress marking in Kennard (1936) and Hollow (1970) are due to the interaction between F0 and Dorsey's Law vowels, there is one other source of unexpected stress assignment to be found in Mandan. These instances of unexpected stress stem from how stress interacts with preverbs and postverbal clitics. The observed pattern is twofold: firstly, that preverbs will always draw primary stress, even if they are short vowels, and secondly, that primary stress will never be placed onto an enclitic.

##### (2.121) Preverbs and primary stress

- a. /i-wa-tee=o'sh/ → *íwateero'sh* 'I like her'
- b. /o-wą-shraa=o'sh/ → *ómasharaaro'sh* 'I slid'
- c. /e-wa-he=o'sh/ → *épe'sh* 'I said it'
- d. /aa-wa-rEEh=o'sh/ → *áawareeho'sh* 'I brought it'

##### (2.122) Enclitics and primary stress

- a. /tu=ootE/ → *túroote* 'there must be some'
- b. /hE=oowąk=o'sh/ → *héroomako'sh* 'he saw it'
- c. /hi=rjítE=o'sh/ → *híniiteroomako'sh* 'he got there fast'
- d. /pxik=o'sh/ → *pxiko'sh* 'it worked loose and fell'
- e. /wrjs=E/ → *minise* 'horse'

The preverbs in (2.121) all draw stress, even though most of them do not satisfy IAMB: i.e., they are short vowels. The transitivizer preverb *aa-* in (2.121d) follows typical stress assignment, since it is a heavy syllable, but the other preverbs do not. This raises the question of whether Hollow's (1970) analysis that certain morphological items carry underlying stress is correct. Furthermore, these data raise the question of whether footing is always iambic.

An additional complication is the fact that the data in (2.122) show that primary stress cannot fall on an enclitic. In (2.122a) through (2.122d), the second syllable in each word is heavy and should attract stress to become a LH̄ iamb. Similarly, the data in (2.122e) are such that stress should fall on the second syllable to form a LL̄ iamb. In none of the data in (2.122), however, do we see expected iambic footing.

Combining what we see in (2.121) and (2.122), we must account for how such stress assignment is possible. One explanation for the data in (2.122) is that stress does not fall on enclitics due to the fact they are prosodically deficient by virtue of the fact enclitics in Mandan are phonological clitics: i.e., they rely on prosodically adjoining to a prosodic word to be phonologically realized. As such, we may motivate the stress pattern with respect to (2.122). This same explanation does not hold for data involving preverbs in (2.121), as preverbs are not proclitics, and can be surrounded by other prefixes. We can see that preverbs can both follow and precede inflectional prefixes in the examples below.

(2.123) Preverbs in Mandan plus other prefixes

- a. *wáa'orakaraahinixiniite'sh*  
 waa-o-ra-ki-rEEh=rjx=rjítE=o'sh  
 NEG-PV.IRR-2A-VERT-go.back.there=NEG=CEL=IND.M  
 'you're not going to go just yet' (Hollow 1973b:216)
- b. *karóoruxihka*  
 ka-ro-o-ru-xik=ka  
 AGT-1S-PV.IRR-INS.HAND-be.bad=HAB  
 'the ones bad to us' (Hollow 1973b:45)
- c. *wáa'iwahekinixo'sh*  
 waa-i-wa-hek=rjx=o'sh  
 NEG-PV.INS-1A-know=NEG=IND.M  
 'I don't know' (Hollow 1973a:47)

All of the data above features expected iambic footing, either by having H̄ feet like in (2.123a) and (2.123c) or LH̄ feet like in (2.123b). Each example above has an inflectional prefix flanking a preverb and, except for (2.123b), the preverb is not drawing primary stress. In (2.123b), we may say that stress is technically on the preverb, but that same syllable also contains the first person plural stative pronominal prefix *ro-*, which blends with the irrealis preverb *o-* to form a single syllable. Adding additional prefixes to the left of a preverb draws primary stress away from it if a heavy syllable occurs at the left edge of the word. Otherwise, in the case of a light syllable preceding the preverb, iambic footing takes place normally.

These data show us that preverbs by themselves are not underlyingly stressed. The data do point to the fact that there is something about preverbs that prevent normal iambic footing unless additional morphological material precedes a preverb. Once additional elements are prefixed onto a stem bearing a preverb, the expected iambic stress

pattern resumes. It is not the case that preverbs suddenly cause footing to go from iambic to trochaic, but the question remains as to what preventing the expected footing to occur past a preverb and into the rest of the stem.

As noted in §2.5.3, preverbs also act as a barrier to nasal harmony spreading. This same barrier appears to block the left-to-right directionality of footing for primary stress, as well as right-to-left nasal harmony. I argue in Chapter 4 that this barrier is really a word boundary within the greater morphological word. Preverbs are not words themselves, but are morphologically part of a composite word. Footing and nasal harmony are unable to cross a word boundary, even an internal word boundary, and this internal word boundary in turn helps explain why Hollow (1970) may have posited that preverbs are underlyingly stressed. There really is only a single process for stress assignment in Mandan, but this internal word boundary obfuscates this regular stress pattern.

#### 2.5.4.4.3 Stress assignment in fossilized compounds

There are a few words in Mandan that do not involve preverbs or enclitics that still display unexpected stress. These irregularities can be explained if we analyze them as adhering the same rules as compounds in contemporary Mandan. In a compound word, primary stress is footed from the left edge of the word. Mandan does not allow footing across a word boundary, so if the first word contains a single light syllable, that syllable is marked with primary stress.

#### (2.124) Stress assignment in compounds

- a. /suk#ruwã?k/ → *súknuma*'k 'young man' (lit. 'child + man')
- b. /pax#fowok/ → *páxshowok* 'bowl' (lit. 'pot + shallow')
- c. /wɾãf#o:t/ → *manáshoot* 'red willow' (lit. 'tobacco + mix')

Modern speakers recognize the words above as being composed of two other words. However, the words below are seen as being simplex words.

#### (2.125) Words with unexpected stress

/hūprīh=E/	<i>húpinihe</i>	'soup'
/krāhrī/	<i>kanáhini</i>	'grain, seed'
/hāxura:=E/	<i>háxuraare</i>	'bat'
/xoprī/	<i>xópini</i>	'be holy, sacred'
/wírã?k/	<i>mína</i> 'k	'sun, moon, orb, boat, vehicle'

The list above is not exhaustive, but does serve as a jumping point to show why these words have unexpected first syllable stress. Diachronically, each of these words is a compound. The word *xópini* 'be holy, sacred' is comprised

of reflexes of PSi \*xopE ‘holy’ and \*rj ‘be, exist.’ Similarly, *kanáhini* ‘grain, seed’ has PSi \*rj compounded at the end, with what appears to be a reflect of \*kra ‘put’ and the stem augment \*-hE. The word for ‘soup’ likewise is a compound of PSi \*hupV ‘juice, liquid’ plus the PSi verb \*rj ‘be, exist.’ The root-final /h/ is likely another instance of the stem augment \*-hE.

The word *hǎxuraare* ‘bat’ is an old compound that consists of PSi \*ha ‘night, darkness’ and \*xuraa ‘eagle.’ Neither of these words exist separately in modern Mandan, and as Rankin et al. (2015) note, reflexes of these two Proto-Siouan roots only occur in compounds. In a similar manner, *mína’ki* ‘sun, moon, orb’ consists of PSi \*wǐ ‘sun, moon, orb’ plus the ‘sitting’ positional \*Raa-ke. The final vowel may be a fossilized remnant of the Proto-Siouan determiner \*ki~\*kǐ, though Mandan both *mína’k* and *mína’ki* appear in the corpus.

What these words with exceptional stress show is that they still maintain the expected pattern of stress assignment for compounds, even though the individual elements of those compounds are no longer analyzed as words. One can argue that stress in these words is now lexical, but we can also posit that these are still compounds, even if one or more elements are no longer available in the lexicon. Either way, the motivation for stress placement in words like those in (2.125) is not purely arbitrary. After all, even the few borrowings into Mandan ignore the stress of the original words and Mandanize them.

(2.126) Stress in borrowings

- a. Arikara to Mandan (Parks & Demallie 2002)

*árikaraaru* [(‘ə.ŋ).kə.(ra:.rʊʔ)] ‘stag’ →

*Arikara* [(a.ri).k<sup>a</sup>ra] ‘Arikara’<sup>22</sup>

---

<sup>22</sup>The folk etymology behind this exonym for the Arikara is that the Mandan first encountered an Arikara hunter who had shot and killed a stag near a Mandan village. When asked who he was and where he was from, the hunter just pointed to his kill and said *árikaraaru* ‘stag,’ not knowing exactly what the Mandan were asking him. This word is also noteworthy in that it follows the tendency to borrow no more than three syllables of a loanword, even though all the sounds of the original Arikara word *árikaraaru* are possible for Mandan speakers.

- b. Lakota to Mandan (Ullrich 2011:208)

*Ihą̀kthų́wan* [(i.hã).(kt̪xũ.wã)] ‘Yankton’ (lit. those who dwell on the edge’) →

*Ihą́tu* [(i.hã).tu] ‘Yankton’<sup>23</sup>

- c. Omaha to Mandan (Larson 2005)

*Umó<sup>n</sup>ho<sup>n</sup>* [(u.mã).hã] ‘upstream, Omaha’ →

*Ómahą* [(‘o).(mã.hã)] ‘Omaha’<sup>24</sup>

- d. French to Mandan (Little Owl & Rhod 1992:4)

*español* [es.(pa.ɲɔl)] ‘Spanish’ →

*íspari’oori* [(‘i).(spa.ri).(ʔo:ri)] ‘Mexican’<sup>25</sup>

- e. Hidatsa to Mandan (Matthews 1877:193)

*miridáari* [mɪ.(ri.ta:ri)] ‘cross over water’ →

*Minítaari* [(‘m̄n̄i).(ta:ri)] ‘Hidatsa’<sup>26</sup>

All of the words in (2.126) are consistent with Mandan primary stress assignment. In most of these words, we see primary stress on a different syllable than the original word, so we can assume that stress is not lexical. Furthermore, several of these words are reanalyzed as having complex internal morphology, which causes a shift in primary stress. We see this behavior in ‘Omaha’ and ‘Mexican,’ where the initial vowel is treated like a preverb. Similarly, the compound in ‘Hidatsa’ is borrowed as a compound rather than a simplex word.

<sup>23</sup>Like the Arikara borrowing, this word is shortened to three syllables. With the exception of the [wã] syllable, which would be realized as [mã], this word is largely pronounceable for Mandan speakers, so this simplification is unnecessary. The Mandanized version of this loanword also conforms to the pattern that Mandan only allows one underlying nasal per root, as the last syllable is an oral vowel, unlike the source word.

<sup>24</sup>The *u-* in Omaha is a locative preverb that is a cognate with the locative preverb *o-* in Mandan. In Omaha, this preverb does not block iambic footing, which is why we see second syllable stress in Omaha. However, Mandan speakers analyzed it as a locative preverb, which caused the word to have fist-syllable stress like other Mandan stems with preverbs. A reflex of the PSi word \*wą́hą ‘upstream, upwind’ is not present in Mandan otherwise.

<sup>25</sup>The initial /i/ in this word is taken to be the instrumental preverb *i-*, since the vast majority of Mandan words with word-initial /i/ involve that preverb. Analyzing the initial /i/ as a preverb causes first syllable stress instead of the expected second syllable iamb due to the internal word boundary found after preverbs in Mandan. There are at least three versions of this word in use. This version comes from Little Owl & Rhod (1992:4), but Hollow (1970:95) gives [ʃ] for the fricative: i.e., [(i).(ʃpa.ri).(ʔo:ri)]. Given the fact that French /s/ becomes Mandan /ʃ/ in this word, it is possible that this loan entered Mandan from French via Hidatsa, where there is no /s/, only /ʃ/. The word for ‘Mexican’ in contemporary Hidatsa is [(i.ʃpa).(ri.ʔo:ri)], which is often shortened to just [(i.ʃpa).ri]. The truncated Hidatsa version is also found in Mandan. The version of this word in Mandan with the [ʃ] is likely contamination from Hidatsa, since virtually all L1 speakers of Mandan over the past century have also been speakers of Hidatsa, which has been used more widely than Mandan throughout the Fort Berthold Reservation since the construction of the Garrison Dam.

<sup>26</sup>The original Hidatsa word is a compound of *miri* ‘water’ and *dáari* ‘cross a river,’ and has anapestic stress due to WEIGHT-TO-STRESS dominating ALIGN-LEFT(Head, Word) in Hidatsa (Boyle et al. 2016). The majority of Mandan speakers over the past century have also been Hidatsa speakers and have therefore recognized this word as a compound. This word is treated as a compound in Mandan, which prevents normal iambic footing because of a word boundary after *mini* ‘water.’ If this word were not analyzed as a compound, we would otherwise expect stress on the second syllable [ta:].

#### 2.5.4.5 Summary of stress assignment

A summarized constraint hierarchy for stress assignment in Mandan is reproduced below.

(2.127) Summary of stress assignment constraints

{ IAMB, ALIGN-LEFT(Head, Word) } ≫ WEIGHT-TO-STRESS ≫ ALL-Ft-LEFT ≫ { \*CLASH, PARSE }

The overall pattern we see as we go through the corpus is that primary stress is predictable if the underlying morphology is known. Mandan utilizes a very regular stress accent as a system of word-level prominence rather than a pitch accent system.<sup>27</sup> Stress in Mandan involves left-aligned, weight-sensitive iambs. Primary stress falls on the leftmost iamb, and secondary accent falls on each subsequent iamb. Exceptions to this pattern are found in words with complex internal structures: i.e., compounds and composites. Footing does not cross word boundaries, so a winning candidate IAMB can be violated when the alternative is forming a foot across a word boundary. More on the importance of word-internal boundaries appears in Chapter 4.

## 2.6 Phonologically-conditioned affixation

Throughout this chapter, I have outlined salient phonological processes observed in Mandan. Several of these processes have specific and predictable interactions with underlying morphology, especially in the case of the ablaut discussed in §2.4.3, the nasal harmony discussed in §2.5.3, and the stress placement discussed in §2.5.4. These three processes all are sensitive to the sequencing of affixes, as there are several spots within the preverbal and postverbal fields that seem to impede one or more of these processes. One open question that has been raised in Chapter 1 is to what extent the phonology of Mandan affects the ordering of affixes.

(2.128) Placement of pronominals in Mandan

- a. *ihaaxiko'sh*  
i-haaxik=o'sh  
PV.INS-not.know=IND.M  
'he does not know'
- b. *iwahaaxiko'sh*  
i-wa-haaxik=o'sh  
PV.INS-1A-not.know=IND.M  
'I do not know'

---

<sup>27</sup>The only Siouan language that demonstrably has a pitch accent system is Crow, where there is a single mora per root that bears an underlying high tone that spreads leftward to create a high pitch plateau (Graczyk 2007, Wallace 1993).

- c. \**waihaaxiko'sh*  
 i-wa-haaxik=o'sh  
 PV.INS-1A-not.know=IND.M  
 'I do not know'

Siouanist literature traditionally refers to pronominal morphology like the first person active marker *wa-* in (2.128b) and (2.128c) as infixes, where a formative that is typically a prefix interrupts the contiguity of a lexical root (Kennard 1936, Boas & Deloria 1941, Rankin et al. 2003, Helmbrecht 2008, *inter alios*). All Siouan languages feature some verbs that have similar constructions as the one seen above, where an applicative preverb appears before a verb and are treated as a single word, and then the preverb seems to trap pronominal morphology between it and the verb stem. All preverbs in Siouan languages are open syllables consisting of a vowel that was a postposition in Proto-Siouan or Pre-Proto-Siouan much in the same way adpositions in various European languages became reanalyzed as being part of the following verb, rather than a free element: e.g., Old English *wip* 'against' + *standan* 'stand' > 'withstand' in Modern English. However, unlike the reanalysis of adpositions as verbal elements in European languages, there is a looser connection between these preverbs in Siouan and their verbal roots given the fact that speakers are able to articulate that the presence of these preverbs affects the meaning of an utterance in a particular way. Speakers of Mandan know that verbs bearing the instrumental preverb *i-* indicate that an action is done by means of some overt or covert instrument. The same cannot be said of speakers of English. As such, we can say that preverbs and verbs likely do not form an atomic morphological unit in the same way that a word like 'withstand' does in English.

This treatment by native speakers raises the question of what is motivating the placement of pronominals between a preverb and a verb, if a preverb can alter the meaning. Preverbs seem at once to be both bound to and unbound to their host verb. This connection ultimately leads to Helmbrecht (2008:273) describing preverbs as "sub-morphemes" of verbal roots. I do not share the same view that preverbs are somehow subunits of lexical items containing them, but rather morphological elements that are equally part of a lexical item as the verbal root is.

Previous investigations into affix ordering in Siouan languages have appealed to phonological motivations for surface affix order. McCarthy & Prince (1993b:129) look at inflectional prefixes in Dakota. They look at a group of verbs that take preverbs, and observe how affixation occurs. Their data appear below.

(2.129) Dakota data from Moravcsik (1977:95)<sup>28</sup>

<i>pa-wa-ħta</i>	[(pa.'wa).xta]	'I tie up'
<i>ma-wa-ni</i>	[(ma.'wa).ni]	'I walk'

<sup>28</sup>I have altered the original orthography to bring it in line with the one used for both Lakota and Dakota in Ullrich (2011).

<i>ma-wa-nuŋ</i>	[(ma.'wa).nũ]	'I steal'
<i>čha-wa-pha</i>	[(tʰa.'wa).pʰa]	'I stab'
<i>i-ma-ktomi</i>	[(ʔi.'ma).(kto.mi)]	'I am Iktomi'
<i>na-wa-pča</i>	[(na.'wa).ptʃa]	'I swallow it'
<i>na-wa-thaka</i>	[(na.'wa).(tʰa.ka)]	'I lock the door'
<i>la-ma-khota</i>	[(la.'ma).(kʰo.ta)]	'I am a Lakota'

This subclass of verbs is similar to those in Mandan with preverbs in that there is a monosyllabic preverbal element, which certain pronominal inflection ignores. This morphology targets the space after the initial syllable, which Shaw (1980) points out is always open. McCarthy & Prince (1993b) theorize that these infixes are really prefixes, and must obey a LEFTMOSTNESS: i.e., a variation on the LEFTMOST(*e*, *D*) constraint discussed in §1.1.3.1. Furthermore, McCarthy & Prince argue that since the first person pronominals are prefixes, they should also adhere to ROOT-ALIGN, which assigns one violation for each instance where the left edge of a root does not coincide with the left edge of a prosodic word. These authors also argue that ONSET plays a pivotal role in affix ordering, with their tableau seen reproduced below.

(2.130) Tableau of /wa + chapA/ from McCarthy & Prince:130

/wa + čhapA/	ONSET	ROOT-ALIGN	LEFTMOSTNESS
a. wa-[čha.pha] <sub>PrWd</sub>		*!	
b.  [čh-wa-.a.pha] <sub>PrWd</sub>	*!		čh
c.  [čha.-wa-.pha] <sub>PrWd</sub>			čha

McCarthy & Prince (1993b) interpret this class of roots in Dakota as having a strict tendency of requiring the left edge of the root to align with the left edge of the prosodic word. LEFTMOSTNESS is violated by having two segments come between the prefix and the left edge of the word, but it is preferable to violate this constraint than it is to violate ONSET or ROOT-ALIGN. The first person dual/plural marker *uŋ(k)-* is seemingly able to avoid this infixation with vowel-initial stems and remains a prefix.<sup>29</sup> Only consonant-initial stems appears to trigger infixation. We also see that ONSET must dominate the other two constraints, as it is preferable to violate ROOT-ALIGN than it is to have an onsetless syllable, as we can see on their tableaux reproduced below.

<sup>29</sup>This prefix has two allomorphs: *uŋ-* appearing before consonant-initial stems and *uŋk-* before vowel-initial stems.

(2.131) Tableau of /uŋ(k) + ali/ ‘we stepped over it’ from McCarthy & Prince:131

/uŋ(k) + ali/	ONSET	ROOT-ALIGN	LEFTMOSTNESS
a.  uŋ.k-a.li	*	*	
b. a.-uŋ-.li	**!		a

(2.132) Tableau of /uŋ(k) + manuŋ/ ‘we stole it’ from McCarthy & Prince:131

/uŋ(k) + ali/	ONSET	ROOT-ALIGN	LEFTMOSTNESS
a. uŋ-.ma.li	*	*!	
b.  ma.-uŋ-.nuŋ	*		ma

One problem for this analysis that is not discussed is that there are also verbs that prefix *uŋ(k)-* onto the left edge of the prosodic word without being an operation of last resort to avoid violating ONSET. Certain verbs in Lakota and Dakota have word-initial vowel stems, but resist phonologically-conditioned infixation. One such verb is *okhá* ‘sing with a drum,’ a somewhat old-fashioned word that begins with a vowel, but takes prefixes instead of infixes.

(2.133) /wa + okhá/ ‘I sing’ (Ullrich p.c.) → *waókhá*

(2.134) Tableau for /wa + okhá/ using McCarthy & Prince’s (1993b) analysis

/wa + okhá/	ONSET	ROOT-ALIGN	LEFTMOSTNESS
a.  wa-.okhá	*!	*	
b.  o.-wa-.khá			o

McCarthy & Prince (1993b) would predict that the output of /wa + okhá/ should be [o.wa.khá], and yet the actual output is [wa.o.khá]. Most vowel-initial stems in Dakota and Lakota are diachronically pre-verbal elements that have been reanalyzed as integral parts of the verb, since Proto-Siouan had a fairly strict CV syllable structure (Rankin, Carter & Jones 1998). It is in the diachrony that we can ascribe this affix ordering, not to any synchronic phonological process. Likewise, Mandan has vowel-initial roots that involve so-called infixing and ones that do not.

(2.135) Affixation with vowel-initial stems

a. *ímashut* ‘clothing, dress, skirt, shirt’

i. *ímashut* ‘his shirt’

- ii. *ímimashut* ‘my shirt’
  - iii. *ínimashut* ‘your shirt’
  - iv. *ríimashut* ‘our shirts’
- b. *imáa* ‘body’
- i. *imáa* ‘his body’
  - ii. *mí’maa* ‘my body’
  - iii. *ní’maa* ‘your body’
  - iv. *níimaa* ‘our body’

In (2.135a), we see similar behavior as seen in the Dakota data above: a vowel-initial stem undergoes affixation, and aside from the null third person marking, other marking (2.135a-ii) and (2.135a-iii). In (2.135b-ii) and (2.135b-iii), we have similar conditions for person marking, but instead of infixing to avoid violating ONSET, there are allophonic variants that prefix directly onto the vowel-initial stem. Furthermore, even in (2.135a-iv), the first person plural inalienable possessive marker *nu-* takes the form of its prevocalic allophone /rV-/ and simply prefixes onto the vowel-initial stem as well. Unlike in Lakota, all person marking in Mandan is underlyingly /CV-/ in shape. Furthermore, there is nothing phonologically compelling the first person plural to always act as a prefix versus the first person singular marker.

The main thrust of McCarthy & Prince’s (1993b) account of affix order in Dakota relies on prosody being able to outrank morphology and motivate a break in contiguity. They assume that the roots given are atomic in the same way that Helmbrecht (2008) does in his analysis of Hoocąk. Unlike Helmbrecht, McCarthy & Prince do not decompose their Dakota data any further than they are presented. For example, the construction *nawáthaka* ‘I lock the door’ begins with the ‘by foot, leg’ instrumental *na-*. This instrumental also precedes other prefixes, even *uŋ(k)-*. Contrary to their prediction, the first person dual form for this verb is not \**uŋnáthaka*, but *naúŋthaka* ‘we locked it,’ which would violate ONSET and be ruled out as a viable candidate.

The behavior of the morphology discussed above in Dakota, Lakota, and Mandan shows that a phonologically-driven account like that of McCarthy & Prince (1993b) is unable to correctly predict surface affix order, even for the entire paradigm of the verbs they chose to include in their argumentation. Similarly, the term “infix” is equally inadequate in explaining the motivation for certain affixes finding themselves positioned after preverbal elements that are vowel-initial, but not in other vowel-initial environments. In Chapter 1, I suggest that the singular factor in determining affix order in Mandan and therefore in other so-called templatic languages is whether a lexical item is a simplex, compound, or composite word. Simplex and compound words in Mandan will always see prefixation, but

the presence of preverbs indicates that there is an internal word boundary. Unlike non-templatic languages, affixes in templatic languages are able to target multiple word edges. Some affixes target the head of the word, while others target the overall edge of the word, head or not. The data from (1.13) is repeated below and augmented with the distribution of inflectional material in Mandan.

(2.136) Internal structure of word types and examples of their inflection

- a. Simplex word: [dog-**s**]<sub>H</sub> or [lift-**ed**]<sub>H</sub> or [passer-**s**]<sub>H</sub>
- b. Compound word: [[hot][dog-**s**]<sub>H</sub>] or [[air][lift-**ed**]<sub>H</sub>] or [[passer-**s**]<sub>H</sub>[by]]
- c. Composite word: [*i*[**wa-sek**]<sub>H</sub>]=*o'sh* 'I do it' or [*ri-i*[**haaxik**]<sub>H</sub>]=*o'sh* 'we do not know'

Inflectional morphology in non-templatic languages seem to target the head of a word. For simplex words, the head of a word and the word itself are identical, but in compounds, we can see that the plural in English is not simply targeting the right edge of the overall word, else the plural of 'passer-by' would be \*'passer-bys' instead of 'passers-by.' Similarly, we can say that in Mandan, we have two sets of inflectional prefixes, where one set targets the left edge of the overall word, and the other targets the head itself. We can analyze words in Mandan as having these internal word boundaries, and these boundaries effectively motivate the non-featural blocking for nasal harmony or deficient iambs in primary stress footing. Neither process is able to take place across a word boundary. This word boundary is not that of the overall prosodic word, but the morphological word. The phonology is clearly sensitive to these boundaries as shown in the data, and we can thus say that phonology is unable to motivate affix order in Mandan. By showing that phonology cannot be the cause of affix ordering, we must appeal to some other motivating factor.

## Chapter 3

# Verbs and inflection in Mandan

This chapter addresses the issue of Mandan verbal morphology. Specifically, this chapter delves into the distribution of inflectional affixes and other agreement morphology, as well as the preponderance of postverbal enclitics possible in Mandan. Derivational affixes are also discussed here, as is cursory overview of the syntax of Mandan and the structure of the Mandan clause.

Much of the extant literature on Mandan deals with topics presented herein, as most previous scholars have been primarily concerned with glossing narratives (Kennard 1936, Hollow 1970, Coberly 1979, Mixco 1997a). Very little has been done to investigate issues in the behavior of verbs intra- and inter-clausally, though Mixco (1997b) argues that much of the participial markers described by Kennard (1936) and Hollow (1970) are really switch-reference markers. Previous explanations of Mandan have also described varying amounts of tense morphology, which herein is interpreted as being evidentials. I argue that Mandan, like most Siouan languages, lacks dedicated tense morphology, and that such formatives are truly aspectuals or evidentials.

This chapter breaks down the distribution and behavior of the affixes observed in Mandan into three divisions: the prefix field in §3.1, the suffix field in §3.2, and phrasal morphology (i.e., enclitics) in §3.3. I argue that much of the post-verbal morphology in Mandan are actually enclitics and not true suffixes. I conclude this chapter by noting that syntactic organization may shed light on the ordering of enclitics, but the scopal relationships between underlying agents and patients are not reflected in the ordering of the prefix field.

### 3.1 Prefix field

Mandan has a rigid ordering for its prefixes. The table previously seen in Table 1.1 is reproduced below.

Table 3.1: Prefix field in Mandan

11	10	9	8	7	6	5	4	3	2	1	0
REL	NEG	UNSP	1PL	PV.IRR	PV.LOC	1SG	2SG/2PL	SUUS	ITER	INS	STEM
					PV.INS			MID	INCP		
					PV.TR			RECP			

As pointed out in Chapter 1, the prefix field in Mandan vacillates between inflectional and derivational morphology. Slots 1 through 3 are all voice or aspectual markers, with slots 6 and 7 being mood or applicative preverbs. Person marking takes place in slots 4, 5, and 8, while an unspecified argument marker appears in slot 9. Negation is marked in slot 10, and relativization appears in slot 11.

### 3.1.1 Derivational prefixes

The bulk of prefixal slots is occupied by derivational material. The majority of these derivational affixes affect the valency of the verb: e.g., the prefix *ru-* INS.HAND indicates that an action is being done using the agent's hand, where the instrument is only covertly present in the sentence, not overtly.

#### 3.1.1.1 Instrumental prefixes (Slot 1)

Mandan, like every other Siouan language, has a number of instrumental prefixes. These prefixes indicate the manner by which an action occurs when added to a transitive verb. When an instrumental occurs with an intransitive verb, that verb becomes transitive. These instrumental prefixes are lexically determined, and are generally not productive in modern Mandan.

#### (3.1) Mandan instrumental prefixes

<i>ka-</i>	'by force'
<i>pa-</i>	'by pushing'
<i>ra</i> <sub>-1</sub>	'by foot'
<i>ra</i> <sub>-2</sub>	'by mouth'
<i>ra'</i>	'by heat'
<i>ru-</i>	'by hand'
<i>wa'</i>	'by piercing'

All seven of these instrumentals are inherited from Proto-Siouan, as cognates of these instrumentals can also be found in most other Siouan languages. Examples and semantic peculiarities of each instrumental follow below.

### 3.1.1.1.1 'By force' instrumental: *ka-*

This instrumental prefix is often accompanies verbs that deal with cutting or striking actions. It is a reflex of Proto-Siouan \*raka-, and typically manifests as *ka-*. However, when combined with a reflexive marker, the reflexive *ki-* plus *ka-* become *kara-*. This relic trace of the fuller \*raka- formative is likewise found in Dakotan and Dhegihan languages, and these languages likewise form a portmanteau of the reflexive plus force instrumental like Mandan (Rankin et al. 2015).

#### (3.2) Examples of *ka-*

- a. *kaháaro'sh*  
ka-haa=o'sh  
INS.FRCE-be.separated=IND.M  
'he cuts meat from the bone' (Hollow 1970:68)
- b. *íkahjto'sh*  
i-ka-hjt=o'sh  
INS.PV-INS.FRCE-soften.hide=IND.M  
'she softens a hide by beating it' (Hollow 1970:77)
- c. *ka hóora*            *ráahini*  
ka-hoo=E            rEEh=rj  
INS.FRCE-fall.over go.there=ss  
'it was falling down and...' (Hollow 1973a:1)
- d. *karókahashka*  
ka-ro-ka-hash=ka  
AGT-1S.PL-INS.FRCE-be.distintegrated=HAB  
'the one who slaughters us' (Hollow 1973a:146)
- e. *rakáshihe*  
ra-ka-shih=E  
2A-INS.FRCE-be.sharp=sv  
'you sharpen it' (Hollow 1973a:189)
- f. *ówakaptihki*  
o-wa-ka-ptik=ki  
PV.IRR-1A-INS.FRCE-fall.down=COND  
'if I knock it down' (Hollow 1973a:65)
- g. *karáxkqho'sh*  
kara-xkqh=o'sh  
REFL+INS.FRCE-move=IND.M  
'he shook something of his own' (Hollow 1970:448)

### 3.1.1.1.2 ‘By pushing’ instrumental: *pa-*

This instrumental typically implies a pushing-type action, frequently involving the movement of a cutting instrument. The use of *pa-* versus *ka-* when used for cutting motions indicates the difference in intensity of the cutting motion: i.e., butchering a carcass versus mincing food. Hollow (1970:461) notes that this instrumental is often associated with motions away from the body. It is a reflex of Proto-Siouan \**pa-* INS.PUSH.

#### (3.3) Examples of *pa-*

- a. *ówapaweshto'sh*  
o-wa-pa-wesh=kt=o'sh  
PV.IRR-1A-INS.PUSH-cut=POT=IND.M  
‘I might be going to cut it’ (Hollow 1970:454)
- b. *nupáminishinito'sh*  
rų-pa-wrişh=rıt=o'sh  
1A.PL-INS.PUSH-be.folded=2PL=IND.M  
‘we (pl.) rolled it up’ (Hollow 1970:462)
- c. *ópaxiruukini*  
o-pa-xruuk=rı̄  
PV.LOC-INS.PUSH-take.off=ss  
‘she took it off [the wall]’ (Hollow 1973a:91)
- d. *ópaptiktiki*  
o-pa-ptik=ktiki  
PV.LOC-INS.PUSH-have.fallen.down=POT+COND  
‘whenever he pushes them’ (Hollow 1973a:105)
- e. *miní wapáshų'ro'sh*  
wrı̄ wa-pa-shų'=o'sh  
water 1A-INS.PUSH-thresh=IND.M  
‘I swim’ (Hollow 1970:241)
- f. *Máatah Ópatarak*  
wą̄ą̄tah o-pa-trak  
Missouri.River PV.LOC-INS.PUSH-block  
‘Garrison Dam’ (Hollow 1970:256)
- g. *pasáqsi'sh*  
pa-są̄ą̄si=o'sh  
INS.PUSH-be.smooth=IND.M  
‘he polishes it’ (Hollow 1970:461)

### 3.1.1.1.3 ‘By foot’ instrumental: *ra*-<sub>1</sub>

The instrumental *ra*- is homophonous with the ‘by mouth’ instrumental. The ‘by foot’ instrumental is a reflex of the Proto-Siouan instrumental \**ra*q INS.FOOT. This instrumental is nasalized in Core Siouan (i.e., Mississippi Valley and Ohio Valley Siouan), but not nasalized in Peripheral Siouan (i.e., Missouri Valley, Mandan, and Catawban). Catawba uses a prosodically reduced form of the verb *daa* ‘go by foot’ (Rankin et al. 2015). There could have been some contamination with the oral vowel in ‘go’ that caused the vowel in the instrumental to oralize. Nonetheless, this instrumental is distinct from its homophonous counterpart *ra*- INS.MTH, as it is lexically selected for by certain verbs.

#### (3.4) Examples of *ra*-

- a. *ra*kéxo’sh  
 ra-kEx=o’sh  
 INS.FOOT-scrape=IND.M  
 ‘he scrapes it [with his feet]’ (Hollow 1970:107)
- b. *óraraxih*                      *íra*ku’kto’sh  
 o-ra-ra-xih                      i-ra-ku’=kt=o’sh  
 PV.IRR-2A-INS.FOOT-kick PV.INS-2A-give=POT=IND.M  
 ‘you’ll pretend to kick’ (Hollow 1973b:62)
- c. *ra*pí’xo’sh  
 ra-pí’x=o’sh  
 INS.FOOT-be.scattered=IND.M  
 ‘he scatters it [with his foot]’ (Hollow 1970:146)
- d. *ra*shú’ro’sh  
 ra-pa-shú’=o’sh  
 INS.FOOT-thresh=IND.M  
 ‘he threshes corn with his feet’ (Hollow 1970:221)
- e. *wa*rápíito’sh  
 wa-ra-píit=o’sh  
 1A-INS.FOOT-scatter=IND.M  
 ‘I scatter it with my foot’ (Hollow 1970:464)
- f. *ki*rásiruutoomako’sh  
 ki-ra-sruut=oowak=o’sh  
 ITR-INS.FOOT-be.slippery=NARR=IND.M  
 ‘he slipped again’ (Kennard 1936:11)
- g. *ra*shóho’sh  
 ra-shoh=o’sh  
 INS.FOOT-be.pointed=IND.M  
 ‘he stretches his legs’ (Hollow 1970:232)

### 3.1.1.1.4 'By mouth' instrumental: *ra*-<sub>2</sub>

The 'by mouth' instrumental *ra*- is a reflex of Proto-Siouan \**ra*- INS.MTH. Actions involving an agent's lips, mouth, teeth, or tongue will often display this instrumental. Certain stems may involve either *ra*- INS.FOOT or *ra*- INS.MTH, making these verbs homophonous: e.g., *rashkápo'sh* can mean either 'he pinches it between his toes' or 'he nibbles on it.' Context is clearly the tiebreaker in such instances.

#### (3.5) Examples of *ra*-

- a. *rahópo'sh*  
ra-hop=o'sh  
INS.MTH-be.hollow=IND.M  
'he nibbles a hole' (Hollow 1970:77)
- b. *rakáxo'sh*  
ra-kax=o'sh  
INS.MTH-eat.corn.from.cob=IND.M  
'he eats corn from the cob' (Hollow 1970:104)
- c. *óratke*                      *mikó'sh*  
o-ra-tke                      wík=o'sh  
PV.IRR-INS.MTH-touch be.none=IND.M  
'it has no flavor' (Hollow 1973b:138)
- d. *waráxkiho'sh*  
wa-ra-xkih=o'sh  
UNSP-INS.MTH-be.cracked=IND.M  
'he cracks something between his teeth' (Hollow 1970:465)
- e. *íraxqko'sh*  
i-ra-xąk=o'sh  
PV.INS-INS.MTH-be.torn=IND.M  
'he tears it open with his teeth' (Hollow 1970:309)
- f. *waráxtuxte'sh*  
wa-ra-xtuxte=o'sh  
1A-INS.MTH-chew=IND.M  
'I chew it' (Hollow 1970:330)
- g. *rará'uxo'sha?*  
ra-ra-ux=o'sha  
2A-INS.MTH-be.broken=INT.M  
'are you going to break it between your teeth?' (Hollow 1970:465)

### 3.1.1.1.5 ‘By heat’ instrumental: *ra’-*

This instrumental has at times been confused for one of the *ra-* instrumentals due to the fact that many scholars did not hear the coda glottal stop, as well as the fact that many speakers tend to not realize the glottal stop with a full glottal occlusion. The use of creaky voice is often the only clue that this is the ‘by heat’ instrumental in many tokens in the corpus. This instrumental is a reflex of Proto-Siouan \*aRaa INS.TEMP, which denotes an action taken using either extreme heat and extreme cold. In some Siouan languages, this instrumental is still used with extreme cold, but this is not the case in Mandan.

#### (3.6) Examples of *ra’-*

- a. *kará’ptewaherektó’sh*  
 ka-ra’-ptE#wá-hrE=kt=o’sh  
 INC-INS.HEAT-be.burning#1A-CAUS=POT=IND.M  
 ‘I will cause it to start to burn’ (Hollow 1973b:47)
- b. *rá’sakó’sh*  
 ra’-sak=o’sh  
 INS.HEAT-be.dry=IND.M  
 ‘it dried up in the fire’ (Hollow 1970:198)
- c. *mará’reshó’sh*  
 wá-ra’-resh=o’sh  
 1S-INS.HEAT-be.hot=IND.M  
 ‘I am hot’ (Hollow 1970:463)
- d. *rá’xuunuhé’sh*  
 ra’-xuu#rú-hrE=o’sh  
 INS.HEAT-be.charred#1A.PL-CAUS=IND.M  
 ‘we charred it and made it brittle’ (Hollow 1970:330)
- e. *rá’xerephé*  
 ra’-xrep#hrE  
 INS.HEAT-scab#CAUS  
 ‘boil off the bone’ (Kennard 1936:12)
- f. *mí’s*      *rá’sesó’nik*  
 wí’=s      ra’-sE=so’rĭk  
 stone=DEF INS.HEAT-be.red=COMP.CAUS  
 ‘since it was red hot’ (Hollow 1973a:97)
- g. *ráut rá’sitwahara*      *minikú’nító’sh*  
 ruut ra’-sit#wá-hrE      w-rĭ-ku’=rĭt=o’sh  
 rib    INS.HEAT-roast#1A-CAUS 1A-2S-give=2PL=IND.M  
 ‘I roasted the ribs for you (pl.)’ (Hollow 1973a:177)

### 3.1.1.1.6 ‘By hand’ instrumental: *ru-*

One of the most commonly encountered instrumentals is *ru-*, indicating that an action is taking place using the agent’s hands. It is a reflex of Proto-Siouan \**ru-* INS.HAND, which has cognates in every Siouan language.

(3.7) Examples of *ru-*

- a. *íruxqko’sh*  
i-ru-xąk=o’sh  
PV.INS-INS.HAND-be.torn=IND.M  
‘he tears it open [with his hands]’ (Hollow 1970:309)
- b. *nurúsiko’sh*  
ru-ru-sįk=o’sh  
1A.PL-INS.HAND-be.squeezed=IND.M  
‘we squeezed/choked something’ (Hollow 1970:206)
- c. *ruhįito’sh*  
ru-hįit=o’sh  
INS.HAND-tan.hide=IND.M  
‘she tans a hide’ (Hollow 1970:75)
- d. *wáa’owarushaaxi’re*  
waa-o-wa-ru-shE=xi=o’re  
NEG-PV.IRR-1A-INS.HAND-take=NEG=IND.F  
‘I won’t take it’ (Hollow 1973a:131)
- e. *rusé’rak*  
ru-se’=ak  
INS.HAND-open=DS  
‘having opened it’ (Hollow 1973a:137)
- f. *waa’iruptini*  
waa-i-ru-pti=rį  
NOM-PV.INS-INS.HAND-carry=SS  
‘a pot holder and...’ (Hollow 1973a:149)
- g. *ąqwe óshiriihaa*                      *íkiruskekerekaroomako’sh*  
ąqwe o-shriih=haa                      i-ki-ru-xke=krE=ka=oowąk=o’sh  
all    PV.LOC-be.scattered=SIM    PV.INS-VERT-INS.HAND-pluck=3PL=HAB=NARR=IND.M  
‘they would all pull [their heads] back while scattering’ (Hollow 1973a:45)

In the overwhelming majority cases, words bearing *ru-* transparently involve the semantics of an action that takes place by way of an agent’s hand. However, there are numerous cases where there is no obvious connection to an action or state taking place by way of an agent’s hand, sometimes not even having any kind of an agent. Some instrumentals have similar opaque connections between the meaning of the resulting lexical item and the manner

of action they denote, but *ru-* has a much higher number of these semantically non-transparent roots than any other instrumental.

(3.8) Non-transparent semantics for *ru-*

- a. *rusiríxo'sh*  
ru-srix=o'sh  
INS.HAND-splash=IND.M  
'it splashes' (Hollow 1970:218)
- b. *rukóho'sh*  
ru-koh=o'sh  
INS.HAND-be.vacant=IND.M  
'he moves sideways, makes a space' (Hollow 1970:114)
- c. *hásh írumini*  
hásh i-ru-wrì  
grape PV.INS-INS.HAND-be.twisted  
'grape vine' (Trechter 2012b:196)
- d. *ruminísho'sh*  
ru-wrìsh=o'sh  
INS.HAND-be.rolled.up=IND.M  
'he goes around in circles' (Hollow 1970:305)
- e. *ómaruxke'sh*  
o-wà-ru-xke=o'sh  
PV.LOC-1S-INS.HAND-sink=IND.M  
'I am sinking' (Hollow 1970:317)
- f. *ruxóko'sh*  
ru-xok=o'sh  
INS.HAND-be.idle=IND.M  
'he forbids someone from working' (Hollow 1970:319)
- g. *kiruxú'ro'sh*  
k-ru-xú'o'sh  
MID-INS.HAND-plow=IND.M  
'he frowns' (Hollow 1970:331)

It is possible that several of these items originate from some metaphorical usage (e.g., *ruxók* involving someone holding up their hand to prohibit someone else from doing something), whereas for others it is less clear (e.g., *rusirix* describes something that a liquid does, not what someone is doing to the liquid, so there should be no agent involved).

3.1.1.1.7 'By piercing' instrumental: *wa'*-

This instrumental is the least common of all seven instrumentals in Mandan. It is a reflex of Proto-Siouan \*Wa-INS.CUT, which is not restricted to just cutting actions in Mandan. Actions involving *wa'*- all make use of some sharp and pointed object.

(3.9) Examples of *wa'*-

- a. *wá'hopo'sh*  
wa'-hop=o'sh  
INS.PRCE-be.hollow=IND.M  
'he makes a hole with an awl' (Hollow 1970:490)
- b. *wá'skjh*  
wa'-skjh  
INS.PRCE-cut.open  
'cut open' (Kennard 1936:12)
- c. *wá'tke'sh*  
wa'-tkE=o'sh  
INS.PRCE-poke=IND.M  
'he scrapes hair from hide, pokes with pointed object' (Hollow 1970:253)
- d. *wá'úx*  
wa'-ux  
INS.PRCE-be.broken  
'he breaks something with a pointed object' (Hollow 1970:263)
- e. *wá'pshako'sh*  
wa'-pshak=o'sh  
INS.PRCE-be.ripped=IND.M  
'he cut through it, opened it with a point' (Hollow 1970:153)
- f. *írawa'tereko'sh*  
i-ra-wa'-trek=o'sh  
PV.INS-2A-INS.PRCE-sew=IND.M  
'you sew it' (Hollow 1970:97)
- g. *wáa'íwa'shkap*  
waa-i-wa'-shkap  
NOM-PV.INS-INS.PRCE-pinch  
'a pin' (Hollow 1970:230)

### 3.1.1.2 Aspectual prefixes (Slot 2)

Aspect marking appears in the second prefixal slot in Mandan. Both iterativity and inceptivity can be expressed with the prefix *ki-*. Furthermore, the prefix *ki-* is homophonous with the voice marking prefix *ki-*, which is described in §3.1.1.3. The iterative interpretation of *ki-* is very productive in Mandan, and Kennard (1936:11) notes that this formative is used in way similar to the prefix 're-' in English. The same cannot be definitively said about the inceptive interpretation, which does not appear to be productive, and is only sparsely attested in the corpus.

### 3.1.1.2.1 Iterative aspectual: *ki*-<sub>1</sub>

The iterative prefix has an allophone of *k*- before stems beginning with sonorants as well as the instrumental *pa*-. The iterative can convey the meaning of ‘once more’ as well as ‘over and over again.’ The most common interpretation of the iterative observed in the corpus is ‘once more.’ Mixco (1997a:29) notes that iterative marking can co-occur with the adverb *inák* ‘again.’ Throughout the corpus, the most frequent manifestation of iterativity is expressed with the adverb *inák* instead of derivationally on the verb itself.

(3.10) Examples of iterative *ki*-

- a. *óti*                    *íkisehkereromako’sh*  
o-ti                    i-ki-sEk=krE=oowak=o’sh  
PV.LOC-reside PV.INS-ITR-make=3PL=NARR=IND.M  
‘they fixed the house’ (Hollow 1973a:157)
  
- b. *wáa’okina’taaxi*  
waa-o-ki-rá’tE=xi  
NEG-PV.IRR-ITR-stand.AUX=NEG  
‘he won’t be getting up again’ (Hollow 1973a:2)
  
- c. *wakíkuuho’sh*  
wa-ki-kuuh=o’sh  
1A-ITR-come.back.here=IND.M  
‘I came back again’ (Hollow 1970:450)
  
- d. *kerépo’sh*  
k-rep=o’sh  
ITR-be.fat=IND.M  
‘he is fat again’ (Hollow 1970:450)
  
- e. *wakirú’uxo’sh*  
wa-k-ru-ux=o’sh  
1A-ITR-INS.HAND-be.broken=IND.M  
‘I break it again’ (Hollow 1970:489)
  
- f. *keróoro’sh*  
k-roo=o’sh  
ITR-talk=IND.M  
‘he is talking again’ (Hollow 1970:449)

Kennard (1936:11) points out that there are certain verbs for which *ka*- is the iterative prefix, but this is a situation where he is perceiving an intrusive vowel as [a~ə] due to the more centralized realization of Dorsey’s Law vowels. He gives the following examples:

(3.11) Iterative *ka-* in Kennard (1936)

⟨karo'pxani⟩	/k-ropxE=rɨ/	<i>kerópxaani</i>	'he went in again'
⟨ta'menis karo'tkika <sup>'ehe</sup> ⟩	/ta-wrɨs k-rootki=ka'ehe/	<i>taminís keróotkika'ehe</i>	'he struck his horse again'
⟨karo'ktike`reka <sup>'ehe</sup> ⟩	/k-rookti=krE=ka'ehe/	<i>keróotkikereka'ehe</i>	'they camped again'
⟨kara'cikoc⟩	/k-ra-shik=o'sh/	<i>karáshiko'sh</i>	'he kicked it again'

Each of the examples in (3.11) is really an underlying /k-/ that triggers a Dorsey's Law vowel before the sonorant-initial root. This allomorphy does not seem to be phonologically conditioned, given that it is triggered before stems beginning with /r w/ and the instrumental *pa-* but not other stems beginning with /p/: e.g., *kipáxo'sh* 'it is broken again' and not \**kapáxo'sh*.

3.1.1.2.2 Inceptive aspectual: *ka-* and *ki-*<sub>2</sub>

Inceptive aspect is marked very sparingly in the corpus. Virtually every instance of inceptivity involves a verb of motion, with most of the non-motion verbs being from Hollow's (1973b) re-elicitation of Kennard's (1934) narratives. It is possible that this prefix is less productive in the speech of Mandan speakers who were born around the turn of the twentieth century, but the lack of additional data relegates this explanation to the realm of conjecture. However, the fact remains that inceptive marking is more widely attested in narratives from speakers born in the middle of the nineteenth century than it is for speakers born at the turn of the twentieth century and onward.

While Hollow (1973a) documents numerous examples of inceptive *ka-* in his transcribed narratives, it is not included in his list of morphology in the back of his dictionary (Hollow 1970). The inceptive aspect marker falls in the same slot as the iterative aspect marker, and as such, they cannot co-occur. It is possible for multiple manifestations of iterativity to be present on a single verb (i.e., with the prefix *ki-* and the enclitic =*skee*), but no such redundant marking of inceptivity is documented in the corpus.

The narratives in Hollow (1973a) show that *ka-* is the most frequent shape for the inceptive marker, but a few verbs take *ki-* instead. This difference appears to be lexical, as there are no other transparent conditioning factors that might suggest a phonological motivation. We can see examples of both inceptive *ka-* and *ki-* below.

(3.12) Examples of inceptive *ka-*

- a. *kasúkini*  
ka-suk=rɨ  
INCP-come.out=ss  
'he appeared and...' (Hollow 1973a:45)

- b. *kasii ráahini*  
 ka-sii rEEh=r̥i  
 INCP-travel go.there=ss  
 ‘he went traveling and...’ (Hollow 1973a:1)
- c. *karópxekereromako’sh*  
 ka-ropxE=krE=oowak=o’sh  
 INCP-go.in=3PL=NARR=IND.M  
 ‘they began to go in’ (Hollow 1973b:174)
- d. *q̣awe karóokereromako’sh*  
 ạawe ka-roo=krE=oowak=o’sh  
 all INCP-talk=3PL=NARR=IND.M  
 ‘everyone started talking’ (Hollow 1973b:149)
- e. *kani’roomako’sh*  
 ka-r̥i’=oowak=o’sh  
 INCP-climb=NARR=IND.M  
 ‘he started to climb ashore’ (Hollow 1973b:270)
- f. *karáahaa*  
 ka-rEEh=haa  
 INCP-go.there=SIM  
 ‘she started to go’ (Hollow 1973b:275)
- g. *kará’ptewaherektó’sh*  
 ka-ra’-ptE#wá-hrE=kt=o’sh  
 INCP-INS.HEAT-burn#1A-CAUS=POT=IND.M  
 ‘I will cause it to start to burn’ (Hollow 1973b:47)

(3.13) Examples of inceptive *ki-*

- a. *rakarátaxa raháarootiki*  
 ra-k-ra-tax=E ra-haa=ooti=ki  
 2A-INCP-INS.MTH-make.loud.noise=SV 2S-start=EVID=COND  
 ‘when you start crying’ (Hollow 1973a:185)
- b. *kixkq̣haraani*  
 ki-xkq̣h#hrE=r̥i  
 INCP-move#CAUS=ss  
 ‘she began chasing him and...’ (Hollow 1973a:222)
- c. *kikanáani kikinápaa máakaahaa*  
 ki-kraq̣=r̥i ki~ki-rap=E waaqE=haa  
 INCP-sing=ss AUG~INCP-dance=SV lying.AUX=SIM  
 ‘they would start to sing and just start to dance’ (Trechter 2012b:165)

Very few examples of inceptive *ki-* appear in the corpus, so it is not evident how many other verbs fall into the class of *ki-* inceptives versus *ka-* inceptives. We can see above in (3.13a) that inceptive *ki-* behaves like iterative *ki-*

with respect to allophonic realization as /k-/ when before sonorant-initial stems. We can be certain that this example is truly *ki-* and not *ka-* by observing that stress appears on the third vocalic element, indicating that the ⟨ka⟩ in (3.13a) is a Dorsey’s Law vowel and therefore extrametrical. It is possible that we may see additional variation in Bowers’s (1971) recordings of Mrs. Annie Eagle and Mrs. Otter Sage, but the transcription and glossing of the 100-plus hours of recordings remains a task for the future.

The overall pattern we see with respect to aspectual prefixes is that *ki-* is sole iterative prefix, while *ka-* is the primary inceptive prefix with certain tokens bearing *ki-* instead. The lack of L1 speakers means that we may not know if there is any difference in meaning between inceptive *ka-* and *ki-*, or if the distinction lies more in a difference in registers or varieties of Mandan: i.e., Núu’etaa versus Rúptaa varieties. However, it is worth noting that there is no overlap in the words that bear *ka-* as the inceptive marker versus those that bear *ki-*, so this variation may ultimately be ascribed to the lexicon.

An additional unknown is whether stacking these aspectuals is permissible. English allows for constructions like ‘she began writing again’ or ‘we restarted an annual tradition.’ If these aspectuals are stackable, is there any asymmetry in how they can be concatenated? We do not know if Mandan permits constructions like *\*?kikásii* ‘re-begin traveling’ or *\*?kakísii* ‘start traveling again,’ though their absences from corpus suggest that these forms may be marked at the very best or illicit at the very worst.

### 3.1.1.3 Voice prefixes (Slot 3)

This group of derivational prefixes is especially prolific, being found frequently throughout the corpus. The prefix *ki-* has been described as reflexive, reciprocal, middle voice, vertative, and *suus* in Mandan by various authors (Kennard 1936, Hollow 1970, Coberly 1979, *inter alios*). One issue that we must deal with is how to properly describe what Mixco (1997a:22) describes as “polysemous *ki-*.”

A portion of this polysemous *ki-* has been addressed in §3.1.1.2.2, where *ki-* can be an inceptive marker. Herein I present the different manifestations of *ki-* and its numerous uses.

#### 3.1.1.3.1 Middle voice marker: *ki*<sub>-1</sub>

This prefix is found whenever there is some dynamic change to a state or an action. It frequently carries an anti-causative meaning: i.e., the subject of the verb undergoes some change in state without necessarily having an agent enacting that change: e.g., *kishí* ‘become good’ or ‘get better.’

(3.14) Examples of middle voice *ki-*

- a. *wakíkiirasó'sh*  
wa-ki-kiiras=o'sh  
1A-MID-be.stingy.with=IND.M  
'I love him, I am stingy with it' (Hollow 1970:111)
- b. *pkakíisho'sh*  
k-pa-kiish=o'sh  
MID-INS.PUSH-wipe=IND.M  
'he pays off a debt' (Hollow 1970:111)
- c. *rakíkiishke'sh*  
ra-ki-kiishkE=o'sh  
1A-MID-consider=IND.M  
'you think about it, taste it' (Hollow 1970:112)
- d. *kirúxu'ro'sh*  
ki-ru-xu'=o'sh  
MID-INS.HAND-plow=IND.M  
'he frowns' (Hollow 1970:331)
- e. *kimíkhère*  
ki-wík#hrE  
MID-be.none#CAUS  
'remove' (Hollow 1970:113)
- f. *kixéero'sh*  
ki-xee=o'sh  
MID-be.quiet=IND.M  
'he quits, surrenders' (Hollow 1970:312)
- g. *kixíko'sh*  
ki-xik=o'sh  
MID-be.bad=IND.M  
'it soured (of cream), spoiled' (Hollow 1970:314)
- h. *kixté'sh*  
ki-xtE=o'sh  
MID-be.big=IND.M  
'it gets bigger' (Hollow 1970:326)

Some of the examples above are more idiomatic or metaphorical in nature: e.g., *kirúxu'* 'frown' literally means 'becomes plowed,' likely referring the motion of the mouth. The word *pkakíish* 'pay off a debt' literally means to 'have something get pushed clear,' likely referencing the clearing of a ledger. Most instances of middle voice throughout the corpus are transparent, however, and will carry these semantics.

A small number of instances of middle voice exist that suggest that the middle voice can also be used to express accidental actions, as seen below.

(3.15) Middle voice to denote accidental actions

- a. *p̄kashúho'sh*  
k-pa-shúh=o'sh  
MID-INS.PUSH-spill=IND.M  
'he spills something accidentally' (Hollow 1970:288)
- b. *p̄kaxkiho'sh*  
k-pa-xkih=o'sh  
MID-INS.PUSH-be.split=IND.M  
'he split it accidentally' (Hollow 1970:318)

This middle voice marking is more akin to an impersonal construction rather than truly being accident-denoting morphology. As such, a more literal interpretation of the sentences above would be 'something got spilled' or 'something got split' rather than ascribing grammatical subjecthood to the actual agent who affected this change. It is thus possible for speakers of Mandan to downgrade their own agency for an action and simply make use of the middle voice to express that something has happened, but without morphologically attaching a cause to this event.

3.1.1.3.2 *Suus* marker: *ki*-<sub>2</sub>

Like all other Siouan languages, Mandan is able to use the polysemous *ki*- to indicate that the direct object is possessed by the subject. Certain authors refer to this as a reflexive, of which is certainly is one species, but calling it a reflexive does not fully explain what it does. After all, this *suus* marker shows that the direct object of an action is not the agent, but something of the agent's very own.

(3.16) Examples of *suus*-marking *ki*-

- a. *wapáminishs*                      *kirúxotki*  
wa-pa-wr̄ish=s                      k-ru-xot=ki  
UNSP-INS.PUSH-be.folded=DEF SUUS-INS.HANDuntie=COND  
'when she untied her bundle' (Kennard 1936:11)
- b. *tamáah̄i kirúsheka'ehe*  
ta-wáah̄i k-ru-shE=ka'ehe  
AL-knife SUUS-INS.HAND-grasp=QUOT  
'he took his knife, it is said' (Kennard 1936:11)
- c. *ówakiṗka'uxo'sh*  
o-wa-ki-k-pa-ux=o'sh  
PV.IRR-1A-SUUS-ITR-INS.PUSH-be.broken=IND.M  
'I am going to break something of my own again' (Hollow 1970:450)

- d. *istámi's kirusá'roomako'sh*  
 istaw<sub>i</sub>'=s k-ru-sa'=oowak=o'sh  
 eye=DEF SUUS-INS.HAND-wash=NARR=IND.M  
 'he washed his eyes' (Hollow 1973a:37)
- e. *kiká'ro'sh*  
 ki-ka'=o'sh  
 SUUS-have=IND.M  
 'he keeps it' (Hollow 1970:102)

This *suus* marker often accompanies verbs where the subject affects some kind of change upon their own possession: e.g., picking it up or hitting it. It is not used in the corpus with verbs where the direct object is not physically affected by the action. This lack of *suus* with perception verbs does not indicate that such constructions are impossible, but the pattern of verbs that can take *suus* marking suggests that there is a restriction on the kinds of actions that can have a *suus* direct object.

### 3.1.1.3.3 Reflexive and reciprocal marker: *ki*-<sub>3</sub>

(3.17) Examples of reflexive *ki*-

- a. *mikihe'sh*  
 w<sub>i</sub>-ki-hE=o'sh  
 1S-RFLX-see=IND.M  
 'I see myself' (Mixco 1997a:23)
- b. *mí'shak ímikisehki*  
 w<sup>~</sup>-ishak i-w<sub>i</sub>-ki-sEk=ki  
 1S-PRO PV.INS-1S-RFLX-make=COND  
 'when I fix myself' (Hollow 1970:127)
- c. *nikípaweshoote'sh*  
 r<sub>i</sub>-ki-pa-wesh-ootE=o'sh  
 2S-RFLX-INS.PUSH-cut=EVID=IND.M  
 'you must have cut yourself' (Kennard 1936:11)
- d. *nukírushkapo'sh*  
 ru<sub>i</sub>-ki-ru-shkap=o'sh  
 1S.PL-RFLX-INS.HAND-pinch=IND.M  
 'we pinch ourselves (each other)' (Hollow 1970:440)
- e. *ikihe'sh*  
 i-ki-hE=o'sh  
 PV.INS-RFLX-see=IND.M  
 'he sees himself' (Hollow 1970:440)

- f. *ikirookereromako'sh*  
 i-ki-roo=krE=oowak=o'sh  
 PV.INS-RFLX-talk=3PL=NARR=IND.M  
 'they argued about it' (Hollow 1973a:24)

Kennard (1936:31) lists *ki-* as the reflexive marker, while Hollow (1970:440) argues that *iki-* is really the reflexive marker. It is unlikely that Hollow is correct, since the one verb form he uses to justify the base shape of the reflexive in Mandan actually has an instrumental preverb on it that is not attached to the reflexive. The word *ikihe'sh* does mean 'he sees himself,' but the addition of the instrumental preverb indicates the presence of a covert instrument, such as a mirror or a pool of water in which he sees his reflection. In the corpus, each instance of ⟨iki⟩ in Hollow's (1970) transcription is actually an instrumental preverb.

The pronominals used in reflexive marking are all stative prefixes. The first person singular marker before a reflexive is *mi-*, which is not a typical first person singular stative prefix, and is explained further in §3.1.2.2.2.3). The second person *ni-* is likewise the second person stative. The first person plural active *nu-* is homophonous with the first person plural stative in reflexive constructions.

Kennard (1936:11) gives *kiki-* as the form for the reciprocal. Hollow (1970:440) notes that reciprocal and reflexive acts are ambiguous. The presence of *kiki-* is attested in Mixco (1997a:23), though he suggests that it is merely *ki-* concatenated with itself. I likewise take this view, hypothesizing that this reciprocal meaning is accomplished through reduplication. Prefixal reduplication in Mandan add an augmentative meaning to the item being reduplicated. This process typically targets verbs and nouns, but other prefixes can be reduplicated as well for emphasis. This pattern of reduplicating prefixes is observed throughout the corpus, typically on pronominal morphology to emphasize who is doing an action.

There is no devoted reciprocal marking in Mandan, through a reciprocal interpretation can be achieved by reduplicating the reflexive. We can see this behavior below, where each of the utterances carries a reciprocal reading that has been confirmed by the consultant who provided the data from each of the respective narratives that have been cited, but most do not bear double *ki-* markers.

(3.18) Examples of reciprocal marking

- a. *numá'k kikihekere'sh*  
 ruwá'k ki~ki-hE=o'sh  
 man RECP~RFLX-see=IND.M  
 'the men see each other' (Mixco 1997a:23)
- b. *kikiraksqakereromako'sh*  
 ki-kiraksqá=krE=oowak=o'sh  
 RFLX-make.war=3PL=NARR=IND.M

‘they fought each other’ (Hollow 1973b:40)

c. *kikíxkqharaani*

ki~ki-xkqh#hrE=rj

RECP~RFLX-move#CAUS=SS

‘they were chasing each other and...’ (Trechter 2012b:107)

d. *kikáani*

ki-kE=rj

RFLX-pluck=ss

‘they shot [arrows] at each other and...’ (Trechter 2012b:116)

The reflexive can situationally carry reciprocal meaning, though it seems likely that reduplicating the reflexive to ensure a reciprocal reading is done for emphasis. In cases like (3.18d), the single use of the reflexive could yield two readings: ‘they shot [arrows] at each other’ or ‘they shot themselves [with their own arrows].’ The more likely reading of this example is that the actors involved were firing arrows at others, rather than at their own persons. As such, the reduplicated reciprocal construction is unnecessary.

Another possible reason for why double *ki-* marking is observed so rarely is because of the augmentative reading that prefixal reduplication bestows upon an item. As such, in (3.18c), the use of *kiki-* could serve to indicate that the actors involved were not involved in a single chase action, but were chasing each other all over. Nevertheless, Hollow’s (1970) observation holds that *kiki-* is quite rare, and Mixco’s (1997a) position that a reciprocal reading can be conveyed through reduplicating the reflexive *ki-* appears to bear out in the data.

#### 3.1.1.3.4 Vertitive marker: *ki-*<sub>4</sub>

The use of the term vertitive is ascribed to Terrance Kaufman, who coined it for describing cislocative motion in Mayan languages, and this term was passed on to his student Hollow and onto Siouanists at large (Rankin p.c.). The Siouanist definition of this term deals with motion back to a source. Taylor (1976) reconstructs core motion verbs in Proto-Siouan as having vertitive and non-vertitive forms, though his interpretation of vertitivity is restricted to meaning ‘back.’

Quintero (2004:238) defines the vertitive as a kind of *suus* marker, where an agent returns to their home. In practice, the vertitive is often used to indicate motion homeward in Mandan, but it is also found in narratives where an agent has no clear home, as in the case of the cultural figure *Kinúma’kshi* ‘Royal Chief, Old Man Coyote,’ who is constantly traveling the land. As such, this *suus* interpretation does not hold in Mandan.

Cumberland (2005) is really the first Siouanist to contextualize the complex use of the vertitive within a narrative structure. While driving around with a consultant, Cumberland (p.c.) noticed that the consultant had started using

vertitive motion verbs as soon as they reached the mid-point of their journey around the reservation and began the process of returning to the place whence they had originally departed. This vertitive marking did not indicate that they were returning home, but rather returning to a particular origin point that has been established.

The vertitive does not mark a return home, but a return to some deictic center. The type of motion verb used depends on the relationship between a deictic center (DC) and a base. The DC is the geospatial point of perspective from where motion verbs are interpreted. Furthermore, the location designated as the deictic center can shift during discourse, causing a shift in the base to which the agent is returning. The base is the location associated with the traveler, and can be permanent or temporary: e.g., permanent like a home or temporary like a social gathering the traveler has just attended. All verbs of motion deal with movement towards or away from one or both of these two variables. This pattern in Assiniboine is summarized in the table below.

Table 3.2: Verbs of motion in Assiniboine

		<b>Departure</b>	<b>Progress</b>	<b>Arrival</b>
←deictic center	←base	<i>iyáyÁ</i> ‘leave here to go there’	<i>yÁ</i> ‘go there’	<i>í</i> ‘arrive there’
	→base	<i>k<sup>h</sup>iknÁ</i> ‘leave here to go back there’	<i>knÁ</i> ‘go back there’	<i>k<sup>h</sup>i</i> ‘arrive back there’
→deictic center	←base	<i>hiyú</i> ‘leave there to go here’	<i>ú</i> ‘come here’	<i>hí</i> ‘arrive here’
	→base	<i>knicú</i> ‘leave there to go back here’	<i>kú</i> ‘come back here’	<i>kní</i> ‘arrive back here’

Taylor (1976) argues this tripartite Departure-Progress-Arrival paradigm is an innovation of Dakotan languages, but I argue that this tripartite distinction is truly a Proto-Siouan feature in (Kasak 2013a), as cognates of most the above forms exist in other Siouan languages and Catawban. Furthermore, Mandan has cognates of all the motion verbs found in Dakotan languages like Assiniboine, as can be seen in Table 3.3. Kennard (1936) and Hollow (1970) only list the Progress and Arrival series as motion verbs, but the corpus and judgments from speakers reveal that the Departure series exists in Mandan as well. The semantics of the Departure series convey motions that are underway, as we can see in the examples below.

(3.19) Departure-series verbs in Mandan

- a. *tíhuuro’sh*  
 ti#huu=o’sh  
 arrive.here#come.here=IND.M  
 ‘he is arriving’ (Kennard 1936:37)



marking.

Vertitive marking appears not only on the classic verbs of motion shown above, but can also appear on other motion verbs in Mandan.

(3.20) Vertitive usage on non-tripartite motion verbs

- a. *kiptáho'sh*  
ki-ptah=o'sh  
VERT-turn.away=IND.M  
'he turns back' (Hollow 1970:155)
- b. *áakeropxe*  
aa-k-ropxE  
PV.TR-VERT-enter  
'bring something back in' (Hollow 1970:189)
- c. *kisúkherek*  
ki-suk#hrE=ak  
VERT-come.out#CAUS=DS  
'having made him get back out' Hollow 1973a:144
- d. *íki'aakit*                      *háa'aakit*                      *ráahini*  
i-ki-aaki=t                      haa#aaki=t                      rEEh=rĭ  
PV.DIR-VERT-be.above=LOC cloud#be.above=T go.there=ss  
'they went back upward to heaven and...' (Hollow 1973a:153)
- e. *kikú'kereroote'sh*  
ki-ku'=krE=ootE=o'sh  
VERT-give=3PL=EVID=IND.M  
'they must have given it back' (Hollow 1970:474)
- f. *kirúsheka'ehe*  
ki-ru-shE=ka'ehe  
VERT-INS.HAND-grasp=QUOT  
'he took them back, it is said' Hollow 1973a:16

Most of the examples above involve *ki-* prefixing onto a verb of motion, but we can see that the vertitive marker can also appear on verbs that indirectly deal with motion, like *kikú'* 'give back' or *kirúshe* 'take back.' Because of the polysemy of *ki-*, the vertitive is often grouped with the other voice markers. It is not fully clear if this affix truly belongs in slot 2 or 3. While this prefix does deal with properties of the subject of the verb rather than the act itself (i.e., going back to a base associated with the subject), it also has an iterative association, given that an agent is once again in motion towards a base. The fact that the iterative and vertitive *ki-* prefixes are homophonous means it is not obvious which one is which when given constructions like the one below:

(3.21) Multiple *ki-* marking

*kikíku'ro'sh*  
ki-ki-ku'=o'sh  
VERT-ITR-give=IND.M

'he gave it back again'

When presented with examples like the one above, speakers recognize it and its intended meaning, but are unable to specify which *ki-* is indicating that the subject is giving the object back and which one indicates that this action is happening again. The vertitive in the tripartite motion verbs (e.g., *keréeh* 'go back there') seems to be a fossilized formative, as we can have constructions like those below, where the iterative seemingly precedes a vertitive form.

(3.22) Iterative marking with vertitive verbs

a. *wakíkuho'sh*  
wa-ki-kuh=o'sh  
1A-ITR-come.back.here=IND.M  
'I came back again' (Mixco 1997a:12)

b. *kikiríkerek*  
ki-kri=krE=ak  
ITER-arrive.back.here=3PL=DS  
'when they got back' (Kennard 1936:39)

In each of the examples in (3.22) above, iterative marking precedes a vertitive verb. In Hollow (1970) and Mixco (1997a), such cases are glossed as if the vertitive verbs are morphologically deconstructable, synchronically. There is no set of rules in contemporary Mandan that turns an input like /ki-huu/ 'VERT-come.here' into [kuh]. Historically, there was likely a process in Pre-Mandan where the vertitive *ki-* became /k-/ before an /h/, yielding \*k-huu, which then triggered metathesis of the /h/ to avoid aspiration, yielding the modern *kúh* 'come back here.' This process, however, is not something modern speakers are able to access, so these verbs are treated as atomic lexical items herein. There are no examples of clearly concatenated iterative and vertitive prefixes in the corpus, with iterativity being expressed on vertitive-marked actions with the adverb *inák* 'again.' Though there is no definitive evidence from speakers or from the corpus, the vertitive marker is considered here to be in slot 3 of the template due to its close semantic alignment with the agent argument, which the other voice markers here likewise share.

#### 3.1.1.4 Preverbal prefixes (Slots 7 and 8)

Preverbs are frequent elements of words in Mandan. Rankin et al. (2003) and Helmbrecht (2008) agree that these elements likely originate from Proto-Siouan or Pre-Proto-Siouan postpostpositions that became reanalyzed as inte-

gral elements of a verb. There are still traces of these preverbs as true postpositions in certain languages. Crow, for example, makes use of the the instrumental postposition *ii* productively.

(3.23) Example of postpositional instrumental *ii*

*hinne shikáakee-sh baap-tatchée [iseé ii]<sub>PP</sub> ihchilassihk-a-lahkú-k*  
 this boy-DET day-every his.arrow INS practice-CONT-continue-DECL

‘every day this boy kept practicing with his arrows’ (Graczyk 2007:377)

In Mandan, there are nine preverbs, shown below.

(3.24) Preverbs in Mandan

- aa-* transitivizer
- e-* generic preverb
- i-<sub>1</sub>* directional
- i-<sub>2</sub>* instrumental
- i-<sub>3</sub>* ordinalizer
- i-<sub>4</sub>* possessive
- í’-* reflexivizer
- o-<sub>1</sub>* irrealis
- o-<sub>2</sub>* locative

The instrumental postposition *ii* in Crow is cognate with the instrumental preverb *i-* in Mandan, though most preverbs in Mandan involve short vowels. Five of these preverbs have cognates across the Siouan language family, while three appear to be innovations specific to Mandan. One phonological factor that all preverbs share is they have a tendency to draw stress, as described in §2.5.4.4.2. Preverbs likewise act as a boundary for the leftward spread of nasal harmony. This section gives examples involving preverbs and their interaction with inflectional morphology.

**3.1.1.4.1 Applicative preverbs (Slot 7)**

The majority of preverbs in Mandan can be considered applicatives. Siouanist literature typically calls all preverbs applicatives, due to the fact that these elements indicate that the number of arguments that the root verb takes is increased by one. These applicative preverbs are as follows:

### 3.1.1.4.1.1 Transitivizer preverb: *aa-*

The transitivizer *aa-* is used to turn a subset of intransitive verbs into transitive ones. It is used with verbs of motion to give the verb a compositiv reading that can mean to travel with someone or to take or carry something.

(3.25) Examples of the transitivizer *aa-*

- a. *nihúpe ráahuuro're*  
 rj-hup(E) r-aa-huu=o're  
 2POS-shoe 1A.PL-PV.TR-come.here=IND.F  
 'we brought your shoes' (Hollow 1973a:169)
- b. *tasúhkeres wa'áahuuroomako'sh*  
 ta-suk=krE=s wa-aa-huu=oowak=o'sh  
 AL-child=3PL=DEF UNSP-PV.TR-come.here=NARR=IND.M  
 'he brought his children' (Hollow 1973a:177)
- c. *hú áaki'hkaraani*  
 huj aa-ki'h=krE=rj  
 be.many PV.TR-arrive.back.there=3PL=SS  
 'they brought a lot home and...' (Hollow 1973a:184)
- d. *taté éheni na'é'na áanihuukere'sh*  
 tatE e-he=rj ra'e=o'raq aa-rj-huu=krE=o'sh  
 father.VOC PV-say=SS mother.VOC=be=TOP PV.TR-2S-come.here=3PL=IND.M  
 'it was father and mother who brought you here' (Hollow 1973a:211)
- e. *ixe'hqqa't áawakuho're*  
 i-xe'h#hak=a't aa-wa-kuh=o're  
 PV.INS-be.dripping#POS.STND=DEM.DIST PV.TR-1A-come.back.here=IND.F  
 'I brought that basket back' (Hollow 1973a:92)
- f. *inák áasukini patihka'eheero'sh*  
 irak aa-suk=rj pa-tik=ka'chee=o'sh  
 again PV.TR-come.out=SS INS.PUSH-throw=QUOT=IND.M  
 'she took it out again and threw it away' (Hollow 1973a:122)
- g. *áamati'sh*  
 aa-wa-ti=o'sh  
 PV.TR-1S-arrive.here=IND.M  
 'he brought me' (Kennard 1936:13)

There is only one exception to the generalization that *aa-* appears only with motion verbs, which appears below.

- (3.26) *áakx̣yho'sh*  
 aa-kx̣ỵh=o'sh  
 PV.TR-lie.down=IND.M  
 'he lies with someone' (Hollow 1970:127)

Hollow (1970:429) remarks that this term is a euphemism for sexual intercourse, and that it is a calque from English. There are no other instances of *aa-* with any other verb besides a motion verb, and this preverb is not generally productive in contemporary Mandan.

### 3.1.1.4.1.2 Generic preverb: *e-*

The generic preverb *e-* is referred to as 'generic' due to the fact that it does not convey any meaning of its own. It is semantically bleached in Mandan, and has a very limited distribution. Diachronically, this applicative originates can be reconstructed back to *\*e* in Proto-Siouan (Rankin et al. 2015), which may originate in the demonstrative *\*ʔee*. Another possibility is that the Siouan languages that permit multiple preverbs have the combination of *aa-* and *i-* become *e-*.

In Mandan, there are only two verbs with the generic preverb: *éhe* 'say' and *éreh* 'think, want.' The verb 'say' in Mandan is also the only truly irregular verb. Its conjugation appears on the table below.

Table 3.4: Conjugation of *éhe* 'say'

	Singular	Dual	Plural
1	<i>épe'sh</i>	<i>réheero'sh</i>	<i>réhaanito'sh</i>
2	<i>éte'sh</i>		<i>étaanito'sh</i>
3	<i>éheero'sh</i> ~ <i>éhe'sh</i>		<i>éheekere'sh</i>

The Proto-Siouan *\*e-hee* contains a long vowel in its root, which is preserved in the third person forms. This long vowel is contracted in first and second person singular forms, and Hollow (1970) reports that a short vowel is permissible for the third person singular: i.e., *éhe'sh* 'he said it.' However, the overwhelming majority of instances of third person singular forms of *éhe* are *éheero'sh*.

This verb sporadically ablauts; first and second person will ablaut but this does not happen for third person forms. The unexpected first and second person singular forms are descended from a subset of Proto-Siouan verbs that took reduced inflectional prefixes. For example, instead of the typical first person *\*wa-*, some verbs took only *\*w-*, and the same pattern held for second person *\*ya-* and *\*y-*. The cluster *\*wh* obstruentized to [p] and clusters *\*rh* and *\*yh* became [t] in Mandan and became aspirated stops in other daughter languages, such as Lakota: e.g., *ep̣ḥé* 'I say it.' What may have formerly been a phonologically-predictable process has become reanalyzed as irregular verb forms.

An additional peculiarity is that when this verb is marked for an animate object, the irregular stems remain. Normally, marking first and second person arguments involves prefixing the appropriate pronominals, but on top of these pronominals, Mandan preserves the irregular first and second person singular stems on top of normal prefixation. This means that the active argument (i.e., the subject) is marked twice: once prefixally and again suppletively on the verb stem. Examples of this irregular double marking appears below.

(3.27) Irregularities in inflectional markers for *éhe* ‘say’

- a. *éminipe’sh*  
e-w-r̥j-pE=o’sh  
PV-1A-2s-say.1A=IND.M  
‘I said it to you’
- b. *émanate’sh*  
e-w-r̥q-tE=o’sh  
PV-1s-2A-say.2A=IND.M  
‘you said it to me’
- c. \**éminiheero’sh*  
e-w-r̥j-hee=o’sh  
PV-1A-2s-say=IND.M  
‘I said it to you’

The only other verb to take the generic preverb *e-* can likewise be traced back to having this preverb in Proto-Siouan, with PSi \**e-rehe* ‘think’ remaining relatively unchanged in modern Mandan *éreh* ‘think, want.’

(3.28) Examples of *éreh* ‘want, think’

- a. *riréesika’shka*      *ó’ereho’sh*  
ri-reesik=a’shka      o-e-reh=o’sh  
2POSS-tongue=PSBL PV.IRR-PV-think=IND.M  
‘he’ll think that it might be your tongue’ (Hollow 1973a:189)
- b. *Kinúma’kshi*      *éheni*      *Numá’k Máxana íwahekanashe*      *wakína’ni éwereho’sh*  
ki-ruw̥q’k      e-he=r̥j      ruw̥q’k w̥q̥r̥q̥      i-wa-hek=r̥q̥sh=E      wa-kir̥q’=r̥j e-w-reh=o’sh  
MID-man#be.good PV-say=SS man      one      PV.INS-1A-know=ATT=SV 1A-tell=SS      PV-1A-think=IND.M  
‘I want to tell about what I sort of know about First Creator and Lone Man’ (Hollow 1973a:1)
- c. *raráahini*      *érereho’sh*  
ra-rEEh=r̥j      e-r-reh=o’sh  
2A-go.there=SS PV-2A-think=IND.M  
‘you want to go’ (Hollow 1973a:31)
- d. *xé’hini éreh’o’sh*  
xe’h=r̥j e-reh=o’sh  
rain=SS PV-think=IND.M

‘it might rain’ (Hollow 1970:182)

This verb is often used to denote potential, most typically with respect to stating what one wants to do or what one may do. It is also possible to create impersonal constructions expressing the potential for some non-agentive act to happen, especially with weather verbs. Like *aa-*, the preverb *e-* is not productive in Mandan.

### 3.1.1.4.1.3 Directional preverb: *i-*<sub>1</sub>

The directional preverb is found on stative verbs alongside locative postpositions =*t* and =*taa*. This preverb is a reflex of the Proto-Siouan directional applicative \**i-*, and is only used to express motion towards or away from a location that is incomplete.

(3.29) Examples of directional *i-*

- a. *ími'tit*                      *karáahini*              *tasúhkeres*              *wa'áahuuroomako'sh*  
*i-wj'#ti=t*                      *krEEh=rj*                      *ta-suk=krE=s*              *wa-aa-huu=oowak=o'sh*  
 PV.DIR-stone#abide=LOC go.back.there=SS AL-child=3PL=DEF UNSP-PV.TR-come.here=NARR=IND.M  
 ‘he went back to the village and brought his children’ (Hollow 1973a:177)
- b. *mí'shak, ípashahqkt*              *ná'ketaa*              *máa'qk íwasekto'sh*  
*w~-ishak i-pashahak=t*              *rą'kE=taa*              *wąą'ak i-wa-sek=kt=o'sh*  
 1S-PRO PV.DIR-north=LOC sit.AUX=LOC earth PV.INS-1A-make=POT=IND.M  
 ‘as for myself, I'll make land that way to the north’ (Hollow 1973a:9)
- c. *ímaataht*              *waréeh*              *íwateero'sh*  
*i-wąątah=t*              *wa-rEEh*              *i-wa-tee=o'sh*  
 PV.DIR-river=LOC 1A-go.there PV.INS-1A-like=IND.M  
 ‘I'd like to go to the river’ (Hollow 1973a:35)
- d. *máahsi*              *máakahe rátseena*                              *káherekto'sh,*              *ínuma'ktaa*  
*wąąh#si*              *wąąkahe r'-at=s=ee=rą*                              *ka'#hrE=kt=o'sh*              *i-ruwą'k=taa*  
 arrow#feather these 2POSS-father=DEF=DEM.DIST=TOP have#CAUS=POT=IND.M PV.DIR-man=LOC  
 ‘your father should give these eagle feathers away to the men’ (Hollow 1973b:226)
- e. *óo*              *ó'haraani*              *ímiisihqktaa*              *máatah rukxqhkereromako'sh*  
*oo*              *o'#hrE=rj*              *i-wjįsihak=taa*              *wąątah ru-kxąh=krE=oowak=o'sh*  
 DEM.MID be#CAUS=SS PV.DIR-west=LOC river INS.HAND-ford=3PL=NARR=IND.M  
 ‘They crossed the river from there to the west’ (Hollow 1973b:253)
- f. *karóotiki*              *roo*              *numá'ks*              *írextaa*  
*ka=ooti=ki*              *roo*              *ruwą'k=s*              *i-rex=taa*  
 PROV=EVID=COND DEM.MID PV.DIR-light=LOC PV.TR-go.there=HAB=NARR=IND.M  
*áareehkaroomako'sh*  
*aa-rEEh=ka=oowak=o'sh*  
 ‘and then he kept taking him towards the light’ (Hollow 1973b:95)

- g. *pkés*      *íwara't*      *ráahini*      *érehka'ehe*  
 pke=s      i-wra'=t      rEEh=rj      e-reh=ka'ehe  
 turtle=DEF PV.DIR-fire=LOC go.there=SS PV-think=QUOT  
 'the turtle wanted to go to the fire, it is said' (Hollow 1973b:167)

There is no specific postposition that indicates motion away from somewhere, but motion away is periphrastically marked using a demonstrative like *oo* or *roo* 'that, there, then' followed by a causativized verb *ó'* 'be.' This construction always bears the same-subject switch-reference marker, and such it is likely that *ó'haraani* is really just a singular lexical item that can be treated like a unit to mean 'from.'

Unlike most other preverbs, the directional *i-* is very productive. It may appear on any stative verb, including verbalized nouns.

### 3.1.1.4.1.4 Instrumental preverb: *i*-<sub>2</sub>

The instrumental preverb is the most common of all the preverbs, with an enormous amount of nouns and verbs lexically selecting for it. It is homophonous with the directional and ordinal preverbs. The distinction between PSi \*i PV.DIR and PSi \*ii PV.INS has been lost in most daughter languages, with the vowel becoming short in all branches of Siouan except for Missouri Valley.

While this preverb may have introduced an instrumental non-core argument in Pre-Mandan, many instances of *i-* have no obvious instrument. It is possible that the instruments are covert, given that Mandan is a prolific *pro*-drop language, being able to omit subjects, direct objects, and indirect objects to be inferred by context.

(3.30) Examples of instrumental *i-*

- a. *Ptjimihs*      *tasúke*      *wáarumixeena*      *kú'rak*      *íminixak*  
 ptjii#wjiih=s      ta-suk=E      waa-ru-wrix=ee=rq      ku'=ak      i-wrix=ak  
 buffalo#woman=DEF AL-child=SV NOM-INS.HAND-be.circular=DEM.DIST=TOP give=DS PV.INS-play=DS  
 'Cow Woman's child was playing with a hoop he had been given' (Hollow 1973a:112)
- b. *náxihe,*      *nitáxe'hqkq't*      *íwakikiishkekto're*  
 ra#xih=E      ri-ta-xe'h#hak=a't      i-wa-kikiishkE=kt=o're  
 mother.VOC#be.old=SV 2POSS-AL-hang#POS.STND=DEM.DIST PV.INS-1A-try=POT=IND.F  
 'grandmother, I'll try it with that basket of yours' (Hollow 1973a:148)
- c. *wáapaksqhe*      *míhkaraani*      *roo*      *íkatehere*  
 waa-pa-ksqh=E=∅      wjk=krE=rj      roo      i-ka-te#hrE  
 NOM-INS.PUSH-be.worried=SV=CONT be.none=3PL=SS DEM.MID PV.INS-INS.FRCE-pound#CAUS  
*íseks*      *ómiihseena*      *íkiri*      *hú*  
 i-sek=s      o-wjiih=s=ee=rq      i-kri      hq  
 PV.INS-make=DEF PV.IRR-woman=DEF=DEM.DIST=TOP PV.INS-be.grease be.many

*írushaahaa*                      *ı́'shkaharaani*  
i-ru-shE=haa                      ı́'sh=ka#hrE=rı́  
PV.INS-INS.HAND-grasp=SIM be.thus=HAB#CAUS=SS

'Paying him no attention, for the pemmican made here, the girl was mixing it like this with a lot of tallow'  
(Hollow 1973b:208)

d. *áqwe wáa'ı́wahekinixo'sh*  
áqwe waa-i-wa-hek=rı́x=o'sh  
all NEG-PV.INS-1A-know=NEG=IND.M  
'I don't know all of it' (Hollow 1973a:47)

e. *weréhı́uptaa xték*              *ı́mitaarak*              *numá'ks rá'ke'ho're*  
wreh=ı́uptaa xtE=ak      i-wı́-taa=ak              ruwá'k=s ra'-ke'h=o're  
door=next.to be.big=DS PV.INS-1s-peek=DS man=DEF INS.HEAT-be.angry=IND.F  
'I peaked in right next to the big door and the man got mad' (Hollow 1973a:98)

f. *mı́'se ihı́ık*  
wı́'#sE#i-hı́ı́=k  
stone#red#PV.INS-drink=HAB  
'Catlinite (lit. 'red pipe stone')' (Hollow 1970:439)

g. *maná ikawesh*  
wra#i-ka-wesh  
wood#PV.INS-INS.FRCE-cut  
'axe (lit. 'chop wood with it')' (Hollow 1970:439)

h. *wı́ı́pashih*  
waa-i-pa-shih  
NOM-PV.INS-INS.PUSH-be.sharp  
'a file (lit. 'something that makes it sharp')' (Hollow 1970:439)

The instrumental preverbs in (3.30a) and (3.30b) take overt instruments, while only one in (3.30c) has an overt instrument: i.e., a lot of tallow to make the pemmican. The word 'tallow' also involves an instrumental preverb, though the preverb serves no other purpose but to nominalize the verb 'be grease.' The *i-* in (3.30d) and (3.30e) lack any clear possible instrument, which suggests that these verbs are lexically selecting for this preverb for some historical reason that is no longer transparent. We see the use of *i-* as a nominalizer again in (3.30f) through (3.30h).

### 3.1.1.4.1.5 Ordinal preverb: *i-*<sub>3</sub>

The ordinal preverb *i-* has a limited scope of usage. Its sole use is to turn a cardinal number into ordinals.

(3.31) Examples of ordinal *i-*

a. *ı́teetoki*  
i-teetoki  
PR.ORD-eight

‘the eighth’ (Hollow 1970:439)

b. *ínupha*  
i-rup#ha

PR.ORD-two#times

‘the second time’ (Hollow 1970:440)

c. *háp ikixųh*

háp i-kixųh

day PV.ORD-five

‘Friday (lit. ‘fifth day’)’ (Hollow 1970:439)

d. *kitįhka*

ki-tįh=ka

*inaaminihak*

i-raawri#ha=ak

*órookere*

o-roo=krE

*áanakoomako’sh*

E#rak=oowak=o’sh

MID-stick.out=HAB PV.ORD-three#times=DS PV.IRR-talk=3PL hear#POS.SIT=NARR=IND.M

‘it became clearer the third time he heard what they were saying’ (Hollow 1973a:108)

Other Siouan languages, such as Hidatsa (Park 2012) and Lakota (Ullrich 2011), describe ordinal numbers as being constructed by adding the instrumental preverb with the cardinal number. Its widespread use to ordinalize cardinal numbers makes it clear that this is a pan-Siouan characteristic of some Proto-Siouan element, though it is not clear if this preverb evolved from PSi \*ii- PV.INS, PSi \*i- PV.DIR, or some possible third item that has yet to be reconstructed. The ordinalizer *i-* is therefore classed as its own preverb here in order to highlight the semantic contrast it has with the other polysemous *i-* preverbs.

#### 3.1.1.4.1.6 Possessive preverb: *i-*<sub>4</sub>

The final polysemous *i-* preverb is the possessive. The possessive *i-* primarily marks some established complex noun where the second element is marked as being inalienably possessed by the first. There are also a few idiomatic uses of the possessive *i-* where the first noun has been elided but still understood.

(3.32) Examples of possessive *i-*

a. *pó ishųt*

po#i-shųt

fish#PV.POSS-tail

‘fish tail’ (Hollow 1970:438)

b. *núutka ihįse*

ruųtka#i-hįse=E

throat#PV.POSS-long.muscle=sv

‘sternocleidomastoid muscle’ (Hollow 1970:75)

- c. *tamáshka ípa*  
 ta-wáshka#i-pa  
 AL-breast#PV.POSS-head  
 ‘nipple’ (Hollow 1970:142)
- d. *rók íwahuu*  
 rok#i-wa-huu  
 leg#PV.POSS-UNSP-bone  
 ‘thigh bone’ (Hollow 1970:187)
- e. *mató íwerook*  
 wáto#i-wrook  
 bear#PV.POSS-male.animal  
 ‘male bear’ (Hollow 1970:306)
- f. *pshíjxaa imiihka*  
 pshíjxaa#i-wíjh=ka  
 sage#PV.POSS-woman=HAB  
 ‘female sage plant’ (Hollow 1970:286)
- g. *ípirak*  
 i-pirak  
 PV.POSS-ten  
 ‘tribal council’ (Hollow 1970:420)
- h. *ínuma’k*  
 i-ruwá’k  
 PV.POSS-man  
 ‘paterfamilias’ (Hollow 1970:438)

Each of the compounds above show that the the initial noun is the possessor, and that the second noun is tied to the first. In the case of *ípirak* ‘tribal council’ and *ínuma’k* ‘paterfamilias,’ the possessor has been omitted.

This preverb originates from the third person inalienable possessor prefix \*i- in Proto-Siouan. This preverb is likewise used to denote inalienable possession in Mandan, though it is no longer productive. In some other Siouan languages like Hidatsa (Boyle p.c.), there are some nouns where the Proto-Siouan third person possessive prefix \*i- has been reanalyzed as part of the stem, causing irregular possessive marking. Possessive-marking in Mandan, however, is quite regular. Third person possession in Mandan is not morphologically marked aside from cases where possession is intrinsic, as we see in the case of the compounds above.

There are some vestiges of PSi \*i- 3POSS in independent pronouns.

(3.33) Fossilized remains of PSi \*i- 3POSS

- a. *i'o'na*  
 i-o'=ra  
 PV.POSS-be=TOP  
 'as for him/her/them...' (Hollow 1970:88)
- b. *mi'o'na*  
 wi-o'=ra  
 1POSS-be=TOP  
 'as for me' (Hollow 1973b:244)
- c. *i'o'rak*  
 i-o'=ak  
 PV.POSS-be=DS  
 'he/she/they is/are the one(s)' (Hollow 1970:88)
- d. *ee'o'rak*  
 ee#o'=ak  
 DEM.DIST#be=DS  
 'he is the one' (Hollow 1973a:212)
- e. *ni'o'rak*  
 ri-o'=ak  
 2POSS-be=DS  
 'you are the one' (Hollow 1973a:105)
- f. *ishák*  
 ishak  
 pro  
 'he/she/it/they' (Hollow 1973a:1)

The examples in (3.33a) and (3.33c) above utilize the possessive preverb when making a pronominal-type construction, but switch back to typical first and second person possessives for marking pronouns in (3.33b) and (3.33e). In the bare pronoun *ishák*, we see a stem-initial [i] that is a fossilized third-person possessive. The fact that it does not shift stress to the first syllable indicates that speakers no longer treat it as an analyzable unit within the overall lexical item, but its origin is clearly from PSi \*i-. Since \*i- is no longer productive as a general third person possessive marker, there is also a competing form with the distal demonstrative *ee* being incorporated into the pronominal construction in lieu of the possessive preverb. Constructions with *ee*, like the one in (3.33d), are more common in the corpus than those with the preverb *i-*, suggesting that the forms with *i-* are more archaic.

#### 3.1.1.4.1.7 Reflexivizer preverb: *i'*-

The reflexivizer *i'*- is very uncommon, and appears on only a few verbs. Its origin is unclear, as it has no parallels to other Siouan preverbs or pronominals. There are several body parts pertaining to the face and head that begin

with /i/ or /ii/, so it is possible that this this preverb is a contracted version of one of these nouns that has been reanalyzed as having a reflexive meaning. This preverb is most commonly seen on the auxiliary *i'here* 'become, pretend,' consisting of the causative *heré* along with the reflexivizer preverb, and can also be used when one is causing something to happen to oneself or something owned by oneself. We will never see the reflexive prefix *ki-* used with the causative. We can that *i'*- functions like other preverbs in the examples below.

(3.34) Examples of reflexivizer *i'*-

- a. *táani tasúk i'tuherék*  
 tE=rĭ ta-suk i'-tu#hrE=ak  
 stand=SS AL-child PV.RFLX-be.some#CAUS=DS  
 'she stood there and gave birth to her child' (Hollow 1973a:111)
- b. *maná kashíhs ké'ka'ni ée'o'haraa réesiks wá'shkap*  
 wrā ka-shih=s ke'=ka'=rĭ ee-o'=hrE reesik=s wa'-shkap  
 wood INS.FRCE-be.sharp=DEF keep#have=SS DEM.DIST#be#CAUS tongue=DEF INS.PRCE-prick  
*i'haraani*  
 i'-hrE=rĭ  
 PV.RFLX-CAUS=SS  
 'he had been keeping the sharp stick and with that he pinched his own tongue' (Hollow 1973a:191)
- c. *ú'sh rusháa pawésh i'hereromako'sh*  
 ú'sh ru-shE pa-wesh i'-hrE=oowāk=o'sh  
 thus INS.HAND-grasp INS.PUSH-cut PV.RFLX-CAUS=NARR=IND.M  
 'so he took it and then he pretended to cut it' (Hollow 1973a:191)
- d. *Numá'k Máxana níinami i'kahekoomaksĭh*  
 ruwā'k wāxrā rĭi=awĭ i'-ka-hek=oowāk=sĭh  
 man one walk=CONT PV.RFLX-INCP-know=NARR=INTS  
 'Lone Man was walking along and became aware of himself' (Hollow 1973a:5)
- e. *ítopsha íhaa'aakit keréehkereromako'sh, kixkék*  
 i-top-sha i-haa#aaki=t krEEh=krE=oowāk=o'sh ki-kxek  
 PV.POSS-four-COLL PV.DIR-cloud#be.above=LOC go.back.there=3PL=NARR=IND.M MID-star  
*i'haraani*  
 i'-hrE=rĭ  
 PV.RFLX-CAUS=SS  
 'All four of them returned to have, having turned into stars' (Hollow 1973a:175)
- f. *i'mikihqxiko'sh*  
 i'-wĭ-ki-hāq̄xik=o'sh  
 PV.RFLX-1S-RFLX-not.know=IND.M  
 'I fainted' (Trechter 2012b:170)

This preverb is not productive in contemporary Mandan, with the reflexive prefix *ki-* being the most typical realization of reflexivity.

### 3.1.1.4.1.8 Locative preverb: *o*-<sub>1</sub>

The locative preverb *o*- has cognates in all Siouan languages, and is a reflex of PSi \**o*- *pv.ines*, where it carried an inessive meaning. In Mandan, this preverb bears a more generalized locative reading, and is often used to create relative clauses to describe where an action is taking place.

(3.35) Examples of locative *o*-

- a. *súks xamáhaa shí ókashúkaa máaptet*  
 suk=s xwáḥ=E=∅ shi o-ka-shúk=E wáapte=t  
 child=DEF little=SV=CONT foot PV.LOC-INS.FRCE-hang=SV river.bank=LOC  
 ‘the kids’ feet were hanging over the river bank a little bit’ (Hollow 1970:181)
- b. *wáa’iparaare ímikak roo ú’sh mí’reenus*  
 waa-i-praa=E i-wík=ak roo ú’sh wí’=ee=rú=s  
 NOM-PV.INS-be.big=SV PV.INS-be.none=DS DEM.MID be.thus stone=DEM.DIST=ANF=DEF  
*warúshaani réeshkawaharaa íwarootkik óseroopo’re*  
 wa-ru-shE=rĭ re’éshka#wá-hrE=∅ i-wá-rootki=ak o-sroop=o’re  
 1A-INS.HAND-grasp=SS DEM.PROX-SMLT#CAUS PV.DIR-1Astrike=DS PV.LOC-swallow=IND.F  
 ‘It sure was big, so I took the aforementioned stone just like this and I put it in his mouth, and he swallowed it’ (Hollow 1973a:99)
- c. *tawá’irukirihs óptikanashini má’hki, ishák,*  
 ta-wa-i-ru-krih=s o-ptik=rásh=rĭ wá’k=ki ishák  
 AL-UNSP-PV.INS-INS.HAND-be.smooth=DEF PV.LOC-have.fallen.down=ATT=SS POS.LIE=COND PRO  
*Kinúma’kshis, kiwarátanashoomaks*  
 ki-ruwá’k#shi=s ki-wrat=rásh=oowák=s  
 MID-man#be.good=DEF MID-dirt=ATT=NARR=DEF  
 ‘His staff had fallen down when he was laying there, [for] he, First Creator, had turned into dirt’ (Hollow 1973a:8)
- d. *sáqka róonapini áqwe nurúha’ni nukúho’sh*  
 sąka rV-o-rap=rĭ áqwe rú-ru-ha’=rĭ rú-kuh=o’sh  
 be.few 1A.PL-PV.LOC-find=SS all 1A.PL-INS.HAND-pick.berries=SS 1A.PL-come.back.here=IND.M  
 ‘we found a few, picked all the berries, and came back’ (Hollow 1970:52)
- e. *páaxu óhop*  
 paaxu#o-hop  
 nose#PV.LOC-be.hollow  
 ‘nostril’ (Hollow 1970:77)
- f. *miní óropxe*  
 wĭ#o-ropxE  
 water#PV.LOC-enter  
 ‘bathtub’ (Hollow 1970:189)

g. *istámi ósanake*  
 istawíʔ#o-sraʔk=E  
 eye#PV.LOC-be.round  
 ‘eyeball’ (Hollow 1970:216)

h. *ówati*  
 o-wa-ti  
 PV.LOC-1A-reside  
 ‘my house’ Hollow (1970:251)

This preverb mirrors the possessive *i-* and instrumental *i-* in that it is used in compounds to express a relationship between two nominal elements. The locative preverb can likewise create a relative clause that is treated like a noun: e.g., *ówati* ‘my house (lit. ‘where I live’)’.

### 3.1.1.4.2 Irrealis preverb (Slot 8): *o-*<sub>2</sub>

While there are a large number of applicative preverbs, they can be preceded by the irrealis preverb *o-*. In previous grammatical sketches of Mandan, this preverb has been treated as a future marker (Kennard 1936, Hollow 1970, Mixco 1997a). This preverb is found outside of contexts where there is no future reading.

(3.36) Non-future use of *o-*

a. *Róoniire*                      *írasiiitki,*                      *óraikiirixinitq’ t,*                      *tashká’eshkak*  
 rV-o-ríj=E                      i-ra-sii=rít=ki                      o-ra-kiikrix=rít=á’ t                      tashka-eshka=ak  
 1A.PL-PV.LOC-walk=SV PV.DIR-2A-travel=COND PV.IRR-2A-catch.up.with=2PL=HYP how-SMLT=DS  
*roo*    *resh*    *nanúhinito’sha?*  
 roo    resh    ra-rúh=rít=o’sha  
 DEM.MID this.way 2A-be.here=2PL=INT.M

‘If you (pl.) had followed our tracks, you might have caught up with us, so how come you’re still here like this?’ (Hollow 1973a:208)

b. “*roo*    *wakxúhki*                      *ó’irahékq’ t*”                      *éheni*    *Kinúma’kshi*  
 roo    wa-kxúh=ki                      o-i-ra-hek=á’ t                      e-he=rí    ki-ruwá’k#shi  
 DEM.MID 1A-lie.down=HYP PV.IRR-PV.INS-2A-know=CONS PV-say=SS MID-man#be.good  
*kxúhoomako’sh*  
 kxúh=oowák=o’sh  
 lie.down=NARR=IND.M

“‘If I lie down here, you would know’ he said and First Creator lay down.’ (Hollow 1973a:1)

c. *ishák itaa*                      *órushenikini*                      *ki’hka’eheroo*  
 ishak i-tE                      o-ru-shE=rík=rí                      ki’h=ka’ehe=oo  
 PRO PV.INS-stand PV.IRR-INS.HAND-grasp=ITR=SS arrive.back.here=QUOT=DEM.MID

‘He was tired and could not take any more, so he got back, it is said now’ (Hollow 1973a:124)

We see conditional constructions in (3.36a) and (3.36b), where *o-* is found following a conditional clause. Furthermore, we can see in (3.36b) that the *o-* is able to precede other preverbs, as in *ó'iraheka't* 'you would know.' In cases where both *o-* preverbs appear, they are realized as a single syllable with a long [o:].

(3.37) Instances of sequential *o-* preverbs

a. *ókaptiko'sh*  
 o-o-ka-ptik=o'sh  
 PV.IRR-PV.LOC-INS.FRCE-have.fallen.down=IND.M  
 'he will shoot it down' (Kennard 1936:5)

b. *ówakakako'sh*  
 o-o-wa-ka-kak=o'sh  
 PV.IRR-PV.LOC-INS.FRCE-be.tight=IND.M  
 'I will be mired' (Kennard 1936:5)

The use of *o-* in (3.36c) carries an even more unambiguously modal reading, rather than a temporal one. The narrator is describing a situation in the past and uses *o-* despite that lack of any future reading. We can also see that *o-* is not required in conditional constructions, given the data below.

(3.38) Conditional constructions with and without *o-*

a. *tópha wahúuki, ú'ka miní róropxe're*  
 top#ha wa-huu=ki ú'ka wrj rV-o-ropxE=o're  
 four#times 1A-come.here=COND then water 1A.PL-PV.IRR-enter=IND.F  
 'if I come four times, then we'll go swimming' (Hollow 1973a:106)

b. *wáarahuunixki óxiko'sh*  
 waa-ra-huu=rjx=ki o-xik=o'sh  
 NEG-2A-come.here=NEG=COND PV.IRR-be.bad=IND.M  
 'if you don't come, it will be bad' (Hollow 1973b:53)

c. *tashká, wahéréki, taté rásq't kitjho'xere*  
 tashka wa-hrE=ki tatE ras=a't ki-tjho'xrE  
 how 1A-CAUS=HYP father.VOC name=DEM.DIST MID-stick.out=DUB  
 'how will my father's name come out if I do it?' (Hollow 1973a:61)

d. *kotewé úyte rupáskjhi taptijktó'sh*  
 ko-t-we úyte ru-pa-skjhi=ki ta-ptij=kt=o'sh  
 REL-WH-INDF be.first INS.HAND-INS.PUSH-cut.open=COND AL-buffalo=POT=IND.M  
 'if someone slashes it first, it will be his buffalo' (Hollow 1973b:7)

The first two examples above feature the irrealis preverb *o-*, while the second pair do not. All of the data contain conditionals constructions that imply some future consequence to a conditional clause. The irrealis preverb can certainly be used to give future readings to an action or state, but it can also be used to mark hypothetical situations.

Another use for the irrealis preverb is creating relative clauses and nominalize verbs in a similar manner to the locative and instrumental preverbs. We can see examples of this behavior below.

(3.39) Relativization and nominalization with *o-*

- a. *ó'í'tu*  
 o-í'-tu  
 PV.IRR-PV.RFLX-be.some  
 'birth, birthday (lit. 'when one is born')' (Hollow 1970:96)
- b. *wáa'okiraksqamík*  
 waa-o-kiraksqá#wík  
 NEG-PV.IRR-make.war#be.none  
 'peace (lit. 'when there is no war')' (Hollow 1970:111)
- c. *hąsh ósek*  
 hąsh#o-sEk  
 grape#PV.IRR-be.dry  
 'partially raisined grapes (lit. 'when the grape is dried out')' (Hollow 1970:69)
- d. *wáa'ohaaxi*  
 waa-o-hE=xi  
 NEG-PV.IRR-see=NEG  
 'an invisible thing (lit. 'when one cannot see it')' (Hollow 1970:71)
- e. *súk óhųkámík*  
 suk#o-hųka#wík  
 child#PV.IRR-parent#be.none  
 'orphan (lit. 'when a child is parentless')' (Hollow 1970:83)

Each of the tokens involving the irrealis preverb above are able to stand on their own as a relative clause, but these relative clauses are also able to then take nominal morphology such as articles, demonstratives, and postpositions. The irrealis preverb is highly productive in Mandan, and is frequently used to coin new words on the fly, or even as circumlocution for when a speaker does not remember a word but still wants to describe it. The literal nature of Mandan words means that there are often numerous possible ways to express a single concept, so the irrealis preverb frequently is employed to great effect.

### 3.1.2 Inflectional prefixes

Mandan makes heavy use of person and number marking on verbs. This reliance on heavily-affixing verbal elements allows Mandan to omit overt nominal arguments. Mandan can take *pro*-drop to the extreme at times. We can compare the two sentences below.

(3.40) *Pro-drop in Mandan*

- a. *miiho'na<sub>i</sub> páaxu shishihka<sub>j</sub> wará'nast<sub>k</sub> ikųųtekerereroomako'sh*  
*wj̄h=ó=rą paaxu shi~shih=ka wra'=rat=t i-kųųte=krE=oowąk=ó'sh*  
 woman=be=TOP nose AUG~be.sharp=HAB fire=middle=LOC PV.DIR-throw=3PL=NARR=IND.M  
 'those women threw the mosquito in the middle of the fire' (Hollow 1973b:153)
- b. *pro<sub>i</sub> pro<sub>j</sub> pro<sub>k</sub> ikųųtekerereroomako'sh*  
*pro pro pro i-kųųte=krE=oowąk=ó'sh*  
 1A 3S 3S.LOC PV.DIR-throw=3PL=NARR=IND.M  
 'they threw it there'

The third person plural enclitic *=kere* marks a third person plural subject, there is no third person singular marking in Mandan, but the directional preverb *i-* indicates that there is a specific direction towards which the direct object is thrown. The presence of all this morphology supplies enough information that overt nominal arguments are not necessary to express the notion that the verb is ditransitive and what semantic features these arguments have. Once a nominal element has been introduced into the discourse, subsequent references to it are typically elided. Subjects are most commonly dropped, with a system of switch-reference marking clarifying who is doing the action when both subjects are third person. Because of this strong preference for *pro-drop*, Mandan relies heavily upon context and inference, along with inflectional morphology, to convey who is doing an action, and whom or what is undergoing said action.

We can divide the inflectional prefixes into two distinct groups: inner prefixes and outer prefixes. This distinction is drawn from the observation that certain prefixes will always appear after a preverb but before a verbal root (i.e., inner prefixes), while other prefixes appear before preverbs at the leftmost edge of the word (i.e., outer prefixes).

One major division between the kinds of prefixes is that pronominals in Mandan reflect the thematic role that an argument plays. Mandan has an active-stative alignment. Active marking typically indicates a semantic agent: i.e., someone who is undertaking an action. Stative marking is for arguments that lack any agency over the act: e.g., In some active-stative languages, the marking for subjects may either be active or stative, depending on the volitionality: e.g., 'I coughed' may normally be stative, but if the speaker wishes to convey that this cough was intentionally and controllably done, the active may be used.

Mandan is a split-S language, meaning its subjects are lexically split between active or stative. That is to say, a verb is lexically marked for whether its subject takes active marking or stative marking. Some verbs that lack a semantic agent still take active marking, such as *irukap* 'be unable,' though it is the case that no verbs with semantic agents take stative subjects. There are nine different inflectional prefixes, which are summarized below.

(3.41) Inflectional prefixes in Mandan

- wa*<sub>-1</sub> first person singular active
- ma*- first person singular stative
- ra*- second person active
- ni*- second person stative
- nu*- first person plural active
- ro*- first person plural stative
- wa*<sub>-2</sub> unspecified argument stative
- waa*- negative
- ko*- relativizer

A description of the distribution and variation of each of these prefixes appears in the sections that follow.

**3.1.2.1 Second person prefix (Slot 4)**

When multiple inflectional prefixes occur on the same verbal stem, the one closest to the root will be the second person marker. Unlike first person, the second person prefix does not encode number. There are two main prefixes that indicate a second person argument:

(3.42) Default second person markers

- ra*- second person active
- ni*- second person stative

We can see examples of these prefixes at work below.

**3.1.2.1.1 Second person active prefix: *ra*-**

The default marking for a second person active argument is the prefix *ra*-. This prefix is a reflex of the Proto-Siouan second person active marker \**ya*-, since PSi \**y* merged with \**r* in Mandan and Missouri Valley Siouan.

(3.43) Examples of second person active *ra*-

- a. *áakahqktaahq̄q̄ raréehki, mí'shak, pasháhqktaahq̄q̄ waréehto'sh*  
*aakah̄k̄=taa=h̄q̄q̄ ra-rEEh=ki wʔ-ishak pashah̄k̄=taa=h̄q̄q̄ wa-rEEh=kt=o'sh*  
 south=LOC=INS 2A-go.there=COND 1POSS-pro north=LOC=INS 1A-go.there=POT=IND.M  
 'if you go to the south side, me, I'll go to the north side' (Hollow 1973a:3)

- b. *wáa'iraseke*                      *shí'sh*  
 waa-i-ra-sek=E                      shi=o'sh  
 NOM-PV.INS-2A-make=SV be.good=IND.M  
 'what you made is good' (Hollow 1973a:11)
- c. *máa'ake* *ráké'raa*                      *órakxuh*                      *háqkaa*                      *íninaahki,*  
 waa'ak=E ra-ke'=E=Ø                      o-ra-kxuh                      háakE=Ø                      i-ri-raa=ki  
 earth=SV 2A-dig=SV=CONT PV.IRR-2A-lie.down stand.AUX=CONT PV.INS-2s-be.out.of.sight=COND  
*ó'uuka'sh*  
 o-uuka=o'sh  
 PV.IRR-be.enough=IND.M  
 'when you are out of sight, digging out a space as big as you when you lie down, that will be enough'  
 (Hollow 1973a:25)
- d. *súkite,*                      *matewé*                      *írasekinito'sha?*  
 suk=rit=E wa-t-we                      i-ra-sek=rit=o'sha  
 child=2PL=SV UNSP-WH-INDF PV.INS-2A-make=2PL=INT.M  
 'children, what are you doing?' (Hollow 1973a:28)
- e. *tashká'eshka* *rarátaxo'sha?*  
 tashka-eshka ra-ra-tax=o'sha  
 how-SMLT 2A-INS.MTH-make.loud.noise=INT.M  
 'how come you are crying?' (Hollow 1973a:42)
- f. *warárapiniiraq't*                                      *ké'ka'haraata!*  
 wa-ra-raaprij=a't                                      ke'#ka'#hrE=ta  
 UNSP-2A-be.around.neck=DEM.DIST keep#have#CAUS=IMP.M  
 'let him have that necklace of yours!' (Hollow 1973a:58)
- g. *nukeréehki,*                                      *waráruusto'sh*  
 ru-krEEh=ki                                      wa-ra-ruut=kt=o'sh  
 1A.PL-go.back.there=COND UNSP-2A-eat=POT=IND.M  
 'when we get home, you can eat' (Hollow 1973a:87)
- h. *náxihe,*                                      *ítewetaa*                                      *raréeho'na?*  
 ra#xih=E                                      i-t-we=taa                                      ra-rEEh=o'ra  
 mother.VOC#be.old=SV PV.DIR-WH-INDF=LOC 2A-go.there=INT.F  
 'grandmother, where are you going?' (Hollow 1973a:89)

The overwhelming majority of second person active marking is carried out with the *ra-* prefix, but there are three allomorphs for this formative: /r'-/, /re-/, and /ra-/.

### 3.1.2.1.1.1 Allomorph /r'-/

An underlying /r'-/ allomorph appears with vowel-initial stems. The glottal stop then metathesizes with the following vowel and causes long vowels to contract, as described in §2.5.2.1. This is a completely predictable process for

determining /ra-/ versus /r'-/.

(3.44) Second person active marking before vowel-initial stems

- a. *ní'maare*      *íkú'hq̄q*                      *tákrharaani*                      *nitáxaraxeroo*  
 rj-waq̄q=E      i-ku' =h̄q̄q                      tak#ra-hrE=rj                      rj-ta-xrax=roo  
 2POSS-body=SV PV.DIR-be.all.over=LOC be.painted.with.white.clay#2A-CAUS=SS 2POSS-AL-chest=DEM.MID  
*manúuxikpa*                      *rá'íkisekto'sh*  
 wa-r̄uq̄#xik#pa                      ra-aaki#isek=kt=o'sh  
 UNSP-be.fog#be.bad#head 2A-be.above#PV.INS-make=POT=IND.M

'you should paint your body all over with white clay and paint a skull on your chest' (Hollow 1973b:98)

- b. *rá's*      *raráahaarami*                      *míihna'k*                      *íma'pet*                      *háa ná'ko'sh*  
 r'-as      ra-rEEh=haa=awj                      wj̄h#ra'k                      i-w̄a'pe=t                      hE ra'k=ind.m  
 2A-follow 2A-go.there=SIM=CONT woman#POS.SIT PV.DIR-below=LOC see POS.SIT=IND.M

'as you follow it while you keep going down, this woman sits looking below' (Hollow 1973a:82)

- c. *Oo*      *o'haraani*      *rá'kaani*                      *"ptamí'tis*                      *í'ú'taa*  
 oo      o'#hrE=rj      r'-aakE=rj      p-ta-wj̄'#ti=s                      i-ú'=taa  
 DEM.DIST be#CAUS=SS 2A-step.on=SS 1POSS-AL-stone#reside=DEF PV.DIR-be.closer=LOC  
*wakeréeho'sh,"*                      *étekto'sh*  
 wa-krEEh=o'sh                      e-te=kt=o'sh  
 1A-go.back.there=IND.M PV-say.2S=POT=IND.M

'from there you should step on it and say "I am going back toward my village."' (Hollow 1973b:227)

- d. *rímahq̄po'sh*  
 r'-iiwah̄p=o'sh  
 2A-be.lost=IND.M

'I am lost' (Hollow 1970:96)

As we see in (3.44d), the semantics of the verb *íimahq̄p* 'be lost' should require a stative subject, but the verb only takes active marking. This particular verb is one of several that are lexically marked to take active subjects. The allophonic variation between /ra-/ and /r'-/ has a small set of exceptions, including the verb *é* 'hear' and the verb *ú* 'shoot, wound.'

(3.45) Use of ra- before vowel-initial stem

- a. *waróore*      *ra'éki,*                      *óshi'sh*  
 wa-roo=E      ra-E=ki                      o-shi=o'sh  
 UNSP-talk=SV 2A-hear=COND PV.IRR-be.good=IND.M

'if you hear what I say, it will be good' (Hollow 1973b:240)

- b. *ra'ú'sh*  
 ra-u=o'sh  
 2A-wound

'you wound him'

These verbal roots are both monosyllables with no onset, so it is the case that /r'-/ is only a viable allomorph of /ra-/ on vowel-initial stems that are polysyllabic.

### 3.1.2.1.1.2 Allomorph /re-/

The allomorph /re-/, as Kennard (1936:5) describes it, is less predictable. In transcriptions of narratives provided by speakers born during the middle of the nineteenth century, /re-/ is sometimes used before verbal stems that begin with a sonorant and /e e:/. This trend towards local vowel harmony seems to be an incomplete change, as it not consistent, even within data given by the same speaker. This allomorph also does not occur when there intervening morphology between the inflectional prefix and the verbal root, and it is quite rare in data collected from speakers born around the turn of the twentieth century or later.

(3.46) Use of *re-* instead of *ra-*

- a. *nihúyxihe*                      *hiré*                      *réréhki*    *oo*    *inák*                      *órahi're*  
 rj-hu#xih=E                      hire                      re-rEEh=ki oo    irak                      o-ra-hi=o're  
 2POSS-mother#be.old=sv 2A-go.there=COND DEM.MID    again PV.IRR-2A-arrive.there=IND.F  
 'if you go to your grandmother now, you will get there again' (Hollow 1973a:102)
- b. *ratóore,*    *wáashi*                      *nuharáanitak,*                      *ú'sh*                      *rorárusanaahini*  
 ratoo=E    waa-shi                      waa-shi                      ru-hrE=rjt=ak    u'sh  
 be.old=sv NOM-be.good 1A.PL-CAUS=2PL=DS be.thus                      1S.PL-2A-INS.HAND-leave.behind=ss  
*raráahini*                      *éreho'sh*  
 ro-ra-ru-sraqh=rj    ra-rEEh=rj                      e-re-reh=o'sh  
 2A-go.there=ss    PV-2A-think=IND.M  
 'elder, we (pl.) are having a good time, so now you want to go and leave us' (Hollow 1973a:31)
- c. *wáashi*                      *reheré'sh*  
 waa-shi                      re-hrE=o'sh  
 NOM-be.good 2A-CAUS=IND.M  
 'thank you (lit. 'you did something good')' (Hollow 1973a:35)

The default prefix *ra-* is used almost exclusively instead of *re-* in contemporary Mandan. The one exception to this tendency is the verb *éreh* 'want, think.' There are more instances of *éreh* for 'you want' in the corpus than *érah*, so it seems that this verb is developing into having a slightly irregular conjugation paradigm for some speakers, though both forms are valid.

### 3.1.2.1.1.3 Allomorph /ra-/

This allomorph of *ra-* is only found when preceded by a first person singular stative prefix. The default first person singular stative prefix is /wə-/, though it has an allomorph of /w-/ before a second person active prefix. This sequence



'be careful tonight, [because] you (pl.) are men' (Hollow 1973b:258)

- d. *inikxqhinisto'sh*, *numá'kaaki inihekiniki*  
 i-rj-kxq̄h=rjt=kt=o'sh ruwá'k-aaki i-rj-hek=rjt=ki  
 PV.INS-2S-laugh=2PL=POT=IND.M man-COLL PV.INS-2S-know=2PL=COND  
 'if people know about you (pl.), they will laugh at you' (Hollow 1973a:28)
- e. *imikixkahini* *ini'u'taa* *waptáahini wahúukto'sh*  
 i-wj-ki-xkah=rj i-rj-ú'=taa wa-ptEh=rj wa-huu=kt=o'sh  
 PV.INS-1S-RFLX-put.on.regalia=SS PV.DIR-2S-be.closer=LOC 1A-run=SS 1A-come.here=POT=IND.M  
 'I will dress up and come running towards you' (Hollow 1973b:70)
- f. *keréehniherekto'sh*  
 krEEh#rj-hrE=kt=o'sh  
 go.back.there#2S-CAUS=POT=IND.M  
 'he will send you home' (Hollow 1973b:219)

The first half of the examples above show stative subjects, while the second half show other stative arguments. There are two others allomorph for *ni-*: /r̄~/ and /rj-.

### 3.1.2.1.2.1 Allomorph /r̄~/

Very few verbal roots in Mandan are vowel-initial where that vowel is not a preverb. These verbs take a second person stative prefix that is similar to the one described in §3.1.2.1.1.1. The variant of *ni-* that appears before vowel-initial stems is /r̄~/, which has the basic shape of the vowel-initial active /r'-/, except for the fact that this prefix causes the vowel that follows it to become nasalized.

We can see the impact this floating nasal has on the surface representation of the verbs below.

(3.49) Second person stative marking before vowel-initial stems

- a. *n̄i'niso'sh*  
 r̄~-ir̄is=o'sh  
 2S-be.alive=IND.M  
 'you are alive' (Hollow 1970:91)
- b. *n̄i'wereero'sh*  
 r̄~-iiwree=o'sh  
 2S-yawn=IND.M  
 'you yawn' (Hollow 1970:98)
- c. *tashká'eshkak mí'he tatáqhq* *n̄i'hinito'na?*  
 tashka-eshka=ak wj'h=E ta~taq̄=hq r̄'i-ih=rjt=o'ra  
 how-SMLT=DS robe=SV R~be.different=INS 2S-be.drapped.in=INT.F  
 'how come you covered yourself with all kinds of different robes?' (Hollow 1973b:237)

While the nasality on the prefix for example (3.49a) above can possibly be explained by nasal harmony spreading leftward from the root, there are no viable sources of nasal spread that can move from the roots *íweree* ‘yawn’ or *ih* ‘be drapped in something.’ Let us compare the data above to the following example where we see no nasality on the prefix.

(3.50) Use of /r’-/ instead of /r̃’-/

*rí’sqaro’sh*  
r’-isq̃a=ó’sh  
2A-be.in.a.hurry=IND.M

‘you are in a hurry’ (Hollow 1970:92)

The lack of a nasality on the first syllable indicates that we are looking at very that takes active subjects. Thus, we can use this floating nasal on the prefix as a test for whether a verb takes an active or stative subject.

### 3.1.2.1.2.2 Allomorph /r̃’-/

When first person plural active agents act upon second person arguments (i.e., when the first person plural *nu-* immediately precedes a second person prefix), the second person stative is realized as *nu-* as well.

(3.51) Examples of *nu-* as a second person stative marker

- a. *nunúkina'kto'sh*  
*rų-rų-kirą'=kt=o'sh*  
 1A.PL-2S-tell=POT=IND.M  
 'we will tell you' (Kennard 1936:10)
- b. *máa'ąke nunúku'nitiki,*                      *ónitki*                      *raxkqhini raráahini*  
*wąą'ąk=E rų-rų-ku'=tiki*                      *o-rį-tki*                      *ra-xkqh=rį ra-rEEh=rį*  
 earth=SV 1A.PL-2S-give=POT+COND PV.LOC-2S-be.allotted 2A-move=ss 2A-go.there=ss  
 'as soon as we give you the land, you go move to your allotment and...'. (Trechter 2012b:217)

This allomorph is very uncommon in the corpus, but common in conversation, due to the fact that the corpus consists mostly of traditional narratives about cultural figures. The /rų-/ form can only be realized if there is no preverb between the first person plural active *nu-* and the second person stative *nu-*. If a preverb is placed between these two preverbs, the second person stative reverts to its default shape, *ni-*.

### 3.1.2.2 First person singular prefix (Slot 5)

First person marking differs from second person marking in that there are dedicated first person singular and first person plural promininals. First person prefixes will always precede a second person prefix, though the specific position within the prefix field depends on whether the first person argument is singular or plural. There are two main prefixes that indicate a first person singular argument:

(3.52) Default first person singular person markers

- wa-* first person singular active  
*ma-* first person singular stative

Both of these prefixes have a number of allomorphs. The large degree of allomorphs that both the second person and first person singular prefixes have in Mandan is not unlike the large variation found in some other Siouan languages. This variation is taken to be a symptom of the fact that these prefixes are likely the earliest pieces of inflectional morphology to develop onto Proto-Siouan or Pre-Proto-Siouan stems, with material to the left of the inner pronominals being incorporated into the verbal complex at later stages in the development of various daughter languages.

We can see examples of these prefixes at work below.

### 3.1.2.2.1 First person singular active prefix: *wa-*

The most common realization of a first person singular active argument is the prefix *wa-*. This prefix is a reflex of the Proto-Siouan first person singular active marker \**wa-*.

(3.53) Examples of first person singular active *wa-*

- a. *rá'skama'k*      *wáawahe'sh*,      *manápusheke*  
*ra'ska#wá'k*      *waa-wa-hE=o'sh*      *wra#pushek=E*  
 summer#POS.LIE some-1A-see=IND.M tree#juneberry=SV  
 'this summer I saw some of them, juneberries' (Hollow 1973a:52)
- b. *wahík*,      *manáxot*      *raxápaá*      *ná'kek*,      *wáawaka'rak*,  
*wa-hi=ak*      *wra#xot*      *ra-xap=E*      *ra'kE=ak*      *waa-wa-ka'=ak*  
 1A-arrive.there=DS wood#gray INS.FOOT-be.peeling=SV sit.AUX=AK some-1A-have=DS  
*máamaku'nixo're*  
*waa-wa-ku'=rix=o're*  
 NEG-1S-give=NEG=IND.F  
 'I arrived as she was peeling gray wood, so I asked for some, but she did not give me any' (Hollow 1973a:121)
- c. *wá'áani*      *hiré*      *wahúuro'sh*  
*wa-E=rj*      *hire wa-huu=o'sh*  
 1A-hear=SS now 1A-come.here=IND.M  
 'I heard it and now I came' (Hollow 1973a:41)
- d. *wáhokshukanashe*      *hiré*      *áqwe*      *íwaseko'sh*  
*waa-ho#kshuk=rash=E*      *hire áqwe i-wa-sek=o'sh*  
 NOM-voice#be.narrow=ATT=SV now all PV.INS-1A-make=IND.M  
 'I made all the small creatures now' (Hollow 1973a:11)
- e. *masásaks*      *ú'taa*      *waráahini*      *wahík*      *numákaaki*      *hú're*  
*wá-sa~sak=s*      *ú'=taa*      *wa-rEEh=rj*      *wa-hi=ak*      *ruwá'k-aaki hu=o're*  
 UNSP-AUG~be.dry=DEF be.closer=LOC 1A-go.there=SS 1A-arrive.there=DS man-COLL be.many=IND.F  
 'I went to the badlands and when I got there, there were many people' (Hollow 1973b:318)
- f. *q'ska*      *wapú'h*      *shíwahereka'sh*  
*q'ska*      *wa-pu'h*      *shi#wá-hrE=ka=o'sh*  
 that.way 1A-doctor be.good#1A-CAUS=HAB=IND.M  
 'I am able to doctor that way' (Hollow 1973a:25)
- g. *ptaníshkere*      *máa'qhku'shtaa*      *reehwahere'sh*  
*p-ta-rjshkrE*      *wá'ák=ku'sh=taa*      *rEEh#wá-hrE=o'sh*  
 1POSS-AL-medicine earth=within=LOC go.there#1A-CAUS-IND.M  
 'I put my medicine under the ground' (Hollow 1973a:48)
- h. *wá'owaraahinixo'sh*  
*waa-o-wa-rEEh=rjx=o'sh*  
 NEG-PV.IRR-1A-go.there=NEG=IND.M  
 'I am not going to go there' (Hollow 1973a:48)

While the majority of situations where a first person singular active argument is present involves *wa-*, there are three other allomorphs: /w'-/, /we-/, and /w-/.

### 3.1.2.2.1.1 Allomorph /w'-/

This formative mirrors the distribution of /r'-/, described in §3.1.2.1.1.1. Whenever the first person singular active pronominal appears before a vowel-initial stem, /w'-/ is used instead of /wa-/. Mandan does not permit [Cʔ] clusters, as outlined in §2.5.2.1, so this prefix will be realized [w] that shares a syllable with a coda [ʔ].

(3.54) Use of /w'-/ for first person singular active

- a. *wí'mahəpə'sh*  
w'-iiwəhəp=o'sh  
1A-be.lost=IND.M  
'I am lost' (Hollow 1970:96)
- b. *wá'kana'k*  
w'-aaki#rə'k  
1A-be.above#POS.SIT  
'I ride horseback' (Hollow 1970:59)
- c. *wá'keroomako'sh*  
w'-aakE=oowək=o'sh  
1A-step.on=NARR=IND.M  
'I stepped on it' (Trechter 2012b:128)
- d. *wá'kakshe'sh*  
w'-aakakshE=o'sh  
1A-meet=IND.M  
'I met him' (Kennard 1936:3)

Like with /r'-/, /w'-/ does not appear on open monosyllable roots: e.g., *é* 'hear' is *wa'é* for 'I hear,' never \**wé*'.

### 3.1.2.2.1.2 Allomorph /we-/

The allomorph /we-/ is analogous to the /re-/ allomorph in §3.1.2.1.1.2. It sparingly appears before verb roots that begin with sonorants and have /e e:/ in the root. It most commonly occurs with the verb *éreh* 'think, want' to the point that the majority of the tokens of *éreh* that are conjugated for first person singular active subjects have *we-* instead of *wa-*. Other verbs take *we-* sparingly, so it is not completely predictable, but it happens with *éreh* so often that we can say that this allomorph is becoming part of the conjugation paradigm of this particular verb.

(3.55) Examples of *we-*

- a. *ówa'ek*                      *wakína'ni éwereho'sh*  
o-wa-E=ak                      wa-kirá'=rj e-we-reh=o'sh  
PV.IRR-1A-hear=DS 1A-tell=SS PV-1A-want=IND.M  
'I want to tell what I heard' (Hollow 1973a:47)
- b. *íweheko'sh*  
i-we-hek=o'sh  
PV.INS-1A-know=IND.M  
'I know it' (Kennard 1936:5)
- c. *háki,*                      *nitúyuminike*                      *áawereehki,*                      *q'teena*  
ha=ki                      rj-tuuwrj=k=E                      aa-we-rEEh=ki                      q't=ee=rq  
PROV=COND 2POSS-clan.aunt=SV PV.TR-1A-go.there=COND DEM.DIST=DEM.DIST=TOP  
*íseкто'sh*  
i-sek=kt=o'sh  
PV.INS-make=POT=IND.M  
'So, if I take him to your clan aunt, that one should do it' (Hollow 1973a:57)

The *we-* allomorph of *wa-* is less frequently encountered than the *re-* allomorph of *ra-* in the corpus. It is not clear whether this asymmetry is significant, but it is the case that both *we-* and *re-* seem to be lexically conditioned rather than be morphologically or phonologically conditioned.

3.1.2.2.1.3 Allomorph /w-/

In contemporary Mandan, the *wa-* prefix cannot precede a second person prefix. When a first person singular active argument acts upon a second person argument, we must use the allomorph /w-/ instead of *wa-*. Many daughter languages of Proto-Siouan had a productive phonological process whereby inflectional prefixes beginning with a sonorant syncopated their short vowel before another sonorant. This process is no longer productive in Mandan, but it has left its mark in instances such as /w-/. When combined with *ni-*, the /w-/ nasalizes to [m] and an intrusive Dorsey's Law vowel appears between the /w-/ and the /rj-/ to create a sequence of [m<sup>1</sup>nĩ].

(3.56) Examples of /w-/ for first person singular active

- a. *mini'áashko's*  
w-rj-E=ashko'=s  
1A-2S-hear=EMPH=DEF  
'I heard you' (Hollow 1973a:41)
- b. *wáa'imínirats*                      *q̄qwe,*                      *miníike,*                      *raká'kto'sh*  
waa-i-w-rj-rat=s                      aq̄we                      wj-rj=k=E                      ra-ka'=kt=o'sh  
NOM-PV.INS-1A-2S-promise=DEF be.many 1POSS-son=SV 2A-have=POT=IND.M  
'You will have everything I promised you, my son' (Hollow 1973a:192)

- c. *minikímaaxe'sh*  
w-rj-kiwáaxE=o'sh  
1A-2s-ask=IND.M  
'I asked for you' (Hollow 1973a:131)
- d. *mininíko'sh*  
w-rj-rj̄k=o'sh  
1A-2s-offspring=IND.M  
'you are my son' (Hollow 1973a:217)
- e. *wiráse*                      *minikína'so'sh*  
wi-ras=E                      w-rj-kir̄a's=s=o'sh  
1POSS-name=SV 1A-2s-tell=DEF=IND.M  
'I told you my name' (Hollow 1973a:58)
- f. *réhminihereki,*                      *shúhq't*                      *isii*                      *raréehto'sh*  
rEEh#w-rj-hrE=ki                      shuh=a't                      i-sii                      ra-rEEh=kt=o'sh  
go.there#1A-2s-CAUS=HYP sinew=DEM.DIST pv.ins-travel 2A-go.there=POT=IND.M  
'when I send you there, you follow that sinew' (Hollow 1973a:309)

The prefix /w-/ will never be realized without nasalization due to the fact that it must always appear before /rj-/, which will spread its [+nasal] feature leftward according to the conditions laid out in §2.5.3. This allomorph is always tautosyllabic with /rj̄-/, which is what leads Kennard (1936:10) to treat this combination as a portmanteau, rather than two discrete morphological items that merely share a syllable.

### 3.1.2.2.2 First person singular stative prefix: *ma-*

The pronominal prefix has a similar phonological shape as the first person singular active marker, with the only exception being that it has an underlying nasal vowel instead of an oral one. The first person singular stative prefix is used to mark non-agentive subjects, as well as all over non-subject arguments that bear first person singular semantic features.

(3.57) Examples of *ma-*

- a. *manáseena*                      “*mawáaxe'sh,*”                      *éheroomako'sh*  
wř̄=s=ee=rř̄                      wř̄-waaxe=o'sh                      e-he-oowř̄k=o'sh  
tree=DEF=DEM.DIST=TOP 1s-cottonwood=IND.M PV-say=NARR=IND.M  
'the tree said 'I am a cottonwood"' (Hollow 1973a:36)
- b. *súhkaratoohereka*                      *ma'ú'shka'sh*  
suk#k-ratoo#hrE=ka                      wř̄-ú'sh=ka=ind.m  
child#MID-be.old#CAUS=HAB 1s-be.thus=HAB=IND.M  
'I am the child-rearing kind [of person]' (Hollow 1973a:113)

- c. *hiré watéhqkaa*                      *numá'k ímahuuka'sh*  
 hire wa-te#həkE=∅                      ruwə'k i-wə-huuka=o'sh  
 here 1A-stand#POS.AUX=CONT man      PV.INS-1A-be.brave=IND.M  
 'I am a brave man, standing here' (Trechter 2012b:91)
- d. *mamáxikanasho'sh*  
 wə~wə-xik=rəsh=o'sh  
 AUG~1S-be.bad=ATT=IND.M  
 'I am kind of sick' (Hollow 1973b:107)
- e. "waa'aahuuki,                      órara'kto're"                      émaheerak  
 waa-aa-huu=ki                      o-ra-ra'k=kt=o're                      e-wə-hee=ak  
 some-PV.TR-come.here=COND PV.LOC-2A-make.a.fire=POT=IND.F PV-1S-say=DS  
 "if he brings some, you can build a fire," she said to me' (Hollow 1973a:120)
- f. *rá'ts*                      *wáa'owakiniire*                      *áqwe maséero'sh*  
 r'at=s                      waa-o-wa-ki-rj̄=E                      áqwe wə-see=o'sh  
 2POSS-father=DEF NOM-PV.IRR-1A-RFLX-run=SV all      1S-defeat=IND.M  
 'your father beat me every time I raced him' (Hollow 1973a:124)
- g. *hí*    *hąshkakere'sh,*                      *mapi'kto'sh*  
 hi    hąsh=ka=krE=o'sh                      wə-pi'=kt=o'sh  
 tooth be.long=HAB=3PL=IND.M 1S-devour=POT=IND.M  
 'his teeth are long [and] he might eat me up' (Hollow 1973a:143)
- h. *káare*    *ótaamaharaata,*                      *mishúyka!*  
 kaare    o-taa#wə-hrE=ta                      wj̄-shúyka  
 IMP.NEG PV.LOC-be.pointing#1S-CAUS=IMP.M 1POSS-male's.younger.brother  
 'do not point it at me, my brother!' (Hollow 1973a:167)

The first half of the examples above demonstrate that *ma-* is used for verbs that take stative subjects, while the second half of the data above highlights that *ma-* can be used for both direct and indirect objects.

While \*wə can be reconstructed as a possible first person singular stative marker in Proto-Siouan, it is a much more marked variant, with reflexes of \*w̄ being the norm across most daughter languages. It is not clear whether there was a semantic distinction between these two formatives or if the difference between them may have originally been constrained by some aspect of the grammar of Proto-Siouan or Pre-Proto-Siouan.

This confusion between distinction between PSi \*wə and \*w̄ surfaces in Mandan, where speakers sometimes replace *ma-* with *mi-*. This allomorphy is described below, as well as the the allomorphy of *ma-* with /w̄-/ and /w-/.

### 3.1.2.2.2.1 Allomorph /w̄-/

For vowel-initial verbal stems, we cannot use *ma-*, but its allomorph /w̄-/ instead. This prefix is similar to the first person singular active variant /w'-/ from §3.54, but this prefix bears a floating nasal. This floating nasal causes the

syllable this formative prefixes onto to become nasalized, which then spreads its nasal feature leftward to cause the underlying /w/ in /w˜-/ to be realized as [m].

(3.58) Examples of /w˜-/ for first person singular stative

- a. *mí'ktqho'sh*  
w˜-iktah=o'sh  
1s-be.cold=IND.M  
'I am cold' (Hollow 1970:88)
- b. *mí'niso'sh*  
w˜-irıs=o'sh  
1s-be.alive=IND.M  
'I am alive' (Hollow 1970:91)
- c. *mí'wereero'sh*  
w˜-wree=o'sh  
1s-yawn-IND.M  
'I yawned' (Hollow 1970:98)
- d. *mishúyka*                      *mú'pa*    *ómahixikanashaa*  
wı-shúyka                      w˜-ıpa o-wa-hixik=rash=E=∅  
1POSS-younger.brother 1A-with PV.LOC-1s-be.poor=ATT=SV=CONT  
'my brother is sort of poor with me...' Hollow 1973b:284

The limited number of verbs that have vowel-initial roots means that this prefix is not common. However, there are enough examples to know that we tell the difference between a vowel-initial stem with an active versus a stative subject. Hollow (1970:34) does not describe this distinction, writing instead that /wa-/ goes to /w˜-/ before a vowel with [–round] features. Hollow's dictionary is one of the few sources of full sets of conjugation paradigms, but he does not identify any cause for why certain vowel-initial stems become nasalized while others do not. By winnowing away at the differences between the oral and nasal realizations of these vowel-initial stem prefixes, we can justify the distinction between active and stative verbs as being caused by a floating nasal in the stative prefixes, while the active prefixes do not automatically trigger nasalization.

### 3.1.2.2.2 Allomorph /w-/

The first person singular stative prefix *ma-* can never appear before a second person active prefix. When a second person active argument acts upon a first person singular stative argument, then *ma-* is realized as /w-/ instead. Kenard (1936:10) treats the ensuing [mãñã] syllable as a portmanteau, but this sequence is not a single morphological item.

(3.59) Examples of /w-/ as first person singular stative prefix

- a. *ptawiihqka máxana raharáa manakú'kto'sh*  
 p-ta-wiihąka wąxrą ra-hrE=∅ w-rą-ku'=kt=o'sh  
 1POSS-AL-grandchild one 2A-CAUS=CONT 1S-2A-give=POT=IND.M  
 'you can make one grandchild keep it for me' (Hollow 1973a:61)
- b. *ráahta! wáa'imanasqpekte'sh*  
 rEEh=ta waa-i-w-rą-sąape=kt=o'sh  
 go.there=IMP.M NEG-PV.INS-1S-2A-go.around=POT=IND.M  
 'go! you should not go around me' (Hollow 1973a:147)
- c. *manatéexikini q'shkarahere're*  
 w-rą-tee#xik=rj q'shka#ra-hrE=o're  
 1S-2A-like#be.bad=ss be.that.way#2A-CAUS=IND.F  
 'you do not like me, so you did it like that' (Hollow 1973a:71)
- d. *“numá'kshiki ráse núpo'sh,” émanateso'sh*  
 ruwą'k#shi=ki ras=E rųp=o'sh e-w-rą-te=s=o'sh  
 man#be.good=COND name=SV two=IND.M PV-1S-2A-say.2S=DEF=IND.M  
 'you said “if he is chief, there are two names” to me' (Hollow 1973b:57)
- e. *wawáruutanashak imanapse'sh*  
 wa-wa-ruut=rąsh=ak i-w-rą-psE=o'sh  
 UNSP-1A-eat=ATT=DS PV.INS-1S-2A-bother=IND.M  
 'you are bothering me while I am eating' (Hollow 1973b:133)
- f. *hiré'oshka máamanakarahinixo'sh*  
 hire-oshka waa-w-rą-krah=rjx=o'sh  
 now-EMPH NEG-1S-2A-be.afraid.of=NEG=IND.M  
 'you are not afraid of me even now' (Hollow 1973b:96)

The distinction between the default /wą-/ and /w-/ is that the /w-/ involves a Dorsey's Law vowel, while the default is a full, phonological vowel. We can perceive the distinction between these two allomorphs by observing stress placement. Stress assignment does not take Dorsey's Law vowels into account, while underlying vowels are factored into footing. The intrusive vowel in /w-/ will never affect stress assignment, while the /ą/ in /wą-/ always will.

### 3.1.2.2.2.3 Allomorph /wɨ-/

This variant of /wą-/ appears sporadically throughout the corpus. We can predictably see it used with reflexives.

(3.60) Examples of /wɨ-/

- a. *mikihe'sh*  
wɨ-ki-hE=o'sh  
1S-RFLX-see=IND.M  
'I see myself' (Hollow 1970:440)
- b. *mi'shak imikisehki*                      *nuréehto're*  
wʷ-ishak i-wɨ-ki-sek=ki                      rɨ-rEEh=kt=o're  
1S-PRO    PV.INS-1S-RFLX-make=CONJ 1A.PL-go.there=POT=IND.F  
'Me, I am going to fix myself up and we will go' (Hollow 1973a:127)
- c. *mú'ka,*                      *imikaheko'sh*  
wʷ-ɥɥka                      i-wɨ-ka-hek=o'sh  
1POSS-older.brother PV.INS-1S-INCP-know=IND.M  
'my brother, I have come to my senses' (Hollow 1973a:144)
- d. *imimashut*  
i-wɨ-wəshut  
PV.INS-1S-clothe  
'my clothes' (Hollow 1970:97)
- e. *mimi'ratooro'sh*  
wɨ~wɨ' -ratoo=o'sh  
AUG~1S-be.old=IND.M  
'I am the oldest' (Hollow 1973a:6)
- f. *mi'ma'o'ro'sh*  
wɨ'~wə-o'=o'sh  
AUG~1S-be=IND.M  
'I am the one' (Hollow 1973a:121)

The use of *mi-* before reflexives is documented in previous literature (Kennard 1936, Hollow 1970, Mixco 1997a). However, there is periodic alternation between *mi-* and *ma-*. Mr. Edwin Benson, the last speaker of Mandan, would sometimes vacillate between *mi-*, *mii-*, and *mi'*- for the first person singular stative when giving elicitations. It is not clear if this alternation with *ma-* means that *mi-* is in free variation with *ma-*, or if this is an artifact of language contact with Hidatsa, whose first person stative marker is *mii-*. Virtually all native speakers of Mandan have also spoken Hidatsa as well since at least the beginning of the twentieth century, so it is plausible that this vacillation between different manifestations of the first person singular stative marker is due to the prevalence of Hidatsa usage on the Fort Berthold Indian Reservation.

One piece of evidence that they are interchangeable for some speakers is the fact that there are a number of examples of emphatic reduplication in the corpus where the reduplicated element is one prefix, and the base element is the other prefix, as we see in *mi'ma'o'ro'sh* 'I am the one' or 'it is me.'

Another possibility is that there is an analogical change where first person singular stative in Mandan is *ma-*, but second person stative is *ni-*, and speakers are replacing the vowel in /wə-/ with /i/ to bring it more in line with the phonological shape of the second person stative. The scarcity of *mi-* type prefixes in place of *ma-* in the corpus and the lack of L1 speakers renders it difficult to accurately assess what conditions outside of reflexives that *mi-* is used instead of *ma-*.

### 3.1.2.3 First person plural prefix (Slot 8)

The first person plural prefixes are the first of the outer pronominals. They will always appear to the left of a preverb. Rankin, Carter & Jones (1998, p.c.) believes that the difference in first person singular and non-singular marking in Siouan is due to a pronominal element being grammaticalized onto the verb stem late in the development from Proto-Siouan into its daughter languages. From there, certain languages lost this dedicated first person plural marking, and transferred plural-marking to enclitics.

Mandan retains a reflex of the Proto-Siouan first person marker \*rɥ-, which is the first person plural active prefix *nu-*. In Kasak (2015a, 2016), I make the case that Yuchi is a Siouan language that has diverged greatly and undergone much innovation since splitting from Proto-Siouan. This piece of morphology is one bit of support for this hypothesis. All other Siouan languages have \*ɥ- as their first person plural marker, but Yuchi has *ō-* as its first person inclusive prefix and *rō-* as its first person exclusive prefix. The Mandan form appears to be cognate with the exclusive form, but Mandan *nu-* carries an inclusive reading, which suggests that \*ɥ- merged with \*rɥ- in Mandan, but the reverse happened in Core Siouan: i.e., Mississippi Valley and Ohio Valley Siouan lost the exclusive marker in favor of the inclusive marker. We can compare first person plural marking in several Siouan languages below.

#### (3.61) First person plural marking in Siouan

a. Biloxi<sup>1</sup>

*qkidêê(tu)*  
 ɥ-ki-dêê=tu  
 1A.PL-VERT-go.there=PL

‘we go there’ (Einaudi 1976:77)

b. Hidatsa

*múshia’c*  
 m-u’shia=’a=c  
 1A-arrive=PL=IND

---

<sup>1</sup>I have altered the orthography in Einaudi (1976) to be in line with that found in Kaufman’s (2011) dictionary.

‘we arrived’ (Bird Bear p.c.)

c. Lakota

<i>uŋyé</i>	~	<i>uŋyáŋpi</i>
uŋ-yA		uŋ-yA=pi
1A.PL-go.there		1A.PL-go.there=PL

‘we (du.) went there’ vs ‘we (pl.) went there’ (Ullrich 2011:695)

d. Mandan

<i>nurého’sh</i>	~	<i>nuráhinito’sh</i>
rɥ-rEEh=o’sh		rɥ-rEEh=rɥt=o’sh
1A.PL-go.there=IND		1A.PL-go.there=2PL=IND.M

‘we (du.) went there’ vs ‘we (pl.) went there’

Both Biloxi and Hidatsa have a generalized first person prefix and express plurality through enclitics.<sup>2</sup> Mandan and Lakota retain the use of dedicated first person plural prefixes. Both languages also permit a dual reading by simply adding the first person plural prefix without an accompanying plural enclitic.

Mandan has two main prefixes that indicate a first person plural argument, which are shown below.

(3.62) Default first person plural markers

- nu-* first person plural active
- ro-* first person plural stative

Examples of the prefixes above appear in the following subsections.

3.1.2.3.1 First person plural active prefix: *nu-*

The default allomorph *nu-* common in conversational Mandan and in the corpus. This prefix is in complementary distribution with the first person singular prefixes, though it can co-occur with second person prefixes.

(3.63) Examples of first person plural active prefix *nu-*

a. *máanuhe*      *mikó’sh*  
waa-rɥ-hE      wɥk=o’sh  
NOM-1A.PL-see be.none=IND.M  
‘we saw nothing’ (Hollow 1973b:186)

b. *hiré máanuxkqhinixo’sh*  
hire waa-rɥ-xkq̄h=rɥx=o’sh  
NOW NEG-1A.PL-move=NEG=IND.M  
‘now we will not break camp’ (Hollow 1973b:195)

<sup>2</sup>Einaudi (1976:46) observes that plural marking in Biloxi is optional once a subject has been established as being plural.

- c. *tópha ná'hki, nutíkto'sh,* *éheroomako'sh*  
top#ha rã'k=ki rų-ti=kt=o'sh e-hee=oowãk=o'sh  
four#times POS.SIT=COND 1A.PL-arrive.here=POT=IND.M PV-say=NARR=IND.M  
‘we will arrive when it is the fourth time,’ he said’ (Hollow 1973b:243)
- d. *nukirúharaanik nukúhka'sh*  
rų-k-rhu#hrE=rjk rų-kuh=ka=o'sh  
1A.PL-VERT-SEQ#CAUS=ITR 1A.PL-come.back.here=HAB=IND.M  
‘we always come home when we head back here’ (Hollow 1973b:151)
- e. *hóoraka ptáqka mú'pani warúha'*  
hóoraka p-(ta)-tãqka w'-ųppa=rj wa-ru-ha'  
yesterday 1POSS-AL-woman's.younger.sister 1A-with=SS UNSP-INS.HAND-pick.berries  
*nu'reeho'sh*  
rų-rEEh=o'sh  
1A.PL-go.there=IND.M  
‘yesterday I went berry-picking with my sister’ (Hollow 1973a:52)
- f. *xamáhe nurúshektiki, ihekka'sh*  
xwãh=E rų-ru-shE=ktiki i-hek=ka=o'sh  
be.little=SV 1A.PL-INS.HAND-grasp=POT+COND PV.INS-know=HAB=IND.M  
‘whenever we take a little, he always knows’ (Hollow 1973b:116)
- g. *óo úppanq nurúsanaahini nuhúuro'sh*  
oo ųppa=nã rų-ru-srããh=rj rų-huu=o'sh  
DEM.MID elk=TOP 1A.PL-INS.HAND-leave.behind=SS 1A.PL-come.here=IND.M  
‘we left an elk there and came’ (Hollow 1973b:180)
- h. *nupáminishinito'sh*  
rų-pa-wrjsh=rjt=o'sh  
1A.PL-INS.PUSH-be.rolled.up=2PL=IND.M  
‘we (pl.) rolled it up’ (Hollow 1970:462)
- i. *nu'áanito'sh*  
rų-E=rjt=o'sh  
1A.PL-hear=2PL=IND.M  
‘we hear it’ (Hollow 1970:473)
- j. *máanuhaanitinixo'sh*  
waa-rų-hE=rjt=rjx=o'sh  
NEG-1A.PL-see=2PL=NEG=IND.M  
‘we (pl.) did not see it’

Whenever *nu-* appears without the second person plural enclitic *=nit*, *nu-* typically carries a dual inclusive reading: i.e., the speaker and the addressee only. The enclitic *=nit* grants a plural reading, and does not automatically give an inclusive reading.

### 3.1.2.3.1.1 Allomorph /rV-/

As an outer pronominal, *nu-* often comes into contact with preverbs. All preverbs in Mandan lack an onset, and the frequency at which *nu-* abutted these preverbs has caused Mandan to develop an allomorph where the underlying nasal vowel of /rV-/ *nu-* harmonizes with the following vowel. First person active plural marking onto a vowel-initial stem will cause the initial vowel to lengthen, and the lack of an underlying nasal does not cause the /r/ to nasalize.

(3.64) Examples of /rV-/

- a. *maná tereéekerek*                      *nurúskopini*                      *réerehini*  
 wr̥ tree=krE=ak                      r̥ ru-skop=r̥j                      rV-e-reh=r̥j  
 tree be.big.around=3PL=DS 1A.PL-INS.HAND-be.bent=SS 1A.PL-PV-want=SS  
*máanurutirishe*                      *mikáa*  
 waa-r̥ ru-trish=E                      w̥k=E=∅  
 NOM-1A.PL-INS.HAND-shake=SV be.none=SV=CONT  
 ‘the trees were big, so we wanted to bend them, but we could not budge them’ (Hollow 1973a:52)
- b. *sáqka rónapini*                      *áqwe nurúha’ni*                      *nukúho’sh*  
 sḁka rV-o-r̥p=r̥j                      ḁwe r̥ ru-ha’=r̥j                      r̥ kuh=o’sh  
 be.few 1A.PL-PV.LOC-find=SS all 1A.PL-INS.HAND-pick.berries=SS 1A.PL-come.back.here=IND.M  
 ‘we found a few, we picked everything, and we came back’ (Hollow 1973a:52)
- c. *wáa’oksqa*                      *íseke*                      *s̥hanashak*                      *r̥ihekinito’sh*  
 waa-o-ksḁ                      i-sek=E                      s̥h=r̥ash=ak                      rV-i-sek=r̥t=o’sh  
 NOM-PV.IRR-trouble PV.INS-make=SV be.strong=ATT=DS 1A.PS-PV.INS-know=2PL=IND.M  
 ‘he does crooked things all the time and we know it’ (Hollow 1973a:43)
- d. *r̥isqro’sh*  
 rV-is̥ḁ=o’sh  
 1A.PL-be.in.a.hurry=IND.M  
 ‘we are in a hurry’ (Hollow 1970:92)

This formative is mostly seen in conjunction with preverbs, but /rV-/ also appears when used with any of the few vowel-initial verbal roots in Mandan as we can see in (3.64d). With vowel-initial stems, the main difference between a second person active form and a first person plural active form is whether the first syllable involves a short vowel and a coda glottal or a long vowel.

- (3.65) *r̥isqro’sh*  
 r’-is̥ḁ=o’sh  
 2A-be.in.a.hurry=IND.M  
 ‘you are in a hurry’ (Hollow 1970:92)

We can see in (3.65), the /r’-/ prefix causes metathesis with the glottal stop and the initial vowel, creating a closed syllable, but with the /rV-/ in (3.64d), the syllable remains open and the initial vowel lengthens. The distinction

between these two words can be minimal or nonexistent in fast speech where [V?] can be realized as [V:]. Context certainly helps clarify what subject marking a speaker intends in cases like this one.

### 3.1.2.3.1.2 Allomorph /r-/

Mandan prohibits trimoraic syllables, as discussed in §2.5.1.3, but some preverbs and vowel-initial verbal roots begin with long vowels. We cannot use /rV-/ in these contexts, with /r-/ being used instead.

(3.66) Examples of first person plural active /r-/

- a. *nuráahini*            *Páq̄h̄i' Shųts*            *óo*            *róorookti'sh*  
 rų-rEEh=r̄i            p̄āq̄h̄i#shųt=s            oo            r-o-o-rootki=o'sh  
 1A.PL-go.there=SS porcupine#tail=DEF DEM.MID 1A.PL-PV.IRR-PV.LOC-hit=IND.M  
 'we will go and camp there at Porcupine Tail' (Hollow 1973b:254)
- b. *na'é,*            *nihúpe*            *ráahuuro're*  
 r̄a-E            r̄i-hųp(E)            r-aa-huu=o'sh  
 mother.VOC=SV 2POSS-shoe 1A.PL-PV.TR-come.here=IND.M  
 'mother, we brought your shoes' (Hollow 1973a:147)

This allomorph is not seen often in the corpus due to the fact that there is only one preverb that has an underlying long vowel, and there are no attested active-marking verbs that begin with long vowels. The nature of /rV-/ also can make it ambiguous whether there is an irrealis preverb plus a locative preverb with /r-/ or a locative preverb with /rV-/, since they will be homophonous: e.g., *róorookti'sh* 'we will camp there' can likewise be 'we camp there.' The corpus includes glosses beneath each word, so we can glean the intent of the speaker who went through and explained what he or she had meant, but multiple interpretations are possible in the narratives that have yet to be glossed with a Mandan speaker, such as the Bowers (1971) recordings.

### 3.1.2.3.2 First person plural stative prefix: ro-

The prefix *ro-* is not common in the corpus, due to the fact that the corpus is mostly comprised of narratives where a single cultural figure is on a journey and interacts with maybe one other figure at a time. This is another example of morphology that is more common in conversational Mandan than the corpus would otherwise suggest. This particular formative does not have an obvious Proto-Siouan origin. Catawba has similar *nu-* and *do-* first person plural object markers, the latter bearing the strongest similarity to the Mandan *ro-* (Rankin et al. 2015). Given that Catawban and Mandan are both Peripheral Siouan languages under the proposal laid down in Kasak (2015a), we can say that these similarities are either due to shared innovations in a common ancestor that had already split from Core

Siouan, or that these languages share an archaism that has been lost in other daughter languages of Proto-Siouan, since other Siouan languages do not have dedicated morphology to active versus stative first person plural marking.

(3.67) Examples of first person plural stative *ro-*

- a. *wapthehki*    *rokiikirixaani*    *rápena'ro'sh*  
 wa-ptEh=ki    ro-kiikrixE=rj    ra-pera'='o'sh  
 1A-run=COND 1S.PL-catch.up.to=SS 2A-be.slow=IND.M  
 'if I run away, they will catch us since you are slow' (Hollow 1973b:163)
- b. *óparashtaa*    *íshqataa*    *ná'kini*    *rokirúherektiki*  
 o-prash=taa    i-shaq=taa    ra'k=rj    ro-kru#hrE=ktiki  
 PV.LOC-be.pointed=LOC PV.DIR-across=LOC POS.SIT=SS 1S.PL-VERT+SEQ#CAUS=POT+COND  
*nuréehka'sh*  
 ru-rEEh=ka='o'sh  
 1A.PL-go.there=HAB=IND.M  
 'whenever he calls us across to the ridge there, we always go' (Hollow 1973b:151)
- c. *wáa'oxikt*    *nuréehki,*    *rokirushaata*  
 waa-o-xik=t    ru-reeh=ki    ro-k-ru-shE=ta  
 NOM-PV.LOC-be.bad 1A.PL-go.there=COND 1S.PL-VERT-grasp=IND.M  
 'if we go to a bad place, take us back' (Hollow 1973b:45)
- d. *nu'ú'taa*    *waxópininite,*    *étaanik,*    *waróruute*    *rokú'ka'sh*  
 ru-ú'=taa    wa-xopri=rjt=E    e-tEE=rjk    wa-ro-ruutE    ro-ku'='ka='o'sh  
 1A.PL-be.closer=LOC UNSP-be.holy=2PL=SV PV-say.2A=ITR UNSP-1S.PL-eat 1S.PL-give=HAB=IND.M  
 'you always give something to eat to us holy spirits that you call' (Hollow 1973b:176)
- e. *na'é*    *réhrohereso'sh*  
 ra-E    rEEh#ro-hrE=s='o'sh  
 mother.VOC=SV go.there#1S.PL-CAUS=DEF=IND.M  
 'mother told us to go' (Hollow 1973a:166)
- f. *karókahashka*  
 ka-ro-ka-hash=ka  
 AGT-1S.PL-INS.FRCE-slaughter=HAB  
 'the one who slaughters us' (Hollow 1973a:146)

This prefix is not described in Hollow's (1970) dictionary, but it is discussed in Kennard's (1936) grammar.

### 3.1.2.3.2.1 Allomorph /rV-/

Much like *nu-*, *ro-* cannot appear before a vowel-initial stem. This prefix, too, has an allomorph where the underlying vowel harmonizes the following vowel to create a single long vowel: /rV-/. We can see examples involving this prefix below.

(3.68) Examples of first person plural stative allomorph /rV-/

- a. *éena*      *róokaweho'sh*,                      *manáhítahimi'kshukeena*  
 ee=rą      rV-o-ka-weh=o'sh                      wrą=hj#ta-hi#wi'#kshuk=ee=rą  
 DEM.DIST 1S.PL-INS.FRCE-chose=IND.M wood=with#AL-tooth#stone#be.narrow=DEM.DIST=TOP  
 'then he chooses it for us, a stone-pointed lance' (Hollow 1973b:151)
- b. *mí'ti*      *ki'hini*                      *ríiruptaahini*                      *numá'kaaki rokaraahini*  
 wi'#ti      ki'h=rj                      rV-i-ru-ptEh=rj                      ruwą'k-aaki ro-kraah=rj  
 stone#reside arrive.back.here=SS 1S.PL-PV.INS-INS.HAND-run=SS man-COLL 1S.PL-be.afraid.of=SS  
*téeroharaani*      *érehini*  
 tee#ro-hrE=rj      e-reh=rj  
 die#1S.PL-CAUS=SS PV-want=SS  
 'he got back to the village and blamed us, so the people were afraid of us and wanted to kill us and...'  
 (Hollow 1973a:186)
- c. *numá'kaaki qawe rokaraahkaraani*                      *ríiruksahqmika*  
 ruwą'k-aaki aawe ro-kraah=krE=rj                      rV-i-ru-ksah=awj=ka  
 man-COLL all 1S.PL-be.afraid.of=3PL=SS 1S.PL-PV.INS-INS.HAND-go.away=CONT=HAB  
*réhkere'sh*  
 rEEh=krE=o'sh  
 go.there=3PL=IND.M  
 'all the people were afraid of us and went, leaving us behind' (Hollow 1973a:184)

The homophony between the first person plural active /rV-/ and the first person plural stative /rV-/ above can make it challenging to identify which argument /rV-/ represents in isolation. The context in which such words appear is crucial for informing a listener what the intended argument is that is being marked.

### 3.1.2.3.2.2 Allomorph /r-/

This allomorph of *ro-* is homophonous with the /rV-/ allomorph of *nu-*. This prefix is used before vowel-initial stems that begin with long vowels. If no other pronominal marking is present on the verb, /rV-/ can ambiguously indicate a first person plural active argument or a first person plural stative argument.

(3.69) Ambiguity with /rV-/ marking

- a. *ráaniraahinito'sh*  
r-aa-r̥-rEEh=r̥t=o'sh  
1A.PL-PV.TR-2S-go.there=2PL=IND.M  
'we brought you here'
- b. *ráararaahinito'sh*  
r-aa-ra-rEEh=r̥t=o'sh  
1S.PL-PV.TR-2A-go.there=2PL=IND.M  
'you brought us here'

The /r-/ alone does not tell us if it refers to an active or stative argument, but the presence second person marking clarifies what role /r-/ plays. A verb marked with *ni-* must have its /r-/ refer to an active argument, as *ni-* is stative, and vice versa for *ra-* and its /r-/.

3.1.2.3.2.3 Allomorph /r̥-/

This allomorph of *ro-* is used only with reflexives. The shape of this formative differs from the other reflexive allomorphs *mi-* and *ni-* in that *nu-* does not resemble stative marking, but active marking. There likely was paradigmatic instability at some point in pre-modern Mandan where there was a shift away from stative marking, and only the first person plural stative before a reflexive is identical with its active counterpart. It is unclear how this process worked in Proto-Siouan, given the fact that there is no default pattern we observe across the language family, even within the same branch. In Mississippi Valley Siouan, Lakota marks reflexive subjects with stative pronominals (Ingham 2003:23), while Ioway-Oto and Osage uses active pronominals for subject marking (Whitman 1947:244, Quintero 2004:244). The Ohio Valley Siouan language Tutelo uses dative prefixes with reflexives (Oliverio 1997:77), while the Missouri Valley Siouan language Crow uses active prefixes to mark reflexive subjects (Graczyk 2007:149). It is difficult to pinpoint what the original system of reflexive subject marking was in Proto-Siouan, and the mixed paradigm in Mandan suggests there this system may not have been particularly uniform across the language family. It is worth noting that the number of languages that use active marking for reflexive subjects is in the majority.

We can see the use of *nu-* as a first person plural stative marker below.

(3.70) First person plural stative marking with reflexives

- a. *nukirúskap'o'sh*  
r̥-k-ru-skap=o'sh  
1S.PL-RFLX-INS.HAND-pinch=IND.M  
'we pinch ourselves' (Hollow 1970:440)

- b. *nukihe'sh*  
 rɥ-ki-hE=o'sh  
 1S.PL-RFLX-see=IND.M  
 'we see ourselves' (Hollow 1970:475)

As discussed in §3.1.1.3.3, reflexive marking on verbs with plural subjects can also give a reciprocal reading. Thus, both of the sentences above can be interpreted as 'we pinch each other' and 'we see each other,' respectively. Mandan has no devoted reciprocal marking morphology, so any reciprocal reading is typically left to context.

#### 3.1.2.4 Unspecified argument prefix (Slot 9)

One of the more difficult inflectional prefixes to explain is the unspecified argument marker *wa-*. In much of the Siouanist literature, this prefix is referred to as the absolutive marker. Calling this formative absolutive does not mean that Siouanists believe that these languages have an ergative-absolutive alignment, though historically this was the case at one time. Siouanists that studied at the University of California, Berkeley under Terrence Kaufman had been introduced to ergative-absolutive languages through Kaufman's work on Mayan languages. While Siouanists came to agree that active-stative was the more accurate description of the alignment system found across the language family, the term absolutive remained in the literature for the sake of convention (Rankin p.c.).

In the work presented here, I employ the term the Mixco (1997a) uses in his Mandan grammar: unspecified object. This term captures the actual function of this prefix in Mandan, which is to mark some indefinite non-subject argument. Some of the issues with identifying the unspecified argument marker in Mandan has been the inconsistency (e.g., Kennard 1936, Mixco 1997a, and Trechter 2012b) of long vowel marking, or even the disavowal of vowel length (e.g., Hollow 1970 and Coberly 1979).

Historically, this prefix originates as a merger between the \*wi- and \*wa- classifiers in Proto-Siouan, where \*wi- marks animate non-human arguments and \*wa- marks inanimate arguments. After \*wi- merged with \*wa-, \*wa- became used to mark not only nominal stems, but verbal stems as well. This process seems to have taken place before late Proto-Siouan, as this behavior is observed in every branch of the Siouan language family, where some reflex of \*wa- has become part of the outer pronominal set (Rankin, Carter & Jones 1998). The meaning of this element varies from language to language. Tutelo treats its *wa-* similar treatment in a manner similar to that in Mandan (Oliverio 1997:87). In Dakotan, *wa-* acts as an indefinite object (Ingham 2003:16), but in Dhegihan and Hoocąk-Chiwere, *wa-* is a third person plural object marker (Quintero 2004:75, Helmbrecht & Lehmann 2008:286). Crow and Hidatsa both have an indefinite object marker that doubles as a nominalizer (Boyle 2007:242, Graczyk 2007:195)

One bit of confusion found in previous grammars of Mandan is that this ⟨wa⟩ in others' transcriptions has two

different phonetic realizations: [wa-] and [wa:-]. Furthermore, the [wa:-] really has multiple meanings, the most common of which is that it acts as a nominalizer. The different uses of these formatives is summarized below.

(3.71) Items conflated as ‘absolute’ in Hollow (1970)

- wa-* unspecified argument prefix
- waa-<sub>1</sub>* nominalizer
- waa-<sub>2</sub>* partitive marker
- waa-<sub>3</sub>* indefinite subject prefix

This conflation in previous scholars’ work is due to the fact that *wa-* UNSP, *waa-* NOM, and *waa-* PART have similar semantics. Namely, these formatives all indicate some kind of indefinite characteristic. In particular, this confusion arises from the nominalizer *waa-* having subject semantics for the nominalized element (e.g., *wáashi* ‘something that is good’) versus an action undertaken by someone else (e.g., *wapápshee* ‘baking powder bread,’ which is literally ‘push something flat’). Both *wáashi* and *wapápshee* are treated as nouns syntactically and can receive noun morphology. Thus, while both items are nominalized verbs, the process of how they they are formed differs: *waa-* nominalizes a verbal complex by taking the place of a subject, while *wa-* can be found on deverbals as a stand-in for an object.

### 3.1.2.4.1 Unspecified argument prefix: *wa-*

The unspecified argument marker is often found in the corpus when an agent does an action to ‘something’ or ‘someone’ without specifying what or whom that object is. It is also found with certain verbs that seem to always require an overt object. If no overt nominal object is present, then *wa-* substitutes for whatever it is that is serving as a direct or indirect object.

(3.72) Examples of unspecified argument *wa-* marking

- a. *húy, minikína’nisto’sh, wawákanaaki, manánapaanitki*  
*húy w-rí-kirá’=rít=kt=o’sh wa-wa-kraqa=ki wa-ra-rape=rít=ki*  
 yes 1A-2S-tell=2PL=POT=IND.M UNSP-1A-sing=COND UNSP-2A-dance=2PL=COND  
 ‘yes, I will tell it to you (pl.), when I sing and when you (pl.) dance’ (Hollow 1973b:32)
- b. *káni “tashká wagheréki wawáruuto’xara’shka,” érehoomako’sh*  
*ka=rí tashka wa-hrE=ki wa-wa-ruut=o’xrE=a’shka*  
 PROS=SS how 1A-CAUS=COND UNSP-1A-eat=DUB=PSBL PV-say=NARR=IND.M  
 ‘and how might I be going to eat if I do that?’ (Hollow 1973b:46)
- c. *máatah íwakahaq kasiimi wa’éroomako’sh*  
*wáatah i-waka-haq kasiimi wa’éroomako’sh*  
 river PV.POSS-edge=INS INCP-travel=CONT UNSP-hear=NARR=IND.M  
 ‘Traveling along the river’s edge, he heard something’ (Hollow 1973a:28)

- d. *wakósh*      *ówaku'ro'sh*  
 wa-kosh      o-wa-ku'=o'sh  
 UNSP-whistle PV.IRR-1A-give=IND.M  
 'I am going to whistle for someone' (Hollow 1970:487)
- e. *máamananuunixinisto'sh*  
 waa-wa-ra-rųų=rıx=rıt=kt=o'sh  
 NEG-UNSP-2A-abduct=NEG=2PL=POT=IND.M  
 'you shall not commit adultery' (Hollow 1970:22)
- f. *Waxíhkina'*  
 wa-xik#kirą'  
 UNSP-be.bad#tell  
 'Bad News Clan' (Bowers 1950:30)
- g. *wahúu ikiri*  
 wa-huu#i-kri  
 UNSP-bone#PV.INS-be.grease  
 'marrow' (Hollow 1970:82)
- h. *tawákapxe*  
 ta-wa-kapxe  
 AL-UNSP-earn  
 'his wages' (Hollow 1970:101)
- i. *waká're*  
 wa-ka'=E  
 UNSP-have=SV  
 'property' (Hollow 1970:102)
- j. *wapápsiire*  
 wa-pa-pshii=E  
 UNSP-INS.PUSH-be.flat=SV  
 'baking soda bread' (Benson 1999:14)

The unspecified argument prefix appears frequently throughout the corpus and is one of the most common prefixal elements in Mandan. It is typically used on verbal elements, though it does show up on certain nominalized verbs. In these verbs, the *wa-* is a non-agent argument. No overt subject marking is present on these nominalizations, which contrasts with *waa-*, where *waa-* takes the place of a subject.

In a way, *wa-* is used employed to nominalize verbs in a similar manner to preverbs. Mandan has no dedicated third person marking in its prefix field, so a verb with a preverb along with the habitual aspect marker is often the form nominalized verbs take.

(3.73) Nominalizations using preverbs

- a. *íkakiishka*  
i-ka-kiish=ka  
PV.INS-INS.FRCE-brush.off=HAB  
'broom (lit. 'what one sweeps it with') (Hollow 1970:112)
- b. *pá íwa'xu'ka*  
pa#i-wa'-xu'=ka  
head#PV.INS-INS.PRCE-plow=HAB  
'comb (lit. 'what one plows rows on the head with') (Hollow 1970:142)
- c. *manásh írushtat*  
wraʃh#i-ru-shtat  
tobacco#PV.INS-INS.HAND-twist  
'cigarette (lit. 'what one twists the tobacco by hand with') (Hollow 1970:238)
- d. *ítkek*  
i-tkE=k(a)  
PV.INS-scape=HAB  
'hide scraper (lit. 'what one scrapes it with') (Hollow 1970:253)

The examples above can either be treated as predicates or arguments, depending on the context. The behavior of *wa-*, along with the use of preverbs to create relative clauses that can be treated as nominal elements, receiving nominal morphology. The presence of *wa-* in many Mandan nouns underscores the highly verbal nature of the Mandan language, and that syntactic categories are not so cut and dry.

3.1.2.4.1.1 Allomorph /w'-/

In situations where an unspecified argument marker is placed before a vowel-initial stem that is not a preverb, the allomorph /w'-/ is used instead.

(3.74) Examples of unspecified argument marker as /w'-/

- a. *wá'kupe*  
w'-aakup=E  
UNSP-cover.the.head=sv  
'cap, war bonnet' (Hollow 1970:58)
- b. *ma'se*  
w'-as=E  
UNSP-horn=sv  
'horn spoon' (Hollow 1970:60)

The set above represents the sum total of cases where the unspecified argument marker is realized as /w'-/ instead of /wa-/ in the corpus. Before preverbs, *wa-* is exclusively used.

- (3.75) *wá'iwaseko'sh*,                      \**wí'waseko'sh*  
wa-i-wa-sek=o'sh  
UNSP-PV.INS-make=IND.M  
'I am working' (Hollow 1970:203)

The extremely limited set of verbs beginning with a vowel that is not a preverb and can take unspecified argument marking means that this particular allomorph is exceedingly rare.

### 3.1.2.4.1.2 Allomorph /wǎ-/

In certain words, the unspecified argument prefix *wa-* has developed a nasal underlying vowel. We can look at older Mandan sources and see what once was [wa] is now [mǎ].

(3.76) Change from /wa-/ to /wǎ-/

- a. 'white person'
  - i. *washí* ← /wa-shi/ 'white person (lit. 'someone who has everything good') (Maximilian 1839:246)
  - ii. *mashí* ← /wǎ-shi/ 'white person' (Hollow 1970:276)
- b. 'leather'
  - i. *wapáqapi* ← /wa-pǎapi/ 'leather' (lit. 'something made thin') (Maximilian 1839:249)
  - ii. *wapáqapi* ← /wa-pǎapi/ 'buckskin' (Hollow 1970:136)
  - iii. *mapáqapi* ← /wǎ-pǎapi/ 'deer, buckskin' (Benson p.c.)

The tendency to fortify sonorants to nasal stops when utterance initial has caused certain words beginning with sonorants to become reanalyzed as if the source of those nasal stops was from an underlying nasal vowel. We can see that in the early nineteenth century, the modern word for someone of European descent is *washí* [wa.'ʃi], where the first vowel is definitely oral. All modern speakers use *mashí* [mǎ.'ʃi]. Other words in Mandan have reanalyzed the unspecified argument prefix as having an underlying nasal vowel, such that there is a class of nouns where this nasalization has become lexicalized. Mr. Edwin Benson explained the origin of the term for 'white person,' and his interpretation matches up with Maximilian's (1839). The data in (3.76) show that certain words have shifted universally towards taking /wǎ-/ as their unspecified argument prefix, but other words may take either /wa-/ or /wǎ-/, depending on the speaker.

We can see other nouns in Mandan that share this use of /wǎ-/ for the unspecified argument prefix below.

(3.77) Contemporary nouns with /wə-/ instead of /wa-/

- a. *mapáakokohka* ← /wə-paa-ko~kok=ka/ ‘butterfly’ (Hollow 1970:270)
- b. *mapíhka* ← /wə-pih=ka/ ‘beetle, stink bug’ (Hollow 1970:490)
- c. *maxáxaare* ← /wə-xa~xaa=E/ ‘mountain’ (Hollow 1970:490)
- d. *maxópinixte* ← /wə-xopri#xtE/ ‘God’ (Hollow 1970:490)
- e. *mapí’ksok* ← /wə-pi’ksok/ ‘wild strawberry, raspberry’ (Hollow 1970:272)

None of the words in (3.77) above appear anywhere in the corpus with /wa-/, and will always involve /wə-/. There is no common element that connects these data, so we can say that this is an incomplete morphological change, and one that may not be entirely stable.

#### 3.1.2.4.2 Nominalizer prefix: *waa-*<sub>1</sub>

The nominalizer *waa-* is not inflectional morphology, but is included in this section to highlight its difference from the unspecified argument prefix. All past scholars have treated these two prefixes as being one and the same, but using instrumentation such as Praat (Boersma & Weenik 2016), we can see that there is a distinct length difference between these two formatives.

The semantics of the nominalizer is different from that of the unspecified argument marker in that, while both can be used to nominalize a verb, the nominalizer grants a subject-type reading to the verb it nominalizes. This is often rendered into English as ‘something/someone that X-es’, where the X stands for a verb. We can take the word *wáarokhuutop* ‘table’ as an example of this in action.

- (3.78) *wáarokhuutop*  
waa-rok#huu#top  
NOM-leg#bone#four  
‘table’

The word ‘table’ begins with a nominalizer, and turns the entire determiner phrase into a single phonological word that means ‘something that has four legbones.’ We can add additional nominal morphology, such as determiners or quantifiers: e.g., *wáarokhuutop tóp* ‘four tables,’ or literally ‘four somethings that have four leg bones.’ Since Mandan does not easily accept loan words into its lexicon, novel items and concepts will require a novel word that describes what this new item or concept is. As such, the corpus is filled with tokens containing the nominalizer. We can see several examples of *waa-* used in this way below.

(3.79) Examples of nominalizer *waa-*

- a. *wáara'xuu*  
waa-ra'-xuu  
NOM-INS.HEAT-be.charred  
'coffee (lit. 'something that is charred')' (Hollow 1970:330)
- b. *wáaxte*  
waa-xtE  
NOM-be.big  
'a lot ('something that is big')' (Hollow 1970:328)
- c. *wáa'atxihs*  
waa-at#xih=s  
NOM-father#be.old=DEF  
'the President (lit. 'someone who is the grandfather')' (Hollow 1970:61)
- d. *wáa'iniire*  
waa-irijj=E  
NOM-grow=SV  
'plant (lit. 'something that grows')' (Hollow 1970:62)
- e. *wáa'opakirii*  
waa-o-pa-krii  
NOM-PV.LOC-INS.PUSH-line.up  
'a number (lit. 'something that counts')' (Hollow 1970:119)
- f. *wiikapus*  
wV-i-ka-pus  
NOM-PV.INS-INS.FRCE-be.marked  
'pencil (lit. 'something that makes marks')' (Hollow 1970:77)

In each of the examples above, the *waa-* acts as an indefinite, unspecified subject. Both active and stative verbs are able to be nominalized with *waa-*. The nominalizer also can optionally contact before a vowel-initial stem: e.g., *wáa'ikapus* and *wiikapus* both mean 'writing utensil.' This allomorph is completely optional, and speakers have been known to spontaneously switch from a contracted /wV-/ to a full /waa-/ or vice versa during data elicitation sessions.

3.1.2.4.3 Partitive prefix: *waa*<sub>-2</sub>

An additional use of *waa-* is to give a partitive meaning to some object. This prefix often is accompanied by the word 'some' in the gloss.

(3.80) Partitive *waa-*

- a. *máamaku'nista*, *wáawaruusto'sh!*  
 waa-wa-ku'=rjt=ta waa-wa-ruut=kt=o'sh  
 PRTV-1S-give=2PL=IMP.M PRTV-1A-eat=POT=IND.M  
 'give me some, [because] I want to eat some!' (Hollow 1973a:15)
- b. *nuharáa* *íxike* *máanuruha'ni* *nukirí'sh*  
 ru-hrE=∅ i-xik=E waa-ru-ha'=rj ru-kri=o'sh  
 1A.PL-CAUS=CONT PV.INS-be.bad=SV PRTV-1A.PL-pick.berries=SS 1A.PL-arrive.back.here=IND.M  
 'we were doing it and we barely picked some and we came back' (Hollow 1973a:52)
- c. *hiré rá'skama'k* *wáawahe'sh*, *manápusheke*  
 hire ra'ska#wá'k waa-wa-hE=o'sh wra#pushek=E  
 now summer#POS.LIE PRTV-1A-see=IND.M tree#juneberry=SV  
 'I saw some now this summer, juneberries that is' (Hollow 1973a:52)
- d. *nitawiihaka* *má'kahe wáa'o'kiharaa* *ká'haraani* *éexi* *ruut íteekereka're*  
 rj-ta-wiihaka ma'kahe waa-o'ki-hrE ka'hrE=rj eexi ruut i-tee=krE=ka=o're  
 2POSS-AL-grandchild those PRTV-cook#CAUS have#CAUS=SS paunch eat PV.INS-like=3PL=HAB=IND.F  
 'those granddaughters of yours cooked some for her and want to eat paunch' (Hollow 1973a:72)
- e. *máhe*, *wáa'aawakuhini* *ówakjhereki* *nurúutinisto'sh*  
 wah=E waa-aa-wa-kuh=rj o-wa-kj#hrE=ki ru-ruut=rjt=kt=o'sh  
 turnip=SV PRTV-PV.TR-1A-come.back.here=SS PV.LOC-1A-boil#CAUS=COND 1A.PL-eat=2PL=POT=IND.M  
 'turnips, I will bring some back and we will eat them when I cook them' (Hollow 1973a:75)

It is likely that this *waa-* originated as an enclitic quantifier with a structure in Pre-Mandan like *máhe waa=* 'some turnips,' but the /waa/ become reanalyzed as being an integral part of the verb. Park (2012:480) describes a similar use of the the quantifier *nuwa*, which encliticized onto an overt nominal, but is also realized within the verbal complex when referencing a covert DP. Contemporary Mandan does not have an enclitic for the partitive; it will always be realized as part of the verb. This prefix is mutually exclusive with the unspecified argument prefix, suggesting that they both compete for the same slot because they are both a kind of inflectional prefix that is agreeing with an indefinite or non-specific argument.

#### 3.1.2.4.4 Indefinite subject *waa*-<sub>3</sub>

Another use for *waa-* that seems to have occurred more recently in Mandan than the other two *waa-* prefixes is to mark indefinite subjects. Words bearing this *waa-* are often glossed as 'someone' or 'somebody' doing an action.

(3.81) Examples of the indefinite subject *waa-*

- a. *weréhe kasé'haraani* *wáahuuki*, *káare*  
 wreh=E ka-se'#hrE=rj waa-huu=ki kaare  
 door=SV INS.FRCE-have.come.open#CAUS=SS someone-come.here=COND IMP.NEG

*rusé'na!*  
 ru-se'=rą  
 INS.HAND-have.come.open=IMP.F

'lock the door and if someone comes, do not open it!' (Hollow 1973a:137)

- b. *wáati'ishika'sh*  
 waa-ti-ishi=ka=o'sh  
 someone-arrive.here-CERT=HAB=IND.M  
 'someone must be coming here' (Hollow 1973a:142)
- c. *ishtúhere'eshkaki, wáahuuraa éroomako'sh*  
 ishtúh#hrE-eshka=ki waa-huu=E=∅ E=oowąk=o'sh  
 night#CAUS-SMLT=COND someone-come.here=SV=CONT hear=NARR=IND.M  
 'when it was about evening time, he heard someone coming' (Hollow 1973b:200)
- d. *óo ó'haraani wáarataxaa héroomako'sh*  
 oo o'#hrE=rj waa-ra-tax=E=∅ hE=oowąk=o'sh  
 DEM.MID be#CAUS=SS someone-INS.MTH-make.loud.noise=SV=CONT see=NARR=IND.M  
 'from there, he heard someone crying' (Hollow 1973b:249)

This element seems to be able to be used as an unbound item that is usually combined with the topic marker.

This element also has underlying form of /waa/, but it does not necessarily refer to a subject.

(3.82) Examples of nominal *waa*

- a. *máana ípakixtiki íhehka'sh*  
 waa=rą i-pa-kixti=ki i-hek=ka=o'sh  
 someone=TOP PV.INS-INS.PUSH-approach=COND PV.INS-know=HAB=IND.M  
 'if someone gets close, he always knows' (Hollow 1973b:155)
- b. *máana úypani ropxékerekaroomako'sh*  
 waa=rą úypani ropxE=krE=ka=oowąk=o'sh  
 someone=TOP with=SS enter=3PL=HAB=IND.M  
 'they usually go in with someone' (Hollow 1973b:171)
- c. *hiré'oshka máana kisúkini*  
 hire-oshka wąą=rą ki-suk=rj  
 now-EMPH someone=TOP VERT-exit=SS  
 'even now, someone goes back out and...' (Hollow 1973b:207)
- d. *máana ókų'hkerekteki, warúkahsįhxteka'eheero'sh*  
 waa=rą o-k'ųh=krE=ktiki wa-rukah-įh-xtE=ka'ehEE=o'sh  
 someone=TOP PV.LOC-3POSS.PERS-wife=3PL=POT+COND UNSP-refuse-INTS-AUG=QUOT=IND.M  
 'whenever someone would try to marry her, she always strongly refused, it is said' (Hollow 1973a:101)
- e. *ptamíihe, máatki máataa wáa'owaraahinixo're*  
 p-ta-wįįh=E wąątki waa=taa waa-o-wa-rEEh=rjx=o're  
 1POSS-AL-male's.sister=SV tomorrow somewhere=LOC NEG-PV.IRR-1A-go.there=NEG=IND.F

‘my sister, I am not going anywhere tomorrow’ (Hollow 1973a:284)

- f. *íwaa*                      *óreeho’sh*  
 i-waa=t                      o-rEEh=o’sh  
 PV.DIR-somewhere=LOC PV.IRR-go.there=IND.M  
 ‘he is going away’ (Hollow 1970:265)

- g. *wáa*      *warúute tú*      *éheeni*      *ko’ó’kto’sh*  
 waa      wa-ruutE tu      e-hee=rj      ko-o’=kt=o’sh  
 someone UNSP-eat be.some PV-say=SS REL-be=POT=IND.M  
 ‘there may be someone who is hungry’ (Trechter 2012b:159)

We can see that *máana* ‘someone’ bears topic marking, and can be used in contexts other than subjects. Furthermore, *maa-* is able to be used to substitute for unknown places as well, as in *máataa* ‘somewhere.’ These ‘someone’ and ‘somewhere’ words tend to be the initial element of an intonational phrase, which triggers intonational phrase-initial fortition. Additional morphology added before the /w/, like in (3.82f), removes the conditions for intonational phrase-initial fortition, causing the /w/ to be realized as [w] instead of [m]. Furthermore, we see a few instances of /waa/ alone in the corpus, as demonstrated in (3.82g), where *wáa* appears without the topic marker. Thus, while *waa* often appears in the corpus with an initial [m], this [m] is completely due to this item being used as some kind of topic or emphasized element, which places it within its own intonational phrase.

(3.83) Prosodic structure of (3.82e)

$_{UH} ( \text{ }_{IP} ( \textit{ptamiíhe} )_{IP} \text{ }_{IP} ( \textit{máatki} )_{IP} \text{ }_{IP} ( \textit{máataa wáa’owaraahinixo’re} )_{IP} )_{UH}$

This /waa/ generally combines with enclitics, showing that it is a lexical root, likely expressing an uncertain person or place. It is clearly nominal in nature, as it is only seen with nominal markings: e.g., topic and locative enclitics. As such, these constructions appear to be vestigial indefinite or partitive pronouns, which have generally been reinterpreted as being either partitive or indefinite subject markers in contemporary Mandan.

### 3.1.2.4.5 Summary of *wa-* and *waa-* prefixes

This confusion between the unspecified argument prefix *wa-* and the various *waa-* formatives stems from their common trait of marking indefiniteness for a particular argument. The different phonetic shapes is one clue for which version of an indefinite that the speaker wishes to convey, but the fact that this distinction comes from vowel length and not any other cue has made it difficult for past researchers who are inconsistent about marking vowel length (e.g., Kennard 1936 and Trechter 2012b) or impossible for those who do not recognize vowel length at all (e.g., Hollow 1970 and Coberly 1979).

Other Siouan languages have a prefix that is cognate with the indefinite argument marker *wa-* in Mandan, with that same vowel length. We can thus suppose that there was some element *\*wa-* in Proto-Siouan. The presence of *\*waa-* has not been discussed in the literature as a separate piece of morphology in Proto-Siouan, however. According to (Kasak 2015a), the closest relatives to Mandan are Hidatsa and Crow, which both have a productive cognates of Mandan *waa-*, with those cognates being /*waa-*/ in Hidatsa and /*maa-*/ in Crow. This element fulfills all the roles that both *wa-* and *waa-* play in Mandan, but there are fossilized remnants of *\*wa-* in certain lexical items, such as the Hidatsa word *madú* ‘be some’, which is a cognate of the Mandan *tú* ‘be some.’ The initial syllable in the Hidatsa word bears the short vowel of *\*wa-* instead of the contemporary /*waa-*/ prefix, indicating it was a morphologically complex construction in Proto-Missouri Valley Siouan (e.g., PSi *\*wa-tu* > PMSrV *\*\*wa-tu* > Hid *madu*). We can surmise that *\*wa-* merged with *\*waa-* in Proto-Missouri Valley but remained distinct in Mandan.

Further evidence that Mandan did not innovate this *\*wa-* versus *\*waa-* distinction can be seen in the Ohio Valley language Tutelo, where Oliverio (1997) marks the absolutive prefix as either *wa-* or *waa-* with a high level of inconsistency. One motivating factor for this length difference is that Tutelo also inherited this distinction between PSi *\*wa-* and *\*waa-*. Catawba as a proclitic *pa* that is used for indefinite plural objects that is a cognate with PSi *\*wa-*, though its status as a proclitic seems to be an atavism where this Proto-Siouan prefix has ceased being an integral part of the morphological word.

Mandan seems to be the only language that can allow a morphologically unbound item *wáa* to mean an indefinite subject. Generally speaking, this element appears as an inflectional prefix on the verb in the same verbal slot as the unspecified argument marker. It seems that *wáa* is used as an independent word only as a last resort for when a situation where an indefinite subject is acting on an indefinite object like in (3.82g), where the unspecified argument marker *wa-* is marked on the verb, precluding any other indefinite marker from appearing. Thus, it is not possible for multiple instances of indefiniteness to be marked on a Mandan verb: i.e., the construction *\*wáawaruute tú* ‘there is someone someone who is hungry’ is illicit. When such situations where multiple indefinite arguments arise, the indefinite object is marked on the verb and the indefinite subject manifests as an independent argument. Otherwise, all instances of *wa-* and *waa-* can only appear in the same slot within the prefix template.

### 3.1.2.5 Negative prefix (Slot 10)

The negative prefix *waa-* always co-occurs with a negative enclitic, such as *=nix* or *=xi*. This circumfix-like behavior is due to Mandan reanalyzing the indefinite argument *wáa* as being part of the verbal complex. It is likely that this morphologically unbound element gradually became grammaticalized into an inflectional prefix due to the frequency of this indefinite *wáa* occurring with negative constructions. Circumfixal or double-marking of negation is not

typologically uncommon (Caffarel, Martin & Matthiessen 2004:630), though Mandan is the only Siouan language besides Biloxi (cf. Einaudi 1976:86) to mark negation twice within the verbal complex, as seen below.

(3.84) Examples of negative *waa-*

- a. *wáa'owaraahinixo'sh*  
 waa-o-wa-rEEh=rjx=o'sh  
 NEG-PV.IRR-1A-go.there=NEG=IND.M  
 'I am not going to go' (Hollow 1973a:48)
- b. *téehq wáaraki'hinixak tashkák éwereho'sh*  
 teehq waa-ra-ki'h=rjx=ak tashka=ak e-we-reh=o'sh  
 be.long.distance NEG-2A-arrive.back.there=NEG=DS how=DS PV-1A-think=IND.M  
 'I wondered why you had not returned for so long' (Hollow 1973b:318)
- c. *wáatishi'sh, kashká wáarakina'nixo'sh*  
 waa-ti=ishi=o'sh kashka waa-ra-kirā'=rjx=o'sh  
 someone-arrive.here=VIS=IND.M but NEG-2A-tell=NEG=IND.M  
 'someone must have been here, but you are not telling' (Hollow 1973a:162)
- d. *warúshaani máamahaaxik í'u'taa résh*  
 wa-ru-shE=rj waa-wā-hE=xi=ak i-u'=taa resh  
 1A-INS.HAND-take=SS NEG-1S-see=NEG=DS PV.DIR-be.closer=LOC this.way  
*ótaawaherektak, xé'hqkseet téeroomako're*  
 o-taa#wā-hrE=kt=ak xe'h#hāk=s=ee=t tee=oowaqk=o're  
 PV.LOC-be.facing#1A-CAUS=POT=DS be.dripping#POS.STND=DEF=DEM.DIST=LOC die=NARR=IND.F  
 'I took it and, while she was not looking at me, when I faced it this way toward her, she was dead in that basket' (Hollow 1973a:92)
- e. *wáararaahinixki, óxiko'sh*  
 waa-ra-rEEh=rjx=ki o-xik=o'sh  
 NEG-2A-go. there=NEG=COND PV.IRR-be.bad=IND.M  
 'if you do not go, it will be bad' (Hollow 1973a:113)
- f. *q't minikíkųtēki wáa'oteeniharaaxi'sh*  
 q't w-rj-kikųtē=ki waa-o-tee#rj-hrE=xi=o'sh  
 DEM.DIST 1A-2S-help=COND NEG-PV.IRR-die#2S-CAUS=NEG=IND.M  
 'That one will not kill you if I help you' (Hollow 1973a:113)
- g. *wáara'hashinixharaa, rá'pus'haraani réehak...*  
 waa-ra'-hash=rjx#hrE=∅ ra'-pus#hrE=rj rEEh=ak  
 NEG-INS.HEAT-be.disintegrated=NEG#CAUS=CONT INS.HEAT-be.streaked#CAUS=SS go.there=DS  
 'Not burning him up, it just scorched him in streaks and went' (Hollow 1973a:154)
- h. *miníseet kiskéktiki, írexseena*  
 wrj=s=ee=t ki-skE=ktiki i-rex=s=ee=rā  
 water=DEF=DEM.DIST=LOC REFL-jump=POT+COND PV.INS-be.glistening=DEF=DEM.DIST=TOP



(3.85) Reflexes of PSi \*ko in Crow

[**ko** *bachéesh*]<sub>DP</sub> [**kon**]<sub>DP</sub> *díak*  
**ko**= machée=sh **kon**= nía=k  
**DEM** man=DET.DEF **DEM.AGT** do=IND

‘that man is the one who did it’ (Graczyk 2007:222)

In a DP with an overt nominal like in [*ko bachéesh*]<sub>DP</sub> ‘that man,’ the demonstrative appears at the leftmost edge of the DP shell. A demonstrative may also appear without an overt nominal, as *kon* does in the example above, but in cases such as these, the demonstratives rely on the following word to be prosodically realized, as we can tell by its lack of an underlying pitch accent. The fact that the reflex of PSi \*ko is DP-initial and prosodically deficient in Crow contrasts with *ko* in Biloxi, which is always the right-most element in a DP (Torres 2010).

(3.86) Reflexes of PSi \*ko in Biloxi

[*Opanaskêhona* **ko**]<sub>DP</sub> *naxê’q̣q̣ḳq̣ tandoyq̣* *kidi* *dq̣de*  
 o#pa#naskê#hona **ko** naxê=q̣q̣=ḳq̣ tando=ỵq̣ ki-di ḍq̣de  
 fish#head#long#be.like **DEM** hear=PST=DS female’s.younger.brother=DET.DEF VERT-arrive.here IRR

‘That Very-Long-Headed-Fish heard that her brother would be coming back’ (Torres 2010:128)

The behavior of *ko* in Biloxi is in line with the expected distribution of a demonstrative within a DP shell in a head-final, left-branching language (i.e., at the right edge of a DP). We can certainly see that the *ko* in both Crow and Biloxi have similar functions, but the stark difference lies in their distribution and prosodic behavior.

Under the assumption that Crow and Hidatsa are the closest relatives to Mandan, we can assume that their common ancestor language likewise had a constraint where this determiner was always DP-initial, and that this determiner in Mandan eventually became reanalyzed as an inflectional marker on the verb, rather than discrete lexical item. We can see examples of *ko-* in Mandan below.

The prefix *ko-* in Mandan is not commonly seen, as preverbs and unspecified argument markers have the ability to relativize a clause, with the locative *o-* in particular being commonly seen when describing places. Constructions with *ko-* typically make reference to an agentive argument, though this argument is not always animate.

(3.87) Examples of relativizer *ko-*

a. *mí’ti* *kú’haa* *áani* *máapehekere*, *mí’ti* *kotáakeres* *áq̣we*  
 wí’#ti ḳu’=haa E=ṛi ẉaapehe=krE wí’#ti **ko**-taa=krE=s ạq̣we  
 stone#dwell be.entire=SIM hear=SS mourn=3PL stone#dwell **REL**-LOC=3PL=DEF all

‘the entire village heard it and they mourned, all the ones who lived in the village’ (Hollow 1973b:166)

- b. *hirée róa nútaa óxkqhe koráshitaa, kúhkeres,*  
 hiree roo ru-taa o-xkqh=E ko-rashi=taa kuh=krE=s  
 now DEM.MID 1A.PL-LOC PV.IRR-move=SV REL-behind=LOC come.back.here=3PL=DEF  
*rúkihekto'sh*  
 rV-i-kihE=kt=o'sh  
 1A.PL-PV.INS-wait=POT=IND.M  
 'We are here now, [so] we will wait for the travelers who are behind, the ones coming back' (Hollow 1973b:194)
- c. *kixéektek, mí'ti kotkás qqwe'na pó xtes*  
 ki-xee=ktek wj'#ti ko-tka=s aqwe=rq po xtE=s  
 MID=be.slow=POT+DS stone#dwell REL-reside=DEF all=TOP fish be.big=DEF  
*wakirúutoomako'sh*  
 wa-k-ruut=oowak=o'sh  
 UNSP-INCH-eat=NARR=IND.M  
 'when he stopped, the big fish ate all the ones who lived in the village' (Hollow 1973b:201)
- d. *háp téehq nutéкто'sh, háki kopqto'na*  
 hap(E) teehq ru-te=kt=o'sh ha=ki ko-pat=o'=rq  
 day be.long.distance 1A.PL-stand=POT=IND.M PRO.V=COND REL-show.up=be=TOP  
*nuhékereki*  
 ru-hE=krE=ki  
 1A.PL-see=3PL=COND  
 'we will be there for a long time, so let the ones to come see us' (Hollow 1973b:206)
- e. *minúike, koxáwaawaheres, hirée kiri'sh*  
 wj-rjik=E, ko-xwaa#wahE=s hiree kri=o'sh  
 1POSS-son=SV REL-be.lost#1A-CAUS=DEF now arrive.back.here=IND.M  
 'my son, the one I lost, is now back' (Hollow 1973b:229)
- f. *karóotiki komáa'qktaa hqkeseena úke*  
 ka-ootiki ko-waq'ak=taa haqE=s=ee=rq uk=E  
 PROV=EVID=COND REL-earth=LOC be.lying.AUX=DEF=DEM.DIST=TOP hand=SV  
*irusheroomako'sh*  
 i-ru-shE=oowak=o'sh  
 PV.INS-INS.HAND-hold=NARR=IND.M  
 'and then he got hold of the one on the ground's hand' (Hollow 1973b:273)
- g. *kotámihs kíihkarahseena "hiré ptamíihe,*  
 ko-ta-wijh=s kV-i-k-krah=s=ee=rq hire pta-wijh=E  
 3POSS.PERS-AL-woman=DEF REL-PV.INS-MID-be.afraid=DEF=DEM.DIST=TOP now 1POSS.AL-woman=SV  
*wasú warého'xere're, káni téehqki*  
 wa-sii wa-reh=o'xre=o're ka=rj teehq=ki  
 UNSP-travel 1A-think=DUB=IND.F PROV=SS be.long.distance=COND  
*ówakiri'eshka're," éheka'ehe*  
 o-wa-kri-eshka=o're e-he=ka'ehe  
 PV.IRR-1A-arrive.back.here-SMLT=IND.F PV-say=QUOT  
 'He told the sister he was afraid of "now, my sister, I am thinking of traveling and I will come back after

a long time” (Hollow 1973b:281)

- h. *máa'qk íwaxarats*                      *ko'úyte*    *hík*                      *rokáqkaxihs*                      *máa'yst*  
*wáq'ák i-wa-xrat=s*                      **ko-úyte**    *hi=ak*                      *rokaqka#xih=s*                      *waa-yst*  
 land    PV.INS-UNSP-hold.up=DEF **REL-be.first** arrive.there=DS old.woman#old=DEF NOM-old  
*séharaani*                      *réehote,*                      *se'ésh*                      *náhka'eheroo*  
*se#hrE=rj*                      *rEEh=ootE*                      *se-esh*                      *raq=ka'ehe=oo*  
 be.red#CAUS=SS go.there=EVID be.red-APRX POS.SIT=QUOT=DEM.MID

‘The old lady, the one who got to the land that holds it up first, made it red and went now that she made it all red, it is said’ (Hollow 1973a:123)

There is an optional allophone /kV-/ before vowel-initial stems, as seen in (3.87g). However, the most common realization is as *ko-*, even before vowel-initial stems, which we see in (3.87h). The /kV-/ variant is more common in fast speech. The relativizer *ko-* is most commonly employed when referring to animate subjects, but inanimate subjects are also possible.

(3.88) Inanimate referents for *ko-*

- a. *ímashut*                      *ko'áaki*  
*i-waşhut*                      *ko-aaki*  
 PV.INS-clothe REL-be.above  
 ‘overcoat [lit. ‘clothings that is on top’]’
- b. *maná weréxe*    *ko'úst,*                      *kotké,*                      *kokámix,*                      *koxtés*                      *kixúyuh*  
*wrą wrex=E*    *ko-úst*                      *ko-tkE*                      *ko-kawix*                      *ko-xtE=s*                      *kixuyuh*  
 wood kettle=SV REL-be.old REL-be.heavy REL-be.round REL-be.big=DEF five  
 ‘five big, round, heavy, old drums’ (Mixco 1997a:21)

All of the verbs in (3.88) above are stative. The use of *ko-* in these instances is less frequent when used adjectivally in casual speech. However, the use of *ko-* in some cases can mark the difference between a lexicalized noun-verb combination and a noun and a stative verb used adjectivally.

(3.89) Adjectival use of stative verbs with and without *ko-*

- a. *máareksuk tóh*  
*wáareksuk#toh*  
 bird#be.blue/green  
 ‘bluejay’
- b. *máareksuk tóh*  
*wáareksuk toh*  
 bird                      be.blue/green  
 ‘blue bird’

- c. *máareksuk kotóh*  
 wáareksuk ko-toh  
 bird ko-be.blue/green  
 ‘blue bird, a bird that is blue’

Orthographically, there is no distinction between *máareksuk tóh* for ‘blue jay’ or ‘blue bird,’ but prosodically, ‘blue bird’ has a primary stress on both words, while there is a single primary stress in ‘blue jay,’ indicating that it is a single compound word rather than a DP with a stative verb adjunct. Either *máareksuk tóh* or *máareksuk kotóh* can be used to refer to a blue bird. Like Crow, the presence of the *ko-* differs from other relativized constructions in that it acts to accentuate the predicate being relativized: *máareksuk tóh* ‘blue bird’ versus *máareksuk kotóh* ‘a bird that is blue.’

One additional use of the relativizer is in constructions involving comparisons. The *ko-* can be found on both comparatives and superlatives.

(3.90) Examples of comparative and superlative *ko-*

- a. *Minís koshíkeres ó’haraani xkqherekereromako’sh*  
 wr̥s ko-shi=krE=s o’#hrE=r̥j xkq̥h#hrE=krE=owak=o’sh  
 horse REL-be.good=3PL=DEF be#CAUS=SS move#CAUS=3PL=NARR=IND.M  
 ‘they chased the better horses from there’ (Hollow 1973b:84)
- b. *taminís koshí térootiki, wapáweshini warúshaani*  
 ta-wr̥s ko-shi te=ooti=ki wa-pa-wesh=r̥j wa-ru-shE=r̥j  
 3POSS.AL=horse REL-be.good stand=EVID=COND 1A-INS.PUSH-cut=SS 1A-INS.HAND-hold=SS  
*wahúukto’sh*  
 wa-huu=kt=o’sh  
 1A-come.here=POT=IND.M  
 ‘when his best horse is there, I will cut it loose and come take it’ (Hollow 1973b:259)

Mixco (1997a:22) notes that comparatives can also be periphrastically constructed when two nominals are being compared, with the first clause states a quality and the second clause stating that this quality exceeds that of the second nominal.

(3.91) Periphrastic comparatives

- a. *q’tee imáare hq̥ska’sh; makáh̥h’ho’sh*  
 q̥t=ee iw̥q̥=E h̥ska=o’sh w̥-kah̥h’o’sh  
 DEM.DIST=DEM.DIST body=SV be.long=IND.M 1s-exceed=IND.M  
 ‘he is taller than me [lit. his body is long; he exceeds me]’ (Mixco 1997a:22)
- b. *q’tee imáare koh̥ska’sh*  
 q̥t=ee iw̥q̥=E ko-h̥ska=o’sh  
 DEM.DIST=DEM.DIST body=SV REL-be.long=IND.M

‘he is the tallest [lit. his body is the one that is long]’ (Mixco 1997a:22)

The use of the relativizer to form comparatives is more common than the periphrastic construction seen in (3.91a). No instances of this periphrastic construction appear in the corpus, and have only been documented in conversations with native speakers while eliciting comparatives.

### 3.2 Suffix field

Many Siouan grammars vacillate between describing post-verbal morphology as enclitics or suffixes, even when describing the same language. In Mandan, most post-verbal elements have traditionally been described as suffixes by Hollow (1970) and Mixco (1997a). In Lakota, by contrast, Ingham (2003) and Mirzayan (2010) describe most post-verbal elements as enclitics. Many of these morphological items are cognates between these two languages, so the question arises as to whether Mandan truly has a large suffix field, or if the suffix field is more limited and there exists an enclitic field as well.

I have glossed the data heretofore as if most post-verbal elements are enclitics. The determining factor in deciding if an item is a suffix or an enclitic seems to be whether hiatus between a verbal root and a post-verbal element is resolved with a glottal stop or a flap. We have previously seen the different behavior of word-internal hiatus resolution versus word-enclitic hiatus resolution in §2.5.1. A glottal stop occurs to prevent hiatus when prefixes or suffixes are added to a stem, as we saw in 2.5.1.1.

(3.92) Hiatus between roots and affixes

- a. *ki'úupa*  
ki-úupa  
SUUS-with  
‘[something of her own] with her’ (Hollow 1973a:219)
- b. *íki'aakit*  
i-ki-aaki=t  
PV.DIR-VERT-be.above=LOC  
‘back upward’ (Hollow 1973a:153)
- c. *ótu'eshkat*  
o-tu-eshka=t  
PV.IRR-be.some-SMLT=LOC  
‘where there would be some like that’ (Hollow 1973a:122)
- d. *róo'oshka*  
roo-oshka  
DEM.MID-EMPH

‘right here’ (Hollow 1973a:183)

In each of the examples above, a glottal stop appears at the juncture of a root and an affix. We can contrast this treatment of word-internal hiatus with hiatus found at the juncture of a word and an enclitic.

(3.93) Hiatus between a root and an enclitic

- a. *tíroote’sh*  
ti=ootE=o’sh  
arrive.here=EVID=IND.M  
‘she must have arrived here’ (Hollow 1973a:127)
- b. *nátka*                      *xikxtéroomako’sh*  
raṭ=ka                      xik-xtE=oowąk=o’sh  
be.in.middle=HAB be.bad-AUG=NARR=IND.M  
‘she felt really sorry for him’ (Hollow 1973a:129)
- c. *warápiniiira’t*  
wa-ra-prij=a’t  
UNSP-2A-wear.around.neck=DEM.DIST  
‘that necklace of yours’ (Hollow 1973a:58)

There are two different tactics for dealing with hiatus involving enclitics. If an enclitic beginning with a short vowel comes into contact with a stem ending in a short vowel, the enclitic elides that short vowel. However, if hiatus takes place and involves a long vowel, a [r] is inserted to break up the two vowels and nothing is elided. We see this pattern clearly in (3.93) above.

By looking at this criterion, we can rule out those post-verbal elements that are not true suffixes, but are phrasal morphology (i.e., enclitics). Mandan has the following suffixes.

(3.94) List of suffixes

- aaki    collective 1 (COLL)
- esh    similitive 1 (SMLT)
- eshka    similitive 2 (SMLT)
- sha    collective 2 (COLL)
- sɨh    intensifier (INTS)
- xte    augmentative (AUG)

This list of suffixes is massively reduced compared to the one given in Mixco (1997a:15). Mixco’s proposed suffix order appears below.

Table 3.5: Suffix field in Mandan

0	1	2	3	4	5	6	7	8	9	10	11	12
ROOT	SV	NEG	SMLT	ATT	EVID	ASP	PL.SUBJ	ASP	EMPH	ASP	ASP	CONJ
												FRCE
												MOD
												PST
												QUOT

The ordering in Figure 3.5 is proffered as a comprehensive ordering of suffixes in Mandan, but throughout Mixco's (1997a) grammar, these items do not always appear in their designated suffix slot. Furthermore, there is a large number of post-verbal elements not accounted for in Figure 3.5.

The number of true suffixes in Mandan is quite low, as seen in (3.94). All suffixes are derivational in nature. Examples of all five suffixes appear in the subsections below.

### 3.2.1 Augmentative suffix

The augmentative suffix *-xte* is descended from the Proto-Siouan augmentative *\*-xtE~\*-xti*, which has numerous cognates throughout the language family. This augmentative suffix has also become exists in Mandan as a stative verb *xté* 'be big.' It is not clear whether Proto-Siouan also had an independent verb that became grammaticalized as an augmentative suffix or if Mandan innovated a separate verb from the augmentative by analyzing instances of it as serial verb constructions. As such, we cannot concretely say if this dual purpose for /xtE/ in Mandan is an innovation or an archaism. However, one piece of evidence that Mandan did not innovate this dual usage can be seen in Missouri Valley Siouan.

The Hidatsa word for 'big' is *ihdía*. Phonetic analysis shows that the ⟨h⟩ is really a [x] due to the surrounding high vowels drawing the body of the tongue forward, making this word cognate with Mandan *xté*.<sup>3</sup> There is no record of this verb also being used as an augmentative in modern Hidatsa, but Crow does have an augmentative suffix *-shta* that is cognate with Mandan *-xte*. I have argued that Crow and Hidatsa are the closest relatives of Mandan, so it suggests that the dual use of PSi *\*-xtE* as an augmentative and a lexical verb stems from their common ancestor (Kasak 2015a). We can see the behavior of *-xte* in the data below.

(3.95) Examples of augmentative *-xte*

- a. *wáaxikxte*  
 waa-xik-xtE  
 NOM-be.bad-AUG

<sup>3</sup>We can make this judgment by observing that the formants having more energy in the higher bands rather than the diffused energy we see with [h] (Torres p.c.). This behavior means that the word is really [i.ɤti̯a].

‘something really bad’ (Hollow 1973a:46)

- b. *wóoruut shixt’é’sh, á’t, manápusheqá’t*  
 waa-o-ruut shi-xtE=o’sh á’t wra#pushek=á’t  
 NOM-PV.IRR-eat be.good-AUG=IND.M DEM.DIST tree#juneberry=DEM.DIST

‘Those are good eating, them, those juneberries’ (Hollow 1973a:53)

- c. *ishák kohúyxiho’na, ké’kani kikiirasxte’sh,*  
 ishák ko-hu#xih=o’=ra ke’#ka’=rj ki-kiiras-xtE=o’sh  
 3PRO 3POSS.AL.PERS-mother#be.old=be=TOP keep#have=SS MID-be.stingy.with-AUG=IND.M  
*Numá’kshikaraha*  
 ruwá’k#shi#krah=ha  
 man#be.good#be.afraid.of=SIM

‘Those grandmothers of his, they kept him and sure did love Afraid-to-be-Chief’ (Hollow 1973a:64)

- d. *níikasiiseena kóos iteexteka’eheero’sh*  
 rjika#sii=s=ee=ra koo=s i-tee-xtE=ka’ehee=o’sh  
 offspring#be.yellow=DEF=DEM.DIST=TOP squash=DEF PV.INS-like-AUG=QUOT=IND.M

‘that young calf there really liked the squash, it is said’ (Hollow 1973a:112)

- e. *“náxihe, nuwáruutextaani nuhúuro’sh,” éheroomako’sh*  
 ra#xih=E rj-waruutE-xtE=rj rj-huu=o’sh e-he=oowak=o’sh  
 mother.VOC#be.old=SV 1A.PL-be.hungry.1A.PL-AUG=SS 1A.PL-come.here=IND.M PV-say=NARR=IND.M

He said, “grandmother, we came really hungry” (Hollow 1973a:266)

As we can see in the data above, the underlying form of *-xte* is identical to the lexical verb ‘be big’ /xtE/, given the fact that enclitics that normally trigger ablaut do so. The augmentative is the only suffix that can be ablauted.

### 3.2.2 Collective suffixes

There are two competing collective suffixes in Mandan. Each of these suffixes is very restricted in where they can appear.

#### 3.2.2.1 Collective 1: *-aaki*

The first collective suffix *-aaki* is attested with a single stem: *numá’k* ‘person, man.’

(3.96) Collective 1 examples

- a. *numá’kaaki máamikoomako’sh*  
 ruwá’k-aaki waa-wj#k=oowak=o’sh  
 person-COLL some-be.none=NARR=IND.M  
 ‘there were no people’ (Hollow 1973a:178)

- b. *áakinuma'kaaki*  
 aaki#ruwá'k-aaki  
 be.above#person-COLL  
 'Native American(s)' (Trechter 2012b:220)<sup>4</sup>
- c. *ómahq numá'kaaki*  
 owáhq ruwá'k-aaki  
 Omaha person-COLL  
 'Omaha tribe' (Hollow 1970:431)

This suffix *-aaki* originates from the stative verb *áaki* 'be above.' This verb appears in compounds where it serves to intensify another stative verb, but this pattern does not seem to be productive in modern Mandan. Furthermore, *áaki* serves as the initial element in all such compounds.

(3.97) Compound with *áaki*

*áakana'ro'sh*  
 aaki#raq'=o'sh  
 be.above#ache=IND.M

'he is sick' (Hollow 1970:168)

It is possible that the collective *-aaki* could have been used metaphorically to describe a large number in the past. This suffix is not otherwise productive in modern Mandan.

### 3.2.2.2 Collective 2: *-sha*

This collective suffix comes from the Proto-Siouan collective *\*-sa*. This suffix is restricted to numerals.

(3.98) Examples of collective *-sha*

- a. *núupsha*  
 ruup-sha  
 two-COLL  
 'both of them, two of them, twins' (Hollow 1970:481)
- b. *kixúhsha*  
 kixuh-sha  
 five-COLL  
 'five of them' (Hollow 1970:481)

---

<sup>4</sup>This word for 'Native American' is a contraction of the term *máa'qk áaki numá'kaaki* 'people on the land.' This term is cognate with the Hidatsa term for Native American (*awa'*)*áagaaruxbaaga* 'people on the land,' and is similar to terms for indigenous peoples found in nearby languages: e.g., Lakota *ikčé wičáša* 'ordinary people.'

- c. *náaminisha*  
 raawri-sha  
 three-COLL  
 ‘three of them’ (Hollow 1970:481)
- d. *nunáaminisha shi’sh*  
 ru-raawri-sha shi=o’sh  
 1A.PL-three-COLL be.good=IND.M  
 ‘the three of us are good’ (Hollow 1970:481)

This collective suffix often co-occurs with the ordinal preverb *i-*.

(3.99) Collective suffix with ordinal preverb

- a. *ítoopsha ihaa’aakit keréhkereromako’sh*  
 i-toop-sha i-haa#aaki=t krEEh=krE=oowak=o’sh  
 PV.ORD-four-COLL PV.DIR-cloud#be.above=DIR go.back.there=3PL=NARR=IND.M  
 ‘all four of them returned to heaven’ (Hollow 1973a:175)
- b. *ínuupsha tasúke túkerek*  
 i-ruup-sha ta-suk=E tu=krE=ak  
 PV.ORD-two-COLL 3POSS.AL-child=SV be.some=3PL=DS  
 ‘both of them had children’ (Hollow 1973a:111)
- c. *ínuupsha ráse ísekwahere’sh*  
 i-ruup-sha ras=E i-sek#wahere=o’sh  
 PV.ORD-two-COLL name=SV PV.INS-make#1A-CAUS=IND.M  
 ‘I gave both of them their names’ (Hollow 1973a:64)

The collective *-sha* is sometimes accompanied by the suffix *-shka*. This suffix serves to emphasize the collective reading. This suffix comes from the Proto-Siouan suffix *\*-ska*, which historically a similitive marker. Traces of this *\*-ska* can be seen in other productive suffixes, like the emphatic *-oshka* or the similitive *-eshka*, or on the interrogative word *tashká* ‘how,’ where *tá* is ‘what.’ The collective suffix can appear with this emphatic *-shka*

(3.100) Examples of intensified collective suffixes

- a. *ínuupshashkana húpe ké’ka’rak kú’kerek*  
 i-ruup-sha-shka=ra húp=E ke’#ka’=ak ku’=krE=ak  
 PV.ORD-two-COLL-INTS.COLLECT=TOP shoe=SV keep#have=DS give=3PL=DS  
 ‘both of them kept shoes for him’ (Hollow 1973a:109)
- b. *ítoopshashka Máarepaaxu í’u’taa minípashu’ni*  
 i-toop-sha-shka waa=E#paaxu i-u’=taa wri#pa-shu’=ri  
 PV.ORD-four-COLL-INTS.COLLECT eagle=SV#nose PV.DIR-be.closer=LOC water#INS.PUSH-thresh.with.feet=ss  
*réhkereromako’sh*  
 rEEh=krE=oowak=o’sh  
 go.there=3PL=NARR=IND.M

‘the four of them were swimming toward Eagle Nose’ (Hollow 1973b:295)

- c. *óo*      *ó’haraani*    *numá’kaaki*    *húkeres*      *sheréekini*      *tóopshashka*  
 oo      o’#hrE=rj    ruwá’k-aaki    hɨ=krE=s      shreek=rj      toop-sha-shka  
 DEM.MID be#CAUS=SS person-COLL many=3PL=DEF war.whoop=SS four-COLL-INTS.COLL  
*kaháshkereromako’sh*  
 ka-hash=krE=oowák=o’sh  
 INS.FRCE-be.disintegrated=3PL=NARR=IND.M

‘from there, the whole lot of people war whooped and slaughtered all four of them’ (Hollow 1973b:255)

The intensified collective /-sha-shka/ can appear with or without the ordinal preverb *i-*. The presence of the preverb does not seem to alter the reading, though it seems to serve to intensify the collective meaning.

### 3.2.3 Intensifier suffix

The intensifier *-sĭh* can appear on either verbal or nominal elements. There is also a lexical verb *sĭh* ‘be strong,’ which takes active pronominals: e.g., *wasĭho’sh* ‘I am strong.’ There is also a clause-final enclitic =*sĭh* that can co-occur with the narrative evidential =*oomak*, which will be discussed further in . We can see instances of this suffix below.

(3.101) Examples of the intensifier suffix *-sĭh*

- a. *wáaka’sĭho’sh*  
 waa-ka’-sĭh=o’sh  
 something-have-INTS=IND.M  
 ‘he begs for something’ (Hollow 1970:210)
- b. *shehéksĭh*  
 shehek-sĭh  
 coyote-INTS  
 ‘a liar’ (Hollow 1970:210)
- c. *wáashereek xtena*      *áakit*      *esĭhoomako’sh*  
 waa-shreek xtE=rą      aaki=t      e-sĭh=oowák=o’sh  
 NOM-noise be.big=TOP be.above=LOC hear-INTS=NARR=IND.M  
 ‘he really heard a big noise above him’ (Hollow 1973b:281)
- d. *máana*      *ókų’hkerekteki,*      *warúkahsĭhxteka’eheero’sh*  
 waa=rą      o-k’-ųh=krE=ktiki      wa-rukah-sĭh-xtE=ka’ehEE=o’sh  
 someone=TOP PV.LOC-3POSS.PERS-wife=3PL=POT+COND UNSP-refuse-INTS-AUG=QUOT=IND.M  
 ‘whenever someone would try to marry her, she always strongly refused, it is said’ (Hollow 1973a:101)

The intensifier is able to co-occur with the augmentative for further emphasis. While the intensifier is much rarer in the corpus when compared to the augmentative, both are productive in modern Mandan. When both suffixes

do co-occur, the intensifier will always precede the augmentative. This suffix is homophonous with the intensive indicative complementizer =*sh*, which is discussed later on in §3.3.5.11.

### 3.2.4 Similitive suffixes

There are two similitive suffixes in Mandan: *-esh* and *-eshka*. Both appear to be related to the Proto-Siouan similitive *\*-ska*. Given the fact that there are two similitives in Mandan, it is possible that that the Proto-Siouan *\*-ska* is actually decomposable into *\*-s-ka*, where *\*-ka* is a determiner or a locative. The *\*-s* looks to be a determiner that is cognate with the indicative enclitic =*c* in Hidatsa, and the male addressee indicative enclitic =*o'sh* in Mandan.<sup>5</sup>

#### 3.2.4.1 Similitive 1: *-esh*

In order to grant a similitive reading to a word, the suffix *-esh* can be added to a root. The roots that take this suffix are mostly stative verbs or nouns being used as stative verbs.

(3.102) Examples of the similitive suffix *-esh*

- a. *íirapsi'esh*                      *máakeroomako'sh*  
 ii#ra-psi-esh                      wáákE=oowák=o'sh  
 blood#MUT-be.black-SMLT be.lying.AUX=NARR=IND.M  
 'black blood was there' (Hollow 1973a:132)
- b. *íku'eshaa*                      *ráahini*      *éeta!*  
 i-ku'-esh=E                      rEEh=rì      ee=ta  
 DIR-be.further.away-SMLT=SV go.there=ss defecate=IMP.M  
 'Go a little farther away and relieve yourself' (Hollow 1973b:11)

This particular realization of the similitive is very rare when compared to *-eshka*. The presence of the habitual =*ka* suggests that there may be a slight semantic difference between these two kinds of similitive suffixes, but that difference may have been historical, as *-eshka* is the predominant similitive marker.

#### 3.2.4.2 Similitive 2: *-eshka*

The overwhelming majority of cases where the similitive appears in Mandan involves the suffix *-eshka*. Words bearing this suffix can have a meaning of 'X-like,' where X is the stative verb or noun in question

---

<sup>5</sup>Both Mandan and Hidatsa appropriated the PSi *\*-s* determiner as a declarative marker, but Pre-Modern Mandan appears to have undergone a stage where non-imperative clauses required the copula *ó'* along with certain determiners, demonstratives, or locatives that became re-analyzed as ilocutionary and allocutive morphology. In modern Mandan, these historically distinct pieces of morphology are no longer individually discrete, but form whole morphological items: e.g., =*o'sh* marking male-addressee indicative utterances or *o're* marking female-addressee indicative utterances.

(3.103) Examples of the similitive suffix *-eshka*

- a. *ráahqmi*      *íku'eshka*      *réehak...*  
 rEEh=awj      i-ku'-eshka      rEEh=ak  
 go.there=CONT DIR-be.further.away=SMLT go.there=DS  
 'Going there, when he had gone a little ways...' (Hollow 1973b:68)
- b. *íhekeshkakerek*  
 i-hek-eshka=krE=ak  
 PV.INS-know-SMLT=DS  
 'they kind of knew it' (Hollow 1973a:152)
- c. *rúute náteshka*      *rusháani...*  
 ruut=E ɾat-eshka      ru-shE=rj  
 rib=sv be.in.middle-SMLT INS.HAND-grasp=ss  
 'he took her ribs on both sides...' (Hollow 1973a:176)

### 3.2.5 Summary of suffixes in Mandan

Contrary to what has been proposed in previous analyses in Mandan, very few of the post-verbal morphological material can actually be classified as a true suffix. Most of the formatives following a stem are really enclitics. In §?? in the previous chapter, I have argued that morpho-phonological processes like epenthesis are sensitive to whether there is a word-boundary or not at the locus of hiatus. Namely, [ʔ] is used to prevent hiatus at affix boundaries (i.e., word-internal boundaries caused by affixation), while [ɾ] resolves hiatus between a stem and a morphological item outside the scope of a word boundary (i.e., word-external boundaries caused by encliticization). Suffixes in Mandan will always incur [ʔ]-epenthesis to resolve hiatus. Any formative that does not trigger [ʔ]-epenthesis, therefore, must not be a suffix.

## 3.3 Phrasal morphology

In the section above, I outline the few instances of genuine suffixation that exist in Mandan. These suffixes appear frequently throughout the corpus, but are still relatively infrequent when compared to the other post-verbal material that has been surveyed. The question of what the difference is between these formatives and true suffixes revolves around that kinds of morpho-phonological behaviors we observe. It is robustly the case that Mandan prefers left-aligned weight-sensitive iambs for primary stress placement and likewise that Mandan does not permit two vowels in adjacent syllables to come into contact. A large number of words appear to flout these two major characteristics of Mandan morpho-phonology.

(3.104) Examples of unexpected non-iambic primary stress

- a. *múp*        ~ *múpe*        \**mupé*  
wúp            wúp=E  
corn.mush    corn.mush=sv  
'corn mush' (Hollow 1970:274)
- b. *ínaare*        \**ináare*  
i-raa=E  
PV.INS-rattle=sv  
'a rattle' (Hollow 1970:93)

My argument in §?? about why stress assignment in Mandan is not as irregular as it might seem at first glance stems from the fact that we can analyze cases like that as being composed of non-simplex words. That is to say, these words are composites per Anderson (1992:310), where a single morphological word contains internal word boundaries. Primary stress assignment is unable to cross a word boundary, which explains why neither of the words above demonstrate second-syllable stress, even though a language with left-aligned iambic footing should prefer as such. The words above really have the following underlying structures:

(3.105) Underlying structures for (3.104)

- a. [*múp*] ~ [*múp*]=e, but \*[*mup*]=é  
b. [*i[naa]*]=re, but \*[*i[náa]*]=re

The stress in (3.105a) cannot fall on the final syllable because that would cause footing across a right word boundary onto an enclitic. Similarly, the primary stress in (3.105b) is trapped on an ill-formed iamb because footing cannot cross a left word boundary. Thus, whether it is a word-internal word boundary due to a word being a composite or a word-external word boundary due to the presence of enclitic materials, a word boundary will always act as an impediment for foot formation.

The list of enclitics found here comes from those formatives in the corpus that do not meet the conditions for suffixhood. That is, these morphological items either resist primary stress assignment when in second-syllable positions or trigger [r]-epenthesis to repair hiatus (cf. §2.5.1). These enclitics fall into six different categories: aspectuals, evidentials, number markers, negation, modals, and complementizers.

### 3.3.1 Aspectual enclitics

Previous scholars have described Mandan as a language featuring tense morphology (Kennard 1936, Hollow 1970, Mixco 1997a). Three endings that are often described as marking tense are =s, which is generally called a preterite

or past tense marker; =*oomak*, which is traditionally referred to as a narrative past marker; and =*kt*, which previous works often describe as a future tense or potential marker. Hollow (1970:454) even notes that these three formatives are in complementary distribution. Hollow (1970) also describes the preverb *o-* as a future tense prefix.

(3.106) Tense marking per Hollow (1970)

a. Past tense

*rupsháshso'sh*  
 ru-pshash=s=o'sh  
 INS.HAND-be.hard=DEF=IND.M  
 'he made it hard' (Hollow 1970:479)

b. Narrative past tense

*rupsháshoomako'sh*  
 ru-pshash=oowaḱ=o'sh  
 INS.HAND-be.hard=NARR=IND.M  
 'he hardened it' (Hollow 1970:475)

c. Future tense 1

*ómanakikūte'sha?*  
 o-w-ṛa-kikūte=o'sha  
 PV.IRR-1S-2A-help=INT.M  
 'will you help me?' (Hollow 1970:456)

d. Future tense 2

*áawakerehskeekto'sh*  
 aa-wa-k-rEEh=skee=kt=o'sh  
 PV.TR-1A-VERT-go.there=ITR=POT=IND.M  
 'I might take it back again' (Hollow 1970:480)

Hollow (1970:455) remarks that *o-* is also a “true future” marker if the likelihood of an event happening is certain, though if the likelihood is less certain, *o-* may be used in tandem with the potential marker =*kt*. The *o-* may also be omitted altogether when =*kt* is present. We can see examples of this co-occurrence below.

(3.107) Multiple “future” marking

<i>óo</i>	<i>tí'xtiki</i>	<i>ókasaakto'sh</i>
oo	ta-í'-xtiki	o-ka-saa=kt=o'sh
DEM.MID	3POSS.AL-PV.RFLX-arrow.sack	O-INS.FRCE-hang.up=POT=IND.M

'he will hang his arrow sack there' (Hollow 1973a:116)

This seeming complementary distribution makes sense if the three endings mentioned above are true tense markers, but as the data below show, these morphological items are able to co-occur.

(3.108) Conflicting tense marking

- a. *óma'ke*                      *kotewét*                      *ó'ki,*      *kú'hq't*  
 o-wa'k=E                      ko-t-we=t                      o'=ki      k'-uh=a't  
 PV.IRR-POS.LIE=SV REL-WH-INDF=LOC be=HYP 3POS.PERS-wife=DEM.DIST  
*pkahústo'sh*  
 k-pa-hu=s=kt=o'sh  
 MID-INS.PUSH-be.near=DEF=POT=IND.M  
 'if it is somewhere by her bed, his wife will be by her' (Hollow 1973a:117)
- b. *íminikawoxshasto'sh*  
 i-w-rj-ka-woxsha=s=kt=o'sh  
 PV.INS-1A-2S-INS.FRCE-take.good.care.of=DEF=POT=IND.M  
 'I will take good care of you' (Trechter 2012b:14)

The marker =s is analyzed as a preterit marker by Hollow (1970:478). If this formative truly did mark tense and were in complementary distribution with =oomak and =kt, then these constructions would be ungrammatical. Their presence in the corpus raises the question of how well previous analyses of these markers fit the data. Contemporary discussion of grammatical categories in Siouan languages centers around a language family that robustly marks aspect on verbs and relegates tense marking to adverbial or deictic function words, or tense is simply inferred by context (Parks & Rankin 2001:105). While previous works on Mandan describe the languages as having tense marking, a survey of Siouan literature strongly suggests a uniform tendency towards overtly marking aspect rather than tense throughout the language family. Evidence for Parks & Rankin's (2001) claim can be found in Biloxi (Torres 2010:2), Catawba (Rudes 2007:2), Crow (Graczyk 2007:305), Kanza (Cumberland & Rankin 2012:vii), and Lakota (Ingham 2003:28).

Going off the data in the corpus, along with looking broadly at the Siouan language family in general, I argue that Mandan has no morphological manifestation of tense on its verbs. Rather, postverbal elements that have previously been assumed to relate to tense are actually evidential or mood markers that contextualize a speaker's knowledge of the events being described or attitude towards the likelihood of an event. Below in (3.109) is a list of all enclitics that mark aspect in Mandan that appear in the corpus.

(3.109) List of aspectual enclitics

/=aahka/	retrospective (RTRO)
/=awi/	continuative 1 (CONT)
/=haa/	simultaneous (SIM)
/=ka/	habitual (HAB)
/=raqatE/	prospective (PRSP)
/=rijitE/	celerative (CEL)
/=skee/	iterative (ITR)
/=Ø/	continuative 2 (CONT)

The information that follows highlights the uses of these aspectual enclitics in the corpus, as well as points to cognates in other Siouan languages where establishing cognacy is possible. Relevant morphology appears with an underline in the data below.

3.3.1.1 Retrospective aspectual enclitic: =aahka

Kennard (1936:23) first describes the element =aahka as having multiple uses in Mandan. It may express ability to do an action or it can convey that an action has happened at a specific point, often translated as ‘just then’ or ‘at that moment.’ Hollow (1970) does not describe it, but =aahka does appear in his transcribed texts. Mixco (1997a:54) likewise notes that this formative is polysemous. This enclitic seems to be either a borrowing or a cognate with Hidatsa *áagaal/áahgaa* ‘be on top of.’ It is rare for Mandan to have a simplex formative with a /hC/ cluster, whereas Hidatsa and Crow are rich with words with /hC/ clusters suggests that =aahka is a borrowing. Another possible scenario is that this enclitic comes from a combination of *áaki* ‘be on top’ and the habitual =ka. The loss of the /i/ in *áaki* would create an underlying /kk/ cluster, which would become [hk] on the surface.

This enclitic is very rare in the corpus when used to denote a retrospective aspect: i.e., when describing an action that has just happened. We can see the behavior of this enclitic in the data below.

(3.110) Examples of the retrospective aspectual enclitic =aahka

- a. *róotkiki érehaahka, í'aakit réehtiki órootki xíkqmi,*  
 rootki=ki e-reh=aahka i-aaki=t rEEh=kt(i)=ki o-rootki xik=awi  
 hit=COND PV-want=RTRO PV.DIR-be.above=LOC go.there=POT=COND PV.LOC-hit be.bad=CONT  
*áakitaa kani', ráate...*  
 aaki=taa ka-rj' raat=E  
 be.above=LOC INS.FRCE-climb be.high.up=SV  
 ‘just when she wanted to hit him, he went upward where she could not hit him, she climbed up, way up...’  
 (Hollow 1973a:99)

- b. *mí'maa ó'raahka'sh, inák*  
 w'-iwąą o'=aahka=o'sh irąk  
 1POSS-body be=RTRO=IND.M again  
 'he is about my size, too' (Hollow 1973a:142)
- c. *éheeraahka*  
 e-hee=aahka  
 PV-speak=RTRO  
 'just as he said it' (Kennard 1936:23)
- d. *kirúsheraahka*  
 ki-ru-shE=aahka  
 VERT-INS.HAND-hold=RTRO  
 'just as he took it back' (Kennard 1936:23)
- e. *óo tísaahkak*  
 oo ti=s=aahka=ak  
 DEM.MID arrive.there=DEF=RTRO=DS  
 'having just arrived there' (Kennard 1936:23)
- f. *áahka mí'ti xténa héroomako'sh*  
 aahka wí'#ti xtE=rą he=oowąk=o'sh  
 RTRO stone#reside be.big=TOP see=NARR=IND.M  
 'he just saw a big village' (Hollow 1973b:105)
- g. *réehkere áahka, húpe pí'hąmi, húurak, húpe wará' kapiríhe shúupa*  
 rEEh=krE aahka hup(e) pí'h=awį huu=ak hup(e) wra' ka-prih=E shuupa  
 go.there=3PL RTRO shoe smoke=CONT come.here=DS shoe fire INS.FRCE-spread.flat=SV shin.bone  
*į'sąapek, Shíwará're ée'o'ka'eheeroo*  
 į'sąapE=ak shi#wra'=E ee-o'=ka'ehee=oo  
 PV.RFLX-around=DS foot#fire=SV DEM.DIST-be=QUOT=DEM.MID  
 'they just went, his shoes kept on smoking, he came and his shoes were flaming around his ankles, and  
 it was Fire Shoe, it is said' (Hollow 1973a:146)

In the data in (3.110) above, we see two different manifestations of the retrospective aspectual: one as an enclitic and another as a free adverbial. In (3.110a) through (3.110e), we see =aahka behave like a typical enclitic in that it triggers [r]-epenthesis to prevent hiatus. In (3.110f), we see a full prosodic word appearing at the left edge of the clause, which is where we would expect an adverbial to appear that has scope over the whole proposition.

(3.111) Structure of (3.110f)

[ [ áahka ]<sub>AdvP</sub> [ [ [ Ø ]<sub>DP</sub> [ mí'ti xténa ]<sub>DP</sub> ]<sub>VP</sub> héroomak ]<sub>TP</sub> =o'sh ]<sub>CP</sub>  
 RTRO 3PRO village big saw

'he just saw a big village'

Given that Mandan is such an SOV language, the verb is typically the last thing to appear in a clause. This is not the case in (3.110g), where the free adverbial *áhka* follows the verb it is modifying. We see a similar behavior in the iterative adverbial *inák* ‘again, also’ in (3.110b). In both cases, the adverbial appears dislocated to the right, since it is parenthetical information. When *áhka* appears as a free adverbial in the corpus, it is mostly commonly found in a right dislocated position similar to (3.110g). The fact that this element exists with both a bound and unbound forms suggests that Mandan has been undergoing a morphological reanalysis where the unbound item has become most commonly associated with the verb it modifies and become subsumed in the enclitic field due to the frequency with which it appears postposed after the verb. It is likely that this same process is what has led to the large amount of enclitics in Mandan and other Siouan languages.

### 3.3.1.2 Continuative aspectual enclitics

There are two different manifestations of the continuative aspect. One is an overt enclitic, *=qmi*, whereas the other involves ablauting the final stem vowel in a complementizer phrase. A description of each of these aspectual enclitics appears below.

#### 3.3.1.2.1 Continuative 1: *=qmi*

The continuative enclitic *=qmi* has cognates across the Siouan language family. In Missouri Valley Siouan, Hidatsa has the future enclitic *=wi* and Crow as the enclitic *=wis*, which is typically glossed as ‘probably’ and the desiderative *bia*. Crow likewise has a continuative *=dawi*. In Ohio Valley Siouan, Ofo has *-(a)bĩ* to mark future events, and Tutelo has *-(a)pi* as a desiderative marker. In Catawba, Rudes (2007:54) glosses *-wee* as a potential marker, but it is often glossed as ‘probably’ by L1 consultants in the Catawba source texts.

There is no reconstructed form in Proto-Siouan in Rankin et al. (2015). Missouri Valley Siouan lost nasalization, but the presence of nasality in Mandan but no nasality in Ohio Valley Siouan suggests that there may have been competing forms *\*awi* and *\*awĩ* in the proto-language. All other Siouan languages use this formative to mark some kind of future or possible event, though Crow has *=dawi* as a true continuative and clear cognate with Mandan */=awĩ/*, though this formative in Crow can also have inchoative or inceptive semantics (Graczyk 2007:307). Mandan has undergone a semantic change and no longer has a future or potential reading on this formative. Verbs bearing the continuative aspectual enclitic show that some action keeps happening or happens over and over, typically before the following action cuts off the continuative action. This behavior is shown in the examples below.

(3.112) Examples of the continuative enclitic *=qmi*

- a. *húurq̄mi*,            *súkseet*                    *híroomako'sh*  
 huu=aw̄i            suk=s=ee=t                    hi=oow̄ak=o'sh  
 come.here=CONT child=DEF=DET.DIST=LOC arrive.there=NARR=IND.M  
 'He kept coming, and then he got to the child' (Hollow 1973a:18)
- b. *ráahq̄mi*,            *tís*                    *híreehoomako'sh*  
 rEEh=aw̄i            ti=s                    hi#rEEh=oow̄ak=o'sh  
 go.there=CONT house=DEF arrive.there#go.there=NARR=IND.M  
 'He was going along, and he approached the house' (Hollow 1973b:46)
- c. *ú'shkami*,            *róoktikereromako'sh*  
 ú'sh=ka=aw̄i            rookt=krE=oow̄ak=o'sh  
 be.thus=HAB=CONT strike=3PL=NARR=IND.M  
 'Continuing that way, they made camp' (Hollow 1973b:49)
- d. "míkó'sh,            nukaráho'sh,"            *éheerq̄mi*  
 w̄jk=o'sh            ru-krah=o'sh            e-hee=aw̄i  
 be.none=IND.M 1A-be.afraid.of=IND.M PV-say=CONT  
 ' "no, we are afraid," they kept saying' (Hollow 1973a:22)
- e. *ká'haraamikereka'ehe*  
 ka'#hrE=aw̄i=krE=ka'ehe  
 possess#CAUS=CONT=3PL=QUOT  
 'they kept giving it to them, it is said' (Kennard 1936:30)
- f. *ptáahq̄mi*  
 ptEh=aw̄i  
 run=CONT  
 'continuing to run along' (Kennard 1936:30)

Kennard (1936:30) lists this enclitic as only =*mi* in his grammar. However, when a stem ends in a consonant, he posits that there is a simultaneous =*haa* enclitic between the stem and the continuative aspectual. This analysis does not hold, as all of the verb roots where he places a simultaneous marker end in /h/, as we see in (3.112f), where the stem is /ptEh/ 'run.' Kennard often does not transcribe nasal vowels in the environment of a surface nasal stop, so it is unclear whether he perceives the overt [ã] in the enclitic. Furthermore, as discussed in §2.4.3, the continuative enclitic triggers ablaut on any preceding formative containing an ablaut vowel: i.e., /E/ like in /ptEh/ 'run' or /EE/ like in /rEEh/ 'go there' due to the underlying nasality in this formative.

Mixco (1997a:51) likewise combines this marker with the simultaneous marker in his morphological analyses of Mandan narratives, stating that the /h/ in the simultaneous /=*haa*/ is deleted with consonant-final stems. However, this analysis likewise does not hold, as the concatenation of a stem ending with a long vowel with an enclitic beginning with a short vowel would trigger the insertion of an epenthetic [r] between the long vowel and the short vowel like all enclitics described in §2.5.1 do: i.e., /V:₁=V₂/ are realized as [V:₁rV₂]. The lack of epenthetic [r] in these situ-

ations indicates that there cannot be an underlying long vowel as there is in /=haa/ present before the continuative aspectual enclitic, so what both Kennard and Mixco are both perceiving is simply the /a/ in /=awĩ/.

We can see from the data above that /=awĩ/ experiences typical behavior for vowel-initial enclitics in that the initial vowel of the enclitic deletes before a stem that ends in an underlying short vowel as shown in (3.112c) and (3.112e). What is noteworthy in (3.112e) is that the surface long vowel due to ablaut does not trigger an epenthetic [r], showing that Mandan only resorts to epenthesis when in the presence of underlying long vowels, not necessarily surface long vowels that are present due to ablaut. The /a/ in /=awĩ/ is still deleted after the causitive /hrE/, which ends in an underlying short vowel. Similarly, we notice that regressive nasal harmony does not pass an enclitic boundary in (3.112a) and (3.112d). We can thus conjecture that nasal harmony must take place at an earlier cycle than [r]-epenthesis, else we would have *húunami* and *éheenami* in the previously mentioned examples, but that [r]-epenthesis happens before ablaut, else we would have *ká'haraarqmikereka'ehe* or *ká'haraabamikereka'ehe* in (3.112e).

### 3.3.1.2.2 Continuative 2: =Ø

One reason why Mixco (1997a,b) glosses so many examples with the simultaneous aspectual /=haa/ can be attributed to the fact that the stem vowel /=E/ will ablaut to [a:] when the clause is given a continuative reading. Any stem ending in an ablaut vowel will likewise become [a:] when given a continuative reading.

(3.113) Examples of continuative ablaut in Mandan

- a. *ó'haraani wáarataxaa héroomako'sh*  
 o'#hrE=rj waa-ra-tax=E=Ø hE=oowak=o'sh  
 be#CAUS=SS UNSP-INS.MTH-make.loud.noise=SV =CONT  
 'from there, he saw him crying a lot' (Hollow 1973b:14)
- b. *máa'qk úypat íxatanashini sí hq'kaa inák*  
 waq'qk upat i-xat=rash=rj si ha'kE=Ø irak  
 land be.different PV.INS-look.at=ATT=SS travel stand.POS.AUX=CONT again  
*kúhoomaksjh*  
 kuh=ooak=sjh  
 come.back.here=NARR=INTS  
 'he was looking over different lands and, traveling around, he came back again' (Hollow 1973a:8)
- c. *"q'skak mi'ó'ro'sh, korátoore, épes" éheni waráte rá'xi'kaa*  
 q'ska=ak wj-o'=o'sh ko-ratoo=E e-w-he=s e-he=rj wrat=E ra'-xi'k=E=Ø  
 be.like.this=DS 1S-be=IND.M REL-be.old=SV PV-1A-say=DEF PV-say=SS dust=SV INS.HEAT-storm=SV=CONT  
*kjñáateroomaks*  
 ki-raqtE=oowak=s  
 ITR-get.up=NARR=DEF  
 'I am so, older, I said,' he said and, there being a cloud of dust, he got back up' (Hollow 1973a:9)

- d. *manáataa*      *waté'sh*  
wa-raąte=∅      wa-te=o'sh  
1A-get.up=CONT 1A-stand=IND.M  
'I am standing up' (Hollow 1970:173)
- e. *skáa*      *réeho'sh*  
skE=∅      rEEh=o'sh  
jump=CONT go.there=IND.M  
'he dashes off [lit. he goes there jumping]' (Hollow 1970:211)
- f. *suk rírushaa*      *nuháaro'xere'sha?*  
suk rV-i-ru-shE=∅      rų-haa=o'xrE=o'sha  
child 1A.PL-PV.INS-INS.HAND-hold=CONT 1A.PL-separate=DUB=INT.M  
'we shouldn't be holding onto this child, should we?' (Hollow 1973a:160)
- g. *shé'xtaa*      *mí'ksuke*      *áareehhereromako'sh*  
she'-xtE=∅      wí'#ksuk=E      aa-rEEh#hrE=oowąk=o'sh  
wind-AUG=CONT stone#be.narrow=SV PV.TR-go.there#CAUS=NARR=IND.M  
'being so windy, [the wind] picked up flint rocks' (Hollow 1973a:49)
- h. *nuharáa*      *íxike*      *máanuruhaani*      *nukiri'sh*  
rų-hrE=∅      i-xik=E      waa-rų-ru-haa=rı      rų-kri=o'sh  
1A.PL-CAUS=CONT PV.INS-be.bad=SV PART-1A.PL-INS.HAND-separate=SS 1A.PL-arrive.back.here=IND.M  
'doing it, we barely picked any [berries] and we came back' (Hollow 1973a:52)
- i. *súhkereseena*      *rá'taxak,*      *Kįnúma'kshi*      *kasí,*  
suk=krE=s=ee=ra      ra'-tax=ak      ki-ruwą'k#shi      ka-si=∅  
child=3PL=DEF=DEM.DIST=TOP INS.HEAT-make.loud.noise MID-man#be.good INS.FRCE-travel=CONT  
*máatah íwokahq*      *kasímiroomak'osh*  
waątah i-woka=hą      ka-si=awı=oowąk=o'sh  
river PV.DIR-edge=LOC INS.FRCE-travel=CONT=NARR=IND.M  
'the children cried and, with Old Man Coyote traveling, he was traveling along the river edge' (Hollow 1973a:31)

Clauses bearing this kind of continuative marking are never matrix clauses. That is, this marker only appears on parenthetical clauses that serve as adjuncts that describe some kind of action or state that is continuing to take place what the matrix clause does. We can see this difference between the ablaut continuative and the overt =*qmi* continuative in (3.113i), where both continuatives are present. Normally, we would expect to see a vowel change with an ablauted continuative, yet we see *kasí* remain unchanged. In the corpus, Mrs. Otter Sage translates this word as 'went traveling,' which shows that *kasí* has a continuative reading. Since /i/ cannot ablaut, the phonological shape of the word does not change, though its meaning does. Only /E/ and /EE/ can ablaut in Mandan, so this morphological distinction is only phonetically perceived when a formative with an ablaut vowel is followed by this /=∅/ continuative marking. It is possible that these constructions may also have an added stem vowel /=E/, but

any phonological realization of the stem vowel following a stem ending with a short vowel would result in the deletion of the stem vowel for the reasons described previously in §2.5.1: i.e., /ka-si=E/ → [ka.'si]. The matrix verb *kasimiroomako'sh* ‘he was traveling’ is marked with the overt continuative aspectual enclitic =*qmi*, reinforcing the fact that

Mandan shares this continuative ablaut with Hidatsa, where any stem-final vowel can undergo apophony. We can see examples of this process below.<sup>6</sup>

(3.114) Examples of continuative ablaut in Hidatsa

- a. *garía*            *háhguc*,    *adáashigua*  
 garee=∅    hahgu=c    adaashi=gua  
 vomit=CONT be.at=DECL outside=LOC  
 ‘he is vomiting outside’ (Park 2012:53)
- b. *mirée rushgá*                    *náagihgeeta!*  
 wiree ru-shgi=∅                    raagi#hgee=taa=∅  
 door INS.HAND-twist=∅ sit.SG#3CAUS.INDR=NEG=IMP.PL  
 ‘don’t leave the door open!’ (Park 2012:215)
- c. *awáhsia*                    *naharéec*  
 awa#hsii=∅                    raharee=c  
 land#be.hazy=CONT stand=DECL  
 ‘the haze is continuing’ (Park 2012:269)
- d. *aracóocq*                    *níirag*    *néec*  
 aracooci=∅                    riiri=g    ree=c  
 shuffle.feet=CONT walk=ss go=DECL  
 ‘he went shuffling his feet’ (Park 2012:539)
- e. *cawáa’ii*                    *aruwáriahi*    *ishíac*  
 cawee=∅=ii                    aru-wa-iriahi    ishia=c  
 be.hot=CONT=INTS IRR=1A-breathe be.bad=DECL  
 ‘it is so hot that it is hard for me to breathe’ (Park 2012:230)

In the examples above, Hidatsa demonstrates that it shares a similar process whereby the continuative is marked through ablaut of the final vowel of a verbal stem. Unlike Mandan, Hidatsa is able to ablaut a non-final element within the verbal complex, as we see in (3.114e), where the underlying /ee/ in *cawée* ‘be hot’ ablauts to /aa/ in *cawáa’ii* ‘it keeps being really hot’ and is still followed by the intensifier =*ii*. In all the Mandan data in (3.113), ablaut is restricted to elements in a clause-final position. We can see this behavior below, where (3.113e) is repeated an its internal syntactic structure is shown.

---

<sup>6</sup>The examples from Park (2012) have been slightly modified to conform to the orthography currently being used in the Hidatsa classes at Mandaree High School in Mandaree, ND.

(3.115) Structure of continuative ablaut clauses

- a. *skáa*            *réeho'sh*  
skE=∅            rEEh=o'sh  
jump=CONT go.there=IND.M  
'he dashes off [lit. he goes there jumping]' (Hollow 1970:211)
- b. [ [ *skáa* ]<sub>CP</sub> *réeho'sh* ]<sub>CP</sub>

3.3.1.2.3 Summary of continuatives

Both continuatives can be found in adjunct clauses, typically with minimal additional morphology, but only =*qmi* is able to concatenate with additional formatives. The ablaut continuative is found only at the right edge of a clause, and ablaut only occurs on stems ending with /E/ or /EE/. A continuative reading can be present on stems that have no actual ablauted vowels provided that those stems end in a short vowel.

3.3.1.3 Habitual aspectual enclitic: =*ka*

Many Proto-Siouan roots are reconstructed containing \**-ka* (Rankin et al. 2015). This element in Proto-Siouan is a derivational suffix that provides an attributive meaning: e.g., Proto-Siouan \**wi-roo-ka* ANIM.CL-male-ATT → Mandan *weróok* 'buffalo bull.' In Mandan, an identical reflex of this attributive derivational suffix can still be seen in nominal morphology, where novel nouns can be created with the attributive suffix *-ka*, but when used with verbs, a phonetically identical enclitic =*ka* marks habitual actions or states.

(3.116) Examples of the habitual aspectual enclitic =*ka*

- a. *wasí*            *wáawahq'kexika'sh*  
wa-si            waa-wa-hq'kE=xi=ka=o'sh  
UNS-travel NEG-1A-stand.AUX=NEG=HAB=IND.M  
'I never go around traveling' (Hollow 1973a:54)
- b. *máanikshqtinixka'sh*  
waa-rj-kshqt=rjx=ka=o'sh  
NEG-2s-be.wise=NEG=HAB=IND.M  
'you are not usually careful' (Hollow 1970:444)
- c. *wáa'onatka*            *óxik*            *hq'k*            *waká'ni*            *wahq'keka'sh*  
waa-o-raṭka            o-xik            hq'k            wa-ka'=rj            wa-hq'kE=ka=o'sh  
NOM-PV.IRR-heart PV.IRR-be.bad POS.STND 1A-possess=SS 1A-stand.AUX=HAB=IND.M  
'I always have this bad feeling [for them]' (Hollow 1973a:56)
- d. *íwapashirikaso'sh*  
i-wa-pa-shrih=ka=s=o'sh  
PV.INS-1A-INS.PRCE-think=HAB=IND.M

'I used to think about it' (Hollow 1970:444)

- e. *xamáhe*      *nurúshektiki*                      *ihehka'sh*  
 xwàh=E      ru-ru-shE=kt(i)=ki                      i-hek=ka=o'sh  
 be.small=SV 1A.PL-INS.HAND-hold=POT=COND PV.INS-know=HAB=IND.M  
 'whenever we take a little bit, he always knows' (Hollow 1973b:116)

This enclitic always marks habitual actions, whether this action is something that always happens or never happens. It is also used when describing habitual actions in the past that no longer take place. Kennard (1936:19) does not analyze =ka as a single element; he calls the customary marker, but analyzed the sequence of the habitual and the gender-oriented indicative markers as being a single unit: i.e., /=ka=o'sh/ is /=ka'sh/ per Kennard. When the definite marker /=s/ is present, Kennard likewise analyzes /=ka=s/ as a single element that he calls the usitative. There does not seem to be a clear difference between these two constructions in Kennard's (1936) grammar.

Hollow (1970:444) argues that this enclitic is a single discrete element, but calls it an imperfective aspectual. This analysis does not entirely fit the actual distribution and function of this enclitic, especially when Hollow states that an imperfective action can take preterite marking, where he analyzes the definite marker /=s/ as preterite. As discussed at the beginning of this subsection in example (3.106), it is not the case that Mandan morphologically marks tense, so /=s/ cannot be a true preterite marker. Furthermore, preterite marking is inherently a combination of the perfective aspect and past tense, so it would be contradictory for a true imperfective to take preterite marking.

For the sake of eliminating any confusion over the primary role this enclitic plays in expressing habitual or repeated actions, which lines up with the description of =ka in Mixco (1997a:27). It is likewise not accurate to simply call this enclitic a true imperfective, as it cannot be used to describe actions that are continuous until cut off by an intervening action. We can observe this lack of =ka-marking below, where one imperfective action is taking place (i.e., facing the basket towards the old woman) and is then interrupted by a perfective action (i.e., the spirit of the old woman shooting into the basket).

(3.117) Lack of imperfective marking on an imperfective action

- |                                   |  |            |
|-----------------------------------|--|------------|
| <i>rokáqkaxihseet</i>             | <i>ókitataaherek,</i>                    | <i>shé</i> |
| rokaqa#xih=s=ee=t                 | o-ki-ta~taa#hrE=ak                       | she        |
| old.woman#be.old=DEF=DEM.DIST=LOC | PV.LOC-MID-CONT~be.facing#CAUS=DS        | wind       |
| <i>karóopxeka'eheero'sh,</i>      | <i>taxé'hq'kseet</i>                     |            |
| ka-roopxE=ka'ehe=o'sh             | ta-xe'#ha'k=s=ee=t                       |            |
| INS.FRCE-enter=QUOT=IND.M         | 3POSS.AL-hang#stand.POS=DEF=DEM.DIST=LOC |            |

'he was making it face the old woman, and her spirit went in, it is said, into his basket' (Hollow 1973a:148)

The lack of any overt marking of imperfective aspect on the first action (i.e., making the basket face the old

woman) highlights the fact that the semantics of =ka are narrower than than of a true imperfective. As such, treating this enclitic as marking habitual actions or states more accurately encapsulates the observed usage in the corpus.

### 3.3.1.4 Prospective aspectual enclitic: =naate

The prospective aspectual enclitic =naate has cognates across the Siouan language family. In Hidatsa, Boyle (2007:165) describes the approximative =raa as conveying the sense of ‘almost.’ Crow has a cognate =laa (Graczyk 2007:164). There are two elements in Biloxi that have a match with the meaning of this formative in Mandan and Missouri Valley: the enclitic =nqateke ‘nearly’ and the adverb yqaxa ‘almost’ (Kaufman 2011). Both Mandan and Missouri Valley merge Proto-Siouan \*r and \*y with /r/, while Biloxi maintains a distinction between \*r and \*y, where \*r becomes /d/ before oral vowels and /n/ before nasal vowels, while \*y remains /y/.

The presence of a doublet in Biloxi with two different reflexes complicates a possible Proto-Siouan reconstruction. The varied material present in the Biloxi forms and the shorter forms in Crow and Hidatsa suggest that this was a complex construction in Proto-Siouan, \*raq-tE, where the initial element looks to be related to \*raq- ‘by foot’ plus a \*-tE stem augment. Mandan uses this enclitic to mark a situation that almost came to pass, and is nearly always translated with the English word ‘almost.’ We can see the behavior of this enclitic below.

(3.118) Examples of the prospective aspectual enclitic =naate

- a. *ú'sh, áakeenaataani*                      *róo*                      *áakeeroomaksih*  
 ú'sh    aa-kee=raqtE=rj                      roo                      aa-kee=oowak=sjh  
 be.thus PV.TR-move.away=PRSP=SS DEM.MID PV.TR-move.away=NARR=INTS  
 ‘So, I almost stepped on her and stepped on her here’ (Hollow 1973a:71)
- b. *súxikanashna'k*                      *pá*                      *warú'uxanaate'sh*  
 suk#xik=raqh#raq'k                      pa                      wa-ru-ux=raqtE=o'sh  
 child#be.bad=ATT#POS.SIT head 1A-INS.HAND-be.broken=PRSP=IND.M  
 ‘I almost broke this no-good child’s head’ (Hollow 1973b:158)
- c. *miní wáaxtaani*                      *watúshak*                      *óruxkenaateroomako'sh*  
 wrj    waa-xtE=rj                      wa-tush=ak                      o-ru-xke=raqtE=oowak=o'sh  
 water NOM-be.big=SS UNSP-be.fast=DS PV.LOC-INS.HAND-sink=PRSP=NARR=IND.M  
 ‘the water was really fast and he almost sank’ (Hollow 1973b:296)
- d. *wáato'he*                      *mikanaate'sh*  
 waa-to'h=E                      wjk=raqtE=o'sh  
 NOM-be.blue/green=SV be.none=PRSP=IND.M  
 ‘there is almost no blue’ (Hollow 1970:468)
- e. *mú'pka*                      *ótaa*                      *wahérénaate'sh*  
 w'-uk#pa                      o-taa                      wa-hrE=raqtE=o'sh  
 1POSS-hand#head PV.LOC-be.facing 1A-CAUS=PRSP=IND.M

‘I almost pointed my thumb at him’ (Hollow 1973b:133)

The enclitic preserves the formative-final ablaut vowel from Proto-Siouan, as we see in (3.118a), where the same-subject switch-reference marker =*ni* triggers /E/ to become [aa]. However, unlike most other enclitics that contain nasal elements, =*naate* itself does not trigger ablaut in a preceding stem, as we see in (3.118e), where the underlying ablaut vowel in the causative /hrE/ does not become [aa]. The ability to be ablauted by not cause ablaut is consistent across the corpus for all speakers.

### 3.3.1.5 Celerative aspectual enclitic: =*niite*

The celerative aspectual enclitic =*niite* is first identified in Hollow (1973a:30), which he describes as marking actions that happen quickly or states that arise suddenly. This description matches the usage of this enclitic throughout the corpus. This enclitic seems to be derived from Proto-Siouan \**rii-* ‘walk.’ Other Siouan languages use particular motion verbs to mark aspect periphrastically, such as Lakota, as seen in the data below.

(3.119) Aspectual auxiliaries in Lakota

- a. *kaksá*      *iyéwaye*  
ka-ksA      i-yA#wá-yA  
INS.FRCE-cut PV.DIR-speak#1A-go  
‘I suddenly cut it off’ [lit. ‘I sent it away cutting’] (Ingham 2003:38)
- b. *kaksá*      *iyáye*  
ka-ksA      i-yA~yA  
INS.FRCE-cut PV.DIR-R~go  
‘[the clouds] cleared away’ [lit. [the clouds] went away cutting’] (Ingham 2003:38)

Both of the examples above show a motion verb combining with an action to convey the sense that the action has happened suddenly as in (3.119a), or that the action happened quickly as in (3.119b). Both of these uses of motion verbs in Lakota could parallel the use of *nii* ‘walk’ in Pre-Mandan, where an auxiliary could have become reanalyzed as an enclitic. The presence of the final syllable on =*niite* suggests that there was a \*-tE stem augment on the auxiliary verb at some point. The motivation for how certain stem augments in Proto-Siouan become part of certain stems is not known. Jones (1991:512) proposes that Proto-Siouan roots have a basic shape of CV(V), and that any consonant clusters or root extensions are due remnants of ancient morphology. Certain root extensions are common throughout Siouan and seem obvious, as in the case of stems ending in /k/ or /ka/, which derive from the same source as the habitual enclitic in Mandan that was discussed previously in §3.116. The \*-te stem augment appears in several Mandan enclitics, but its origin is not understood.

While the entirety of the Proto-Siouan origin of *=niite* is opaque, its usage is not. Any action that happens quickly or state that arises suddenly will take the celerative aspectual enclitic. We can see examples of its use in the data below.

(3.120) Examples of the celerative aspectual enclitic *=niite*

- a. *wáaxna'ke*                      *ímisqapaa*                      *wa'aaahiniitekto'sh*  
 waax#ra'k=E                      i-wi-saapE=∅                      wa-rEEh=rjítE=kt=o'sh  
 cottonwood#POS.SIT=SV PV.DIR-1S-around=CONT 1A-go.there=CEL=POT=IND.M  
 'I want to go quickly around that cottonwood tree' (Hollow 1973a:147)
- b. *kotewé*              *kí'kiniiteki,*              *íshqhe*              *kaxípaá*                      *kí'kiniiteki,*              *ée*  
 ko-t-we              kí'k=rjítE=ki              i-shah=e              ka-xip=E=∅                      kí'k=rjítE=ki              ee  
 REL-WH-INDF finish=CEL=COND 3POSS-side=SV INS.FRCE-skin=SV=CONT finish=CEL=COND DEM.DIST  
*wáaka'ro'sh*  
 waa-ka'=o'sh  
 NOM-possess=IND.M  
 'if someone finishes quickest, if [whoever] finishes skinning his side quickest, the [whole thing] is his'  
 (Hollow 1973a:42)
- c. *náataaniitaani érehanashki,*              *mí'seena*                      *írushenashoomaksj̄h*  
 raʔE=njítE=rj̄ e-reh=raʃh=ki              wí'=s=ee=raʔ                      i-ru-shE=raʃh=oowaʔ=sj̄h  
 stand=CEL=SS PV-want=ATT=COND stone=DEF=DEM.DIST=TOP PV.INS-INS.HAND-hold=ATT=NARR=INTS  
 'when he tried to get up in a hurry, the rock was kind of holding him' (Hollow 1973a:45)
- d. *pí'niitekaraani*              *róo*              *Kj̄núma'kshi*              *wáaheres*              *rusháani*              *érehkerek...*  
 pi'=rjítE=krE=rj̄              roo              ki-ruwaʔ'k#shi              waa-hrE=s              ru=shE=rj̄              e-reh=krE=ak  
 devour=CEL=3PL=SS DEM.MID MID-man#be.good NOM-CAUS=DEF INS.HAND-hold=SS PV-want=3PL=DS  
 'they ate [their mother's food] up quickly and they wanted to take Old Man Coyote's food here..' (Hollow 1973a:27)

Unlike the prospective aspectual enclitic *=naate*, the celerative aspectual triggers ablaut, as we can see in (3.120c) above. It is not clear why *=niite* causes ablaut but *=naate* does not, especially since ablaut is predominantly triggered by morphology bearing nasal segments.

### 3.3.1.6 Iterative aspectual enclitic: *=skee*

Mandan can mark iterative aspect derivationally on a verb through the prefix *ki-*, which has cognates across the Siouan language family. Another way in which iterativity manifests in Mandan is through the iterative aspectual enclitic *=skee*. Hoocʔ has a cognate *=šge* 'too, also' (Lundquist p.c.). There seems to be a semantic difference between these two enclitics, but as previously seen in (3.110b) the iterative adverbial *inák* 'again' in Mandan can also have the meaning 'too' or 'also.'



### 3.3.2 Evidential and modal enclitics

Several of the grammars on Siouan languages that have been published in the last decade (e.g., Graczyk's (2007) grammar of Crow and Park's (2012) grammar of Hidatsa) have described much of what had been previously described by earlier scholars as tense markers as really being evidentials or modals. Re-examining similar markers in Mandan, we can make a similar case that many of the verbal endings that (Hollow 1970) and (Mixco 1997a) call tense markers are truly evidentials or modals.

A list of evidentials and modals in Mandan appears below.

#### (3.122) Evidential and modal enclitics in Mandan

/=aahka/	dynamic modal (ABLE)
/=a'shka/	possible modal (PSBL)
/=ishi/	visual evidential (VIS)
/=ka'ehe/	quotative evidential (QUOT)
/=kt/	potential modal (POT)
/=ootE/	indirect evidential (EVID)
/=oowaḱ/	narrative evidential (NARR)
/=o'xrE/	dubitative modal (DUB)
/=raḡsh/	attitudinal evidential (ATT)
/=s/	definite evidential (DEF)

The following subsections illustrate the usage of these enclitics within the corpus. These are some of the most common post-verbal elements in Mandan, as most non-direct evidence is accompanied by some kind of evidential enclitic. Mandan is similar to Hidatsa in this respect (Park 2012:220), though it is not clear if this extensive use of evidentials is a shared trait with Hidatsa or carry-over effect of one language influencing another due to hundreds of years of living closely and intermarriage between the two groups. While several of these enclitics appear extensively throughout the corpus (e.g., the narrative evidential =oomak and the potential modal =kt), there are some that scarcely occur (e.g., the possible modal =a'shka).

#### 3.3.2.1 Dynamic modal enclitic: =aahka

The dynamic modal =aahka is homophonous with the retrospective aspectual =aahka. No data includes instances of both these markers in their respective roles being used on the same verb, however. It is unclear whether Mandan allows both manifestations of =aahka to appear simultaneously like other homophonous formatives (e.g., the

polysemous *ki-* prefix, which can be iterative, middle voice, vertitive, etc.). As perviously discussed in §3.3.1.1), this enclitic is likely derived from some form of the term *áaki* ‘be above, on top of,’ though it is unclear whether it is a native Mandan word or a borrowing from Hidatsa. We can see examples of the dynamic modal enclitic in the data below.

(3.123) Examples of the dynamic modal enclitic =*aahka*

- a. *káare mishúykas ka'ótaahkani kixawáaro'sh*  
 kaare w̄i-shúykas=s ka-ot=aahka=r̄i ki-xwaa=o'sh  
 NEG.IMP 1POSS-male's.younger.brother=DEF INS.FRCE-mix=ABLE=SS MID-disappear=IND.M  
 ‘[I said] don't let my brother get hurt, and he got hurt and died’ (Hollow 1973a:63)
- b. *ikixúyuh-haa-pirák kapéeka'eheero'sh, numá'ke írupa*  
 i-kixúyuh=haa#pirák ka-pee=ka'ehe(e)=o'sh ruwá'k=E i-ru-pa  
 PV.NUM-five=SIM#ten INS.FRCE-be.distributed=QUOT=IND.M man=SV PV.INS-INS.HAND-pull?  
*óruxokaahka*  
 o-ru-xoh=aahka  
 PV.IRR-INS.HAND-lift=ABLE  
 ‘there were fifty were left, it is said, men who could lift a gun’ (Hollow 1973a:47)
- c. “*máa'yst niníiraahkaki" éheerak...*  
 waa-ýt=t r̄i~r̄ij=aahka=ki e-he(e)=ak  
 NOM-be.in.past=LOC R~walk=ABLE=COND PV-say=DS  
 ‘if only [the child] could walk already,’ he said and...’ (Hollow 1973a:160)

This modal almost always corresponds to the English modal ‘can’ or ‘could’ in the sense of conveying one’s ability to perform an action or allow an action to come to pass.

### 3.3.2.2 Possible modal enclitic: =a'shka

Possibility in Mandan can be expressed through the use of =a'shka as an enclitic or a free modal á'shka 'maybe.' This formative is relatively rare in the corpus.

(3.124) Examples of the possible modal enclitic =a'shka

- a. *riréesika'shka*      *ó'ereho'sh*  
 ri-reesik=a'shka    o-e-reh=o'sh  
 2POSS-tongue=PSBL PV.IRR-PV-think=IND.M  
 'he'll think that it might be your tongue' (Hollow 1973a:189)
- b. *káni*      "*tashká waheréki*      *wawáruuto'xara'shka,*"      *érehoomako'sh*  
 ka=rj    tashka wa-hrE=ki    wa-wa-ruut=o'xrE=a'shka  
 PROS=SS how    1A-CAUS=COND UNSP-1A-eat=DUB=PSBL    PV-say=NARR=IND.M  
 'and how might I be going to eat if I do that?' (Hollow 1973b:46)
- c. *mí'shak,* *maní'o'na*      *q'skarahara'shka,*      *éwaharaani...*  
 w'ishak wa-rj-o'=ra      q'ska#ra-hrE=a'shka    e-wa-hrE=rj  
 1s-pro    UNSP-1s-be=TOP be.near#2A-CAUS=PSBL PV-1A-CAUS=SS  
 'me? you were the one who maybe did something, I thought and...' (Hollow 1973b:238)
- d. *súkxikna'k*      *téewahere'shka*      *wáa'iwapkaaxi'sh*  
 suk#xik#ra'k      tee#wah-hrE=a'shka    waa-i-wa-pkE=xi=o'sh  
 child#be.bad#POS.SIT die#1A-CAUS=PSBL    NEG-PV.INS-1A-taste=NEG=IND.M  
 'maybe me killing that no-good kid will not do me any good' (Hollow 1973b:132)
- e. *"nutámaanuks*      *kirí*      *áshka,*" *éhekereromako'sh*  
 ru-ta-waaruk=s      k-ri      ashka    e-he=krE=oowak=o'sh  
 1A.PL-AL-male's.friend=DEF VERT-arrive.there PSBL    PV-say=3PL=NARR=IND.M  
 'I wonder if our friend got back,' they said' (Hollow 1973b:214)

Generally, this enclitic triggers ablaut. There are only a few instances in the corpus where =a'shka does not result in ablaut, like in (3.124d). Most enclitics that trigger ablaut have historically featured nasal segments, but this is not the case with =a'shka. This word does bear similarity to the word q'ska 'be near, correct,' so it is possible that =a'shka is a phonologically reduced form that has lost its nasal feature as an enclitic, but the historical nasality has caused it to be classified as an ablaut-triggering enclitic. Furthermore, the mismatch in fricatives could be due to an increased fricative caused by the sound symbolism Mandan has.

Another use of this formative is as a free formative á'shka 'maybe,' as seen in (3.124e). Like the retrospective aspectual áahka 'just,' speakers may treat the possible modal as an enclitic or an unbound element, though when used as an unbound element, it is always postposed after the matrix verb. This use of á'shka is rarely observed in the corpus, and only appears in direct quotations, though it is common enough in spoken conversations. In (3.124e), the

speakers are wondering aloud to themselves. Normally, almost every complete sentence in Mandan must be marked for the sex of the listener (i.e., a female listener or male listener). However, the possible modal seems to preclude the ability to have this allocutive agreement.

Examples of a question with a listener orientation and another no listener orientation appear below.

(3.125) Direct versus indirect questions

- a. *ótqqs*                      *hí'sha?*  
o-taa=s                      hi=o'sha  
PV.LOC-how.many=DEF arrive.there=INT.M  
'what time is it? [asked to a male listener]' (Benson p.c.)
- b. *ótqqs*                      *hí*                      *áshka?*  
o-taa=s                      hi                      ashka  
PV.LOC-how.many=DEF arrive.there PSBL  
'what time is it? [asked to no one in particular]' (Benson p.c.)

The first question in (3.125a) above is directed to a specific male listener, and as such, it bears the male-oriented indicative enclitic =*o'sh*. The same is not true of the question in (3.125b), where the speaker is not addressing anyone, but wondering aloud 'what time is it?' Consulting with a speaker reveals that this sentence can also mean 'I wonder what time it is.' When used this way, *áshka* does not necessarily imply that the speaker is asking the question to anyone in particular, and with no listener selected, there can be no allocutive agreement marking on the clause.

3.3.2.3 Visual evidential enclitic: =*ishi*

In the corpus, most of the data come from traditional narratives. As such, very little of it is first-hand information. However, when a figure in the narrative is speaking out loud, or in the case of language consultants speaking ex-temporaneously on a topic that is not a traditional narrative, the visual evidential =*ishi* appears. This evidential is used to express that the information being reported come from personal, eye-witness testimony. Another use of this enclitic is to convey that some can tell that something is the case simply by looking at it: e.g., someone must be lost because they appear to be from the speaker's perspective. We can see examples of this evidential below.

(3.126) Examples of the visual evidential enclitic =*ishi*

- a. *ú'sh*    *keréhishikere'sh*  
ú'sh    k-rEEh=ishi=krE=o'sh  
be.thus VERT-go.there=VIS=3PL=IND.M  
'so, they clearly must have gone home' (Hollow 1973b:265)
- b. *mí'ti*                      *rúutakt*                      *ísukishi're*  
wí'#ti                      ruutak=t                      i-suk=ishi=o're  
stone#dwell be.far.away=LOC PV.DIR-exit=VIS=IND.F  
'he obviously must belong to the village over there' (Hollow 1973b:157)
- c. *kowóorooxikanashs*                      *ée*                      *wáa'o'nixishi're*  
ko-wooroo#xik=rash=s                      ee                      waa-o'=rix=ishi=o're  
3POSS.PERS-husband#be.bad=ATT=DEF DEM.DIST NEG-be=NEG=VIS=IND.F  
'it must not be her no-good husband over there after all' (Hollow 1973a:133)

- d. *wáatishika'sh*  
 waa-ti=ishi=ka=o'sh  
 someone-arrive.there=VIS=HAB=IND.M  
 'someone must be coming here' (Hollow 1973a:142)
- e. *ée shanahkere, ptíj ishí'sh*  
 ee shraq=krE ptíj ishi=o'sh  
 DEM.DIST be.around=only buffalo VIS=IND.M  
 'nothing but round things over there, they must be buffalo' (Hollow 1973b:212)

In examples (3.126a) through (3.126d), we can see that =*ishi* serves to inform the listener that the speaker can attest to the veracity of the statement through visual evidence. In (3.126a), for instance, the speaker conjectures that the other people have gone home due to the fact that a visual inspection reveals that they are no longer there. Similarly, in (3.126c), the speaker can tell that the man she is looking at is not her relative's husband, as she can tell by looking at him.

Like several other enclitics, there is a free form, *ishí*. There is no obvious Proto-Siouan origin for this evidential, so it is not clear whether this is a piece of inherited Proto-Siouan morphology or a Mandan innovation. Furthermore, internally reconstructing this formative is tenuous. One possible analysis is that it comes from Pre-Mandan \*i-ši, where \*ši is modern Mandan *shí* 'good,' and \*i is a preverb. This construction could have been used periphrastically to emphasize that a statement has been visually attested. Over time, this verb could have lost its internal morphological boundaries (i.e., \*i-ši > \*\*iši) and then become analyzed as simplex verb, like we see in (3.126e). The Mandan verb complex is so elaborate that speakers could have begun to interpret this evidentiality-denoting verb as being a simple evidential enclitic, which is how =*ishi* typically is realized in the corpus. Another possible origin is the Proto-Siouan locative \*ši, and this locative became lexicalized and acquired verbal morphology in the form of the instrumental preverb *i-*.

### 3.3.2.4 Quotative evidential enclitic: =*ka'ehe*

The corpus mostly consists of traditional narratives of the Mandan people. As such, most events that appear in the corpus are not first-hand information. One way for the speaker to indicate that the information being presented is reported information is to include the quotative evidential enclitic =*ka'ehe*. This marker is transparently composed of the habitual =*ka* and the verb *éhe* 'say.' We see similar morphology across Siouan. There are similarities with the Hidatsa reportative =*rahee* (Boyle 2007:194), which looks to be made up of Proto-Siouan \*ya-hee, where \*ya is some kind of topic marker or demonstrative, and \*hee is the verb 'say.' Crow marks quoted speech both morphologically and periphrastically, with the enclitic =*hcheilu* being made up of the indirect causative *hche* and the plural allomorph

of the habitual aspectual enclitic =*ilu* cliticizing onto the verb or by adding *huuk* ‘they say’ at the end of the statement (Graczyk 2007:397). Assiniboine has two functionally equal quotative markers: =*huštá* and =*káya*, the latter being a combination of either the durative =*ka* or a distal demonstrative *ká* and the verb *yÁ* ‘say’ (Cumberland 2005:357). Biloxi likewise has a construction derived from ‘they say’ plus the habitual aspectual enclitic, =*éetu=xaa* (Dorsey & Swanton 1912:189), though it also has .

Languages across the entire Siouan language family have dedicated morphology or a periphrastic construction to denote quoted speech. However, the composition of the quotative or reportative enclitics are quite varied. As such, cannot conclusively say that there was a quotative marker in Proto-Siouan, but it is likely that we are seeing a case of parallel development, since the element most of these constructions have in common is some form of the word ‘say.’ We can see examples of the quotative evidential enclitic in the data below.

(3.127) Examples of the quotative evidential enclitic =*ka’ehe*

- a. *Numá’k Máxanas réehak, Kinúma’kshis wá’xokaa náateka’eheero’sh*  
*ruwá’k wáxrą=s rEEh=ak ki-ruwá’k#shi=s wa’-xok=E=∅ rąatE=ka’ehe(e)=o’sh*  
 man one=DEF go.there=DS MID-man#be.good=DEF INS.PRCE-be.idle=SV=CONT stand.up=QUOT=IND.M  
 ‘with Lone Man having gone, First Creator jumped up, it is said’ (Hollow 1973a:2)
- b. *“háu, wá’to’sh,” érehka’eheših*  
*hau w’-at=o’sh e-reh=ka’ehe=sih*  
 yes 1POSS-father=IND.M PV-think=QUOT=INTS  
 ‘“yes, it is my father,” he thought, it is said’ (Hollow 1973a:5)
- c. *“hóo,” éheka’eheš*  
*hoo e-he=ka’ehe=s*  
 yes PV-say=QUOT=DEF  
 ‘“yes,” they said, it is said’ (Hollow 1973a:49)
- d. *ú’shkana áahika’eheeroo*  
*ų’sh=ka=rą aa-hi=ka’ehe(e)=oo*  
 be.thus=HAB=TOP PV.TR-arrive.there=QUOT=DEM.MID  
 ‘so, he took her there, it is said, then’ (Hollow 1973a:70)
- e. *Rá’puse íkarapątkereka’eheerak, wakárahash*  
*ra’-pus=E i-k-rapąt=krE=ka’ehe(e)=ak wa-ka-ra-hash*  
 INS.HEAT-be.marked=SV PV.INS-MID-increase=3PL=QUOT=DS 1A-INS.FRCE-INS.FOOT-slaughter  
*warého’sh*  
*wa-rEEh=o’sh*  
 1A-go.there=IND.M  
 ‘Speckled Arrow’s [birds] have increased, it is said, and I am going to slaughter them’ (Hollow 1973a:148)
- f. *ráahini tamáahs kirúsheka’ehe*  
*rEEh=rį ta-wąąh=s ki-ru-shE=ka’ehe*  
 go.there=SS 3POSS.AL-arrow=DEF VERT-INS.HAND-hold=QUOT

‘he went and took back his arrows, it is said’ (Hollow 1973a:16)

g. *máaxtik ókshuko’na*                      *óshiriihaa*                      *ptéhkereká’ehé*  
 wáaxtik o-kshuk-o’=rą                      o-shriih=E=∅                      ptEh=krE=ka’ehé  
 rabbit PV.IRR-be.narrow-be=TOP PV.LOC-be.scattered=SV=CONT run=3PL=QUOT

‘it was the cottontails who were running scattered, it is said’ (Hollow 1973a:17)

The majority of instances of =*ka’ehé* in the corpus involve no additional enclitic material after the quotative itself. We see this behavior in (3.127f) and (3.127g). When the quotative is not word-final, it is because an allocutive declarative marker is following it: e.g., the =*o’sh* we see in (3.127a). The quotative is also followed by the bound medial demonstrative =*oo* to emphasize some place or time in which the quoted event happened like in (3.127d), or it may be followed by the definite =*s* like in (3.127c) or intensive =*sih* like in (3.127b) to highlight that the speaker is reporting information they have not personally witnessed, they can attest to the veracity of the claim nonetheless. Rarely, =*ka’ehé* appears on non-matrix verbs, as we can see in (3.127e), where the veracity of the initial clause is hearsay (i.e. the number of birds that Speckled Arrow has has increased), but the proposition in the matrix clause is not hearsay (i.e., ‘I am going to slaughter them’).

Like the verb *éhe* ‘say,’ the realization of the quotative varies somewhat. When word-final, the last vowel in the stem is short, but when taking additional morphology, the vowel is long. This difference mirrors the alternation between the vacillation between speakers treating the verb ‘say’ as having an underlying short vowel or a long vowel: i.e., /e-he ~ e-hee/.

### 3.3.2.5 Potential modal enclitic: =*kt*

The potential modal enclitic =*kt* is one of the most robustly-attested pieces of postverbal morphology across the Siouan language family. This Proto-Siouan modal enclitic \**ktE* has reflexes in Missouri Valley in the desiderative =*hdi* (Park 2012:194), the potential *ktA* in Lakota (Ullrich 2011:821), the future -*kje* in Hoocąk (Helmbrecht & Lehmann 2006:54), the potential -*tte* in Quapaw (Rankin 2005:484), the optative -*tE* in Biloxi (Einaudi 1976:31), and the ability modal and future marker *te* in Yuchi (Linn 2000:291).

Mandan shares much in common with the various uses of the reflexes of \**ktE* in that =*kt* is extremely versatile as a modal. Its most common usage is to provide a future reading for an event or state, and we can see this use in the data below.

(3.128) Future readings for =*kt*

a. *míiptos rushékto’sh*  
 wíipto=s ru-shE=kt=o’sh  
 ball=DEF INS.HAND-hold=POT=IND.M

‘she will take the ball’ (Hollow 1973a:86)

- b. *tewé úyte paskjìhki taptjìkto’sh*  
 t-we úyte pa-skjìh=ki ta-ptjì=kt=o’sh  
 WH-INDF be.first INS.PUSH-cut.open=COND 3POSS.AL-buffalo=POT=IND.M

‘whoever opens it first, it will be his buffalo’ (Hollow 1973b:6)

- c. *mí’shak hq’khaa íreehraherto’sh*  
 w’-ishak hq’k=haa i-rEEh#ra-hrE=kt=o’sh  
 1POSS-PRO STND.POS=LOC PV.INS-go.there#2A-CAUS=POT=IND.M

‘you will put it on after me’ (Hollow 1973a:109)

- d. *wáa’iminirats áqwe, miníike, raká’kto’sh*  
 waa-i-w-rj-rat=s áqwe wj-rjìk=E ra-ka’=kt=o’sh  
 NOM-PV.INS-1A-2S-promise=DEF all 1POSS-son=SV 2A-possess=POT=IND.M

‘you will have everything I promised you, my son’ (Hollow 1973a:192)

Another common use of =*kt* is to express permissive deontic modality and matches up with such uses of English ‘can.’ The =*kt* here indicates that someone has permission to do something.

(3.129) Permissive deontic readings for =*kt*

- a. *manakikyu’tektto’sh, ókaxiipe*  
 w-ra-kikyu’tE=kt=o’sh o-ka-xiip=E  
 1S-2A-help=POT=IND.M PV.IRR-INS.FRCE-skin=SV  
 ‘you can help me skin it’ (Hollow 1973a:41)
- b. *wáa’aahuuki órara’kto’re*  
 waa-aa-huu=ki o-ra-ra’=kt=o’re  
 PART-PV.TR-come.here=COND PV.LOC-2A-make.fire=POT=IND.F  
 ‘you can make a fire if he brings some’ (Hollow 1973a:120)
- c. *wiipe iwasehki rakéeka’ni raráahiništósh*  
 wiip(e) i-wa-sek=ki ra-keeka’=rj ra-rEEh=rjt=t=o’sh  
 cornball PV.INS-1A-make=COND 2A-have=SS 2A-go.there=2PL=POT=IND.M  
 ‘if I make cornballs, you can have them and go’ (Hollow 1973b:268)
- d. *ómaniitaa miní túteki rahjìkto’sh*  
 o-wa-rjì=taa wri tu=t(e)=ki ra-hjì=kt=o’sh  
 PV.IRR-1A-walk=LOC water be.some=POT=COND 2A-drink=POT=IND.M  
 ‘there will be some water where I walk and you can drink it’ (Hollow 1973a:114)

Another kind of necessitative deontic modality that =*kt* can express is one that conveys an action that one ‘should’ or ‘should not’ engage in per some set or rules, norms, and the like.

(3.130) Necessitative deontic readings for =*kt*

- a. *wáa'oxikanashe*                      *wáarakawehto'sh*  
 waa-o-xik=rash=E                      waa-ra-ka-weh=t=o'sh  
 NOM-PV.IRR-be.bad=ATT=SV NEG-2A-INS.FRCE-pick=POT=IND.M  
 'you should not pick the ones that are no good' (Hollow 1973a:216)
- b. *híhé mí'shak*    *wawákerehto'sh*  
 híhe w'ishak    wa~wa-k-rEEh=t=o'sh  
 well 1POSS-PRO R~1A-VERT-go.there=POT=IND.M  
 'well, I should go home' (Hollow 1973a:217)
- c. *kúhki*                      *ní'o'na*    *raróoraa*                      *namá'kektō'sh*  
 kuh=ki                      rí-o'=ra    ra-roo=E=∅                      ra-wá'kE=kt=o'sh  
 come.back.here=COND 2s-be=TOP 2A-talk=SV=CONT 2A-lie=POT=IND.M  
 'when she comes back, you are the one who should be talking' (Hollow 1973a:221)
- d. *wáa'inak*    *rá'tere*                      *rapkáhutinisto'sh*  
 waa-irak    r'-at=re                      ra-k-pa-hut=rjt=t=o'sh  
 NEG-again 2POSS-father=DEM.PRO X  
 'you (pl.) should never make up with your father' (Hollow 1973a:194)

As the data in (3.130a) show, when the potential enclitic is present, a negative enclitic can be omitted so long as the negative prefix is present. The potential very rarely appears in negated propositions.

### 3.3.2.5.1 Allomorph /=t/

Mandan is the only Siouan language that has reduced Proto-Siouan \*ktE to a mere consonant cluster without a syllabic nucleus. Furthermore, it becomes a simple /=t/ when cliticizing onto a stem that ends in a consonant that is not /ʔ/. We can see this allomorphy at work below.

(3.131) Examples of the allomorph =t

- a. *nukeréehki*                      *warárustō'sh*  
 ru-k-rEEh=ki                      wa-ra-rut=t=o'sh  
 1A.PL-VERT-go.there=COND UNSP-2A-eat=POT=IND.M  
 'let's go home and then you will eat' (Hollow 1973a:87)
- b. *hiré nuxkáhinisto'sh*  
 hire ru-kxah=rjt=t=o'sh  
 now 1A.PL-move=2PL=POT=IND.M  
 'we will take off now' (Hollow 1973b:82)
- c. *máatki*    *nuxkáhto'sh*  
 waatki    ru-kxah=t=o'sh  
 tomorrow 1A.PL-move=POT=IND.M  
 'we will move tomorrow' (Hollow 1973b:48)

- d. *sé waharáa minikú'kto'sh*  
 se wa-hrE w-rj-kú'=kt=o'sh  
 be.red 1A-CAUS 1A-2S-give=POT=IND.M  
 'I might make it red for you' (Hollow 1970:454)

We can see in the data above that the potential modal enclitic is realized as =*t* instead of =*kt* when following a consonant-final stem. The one exception to this is a stem that ends in a glottal stop, as glottal stops are not treated phonologically as a consonant, but are considered part of the syllable nucleus instead. We see this behavior in (3.131d), where the verb *kú'* 'give' is followed by =*kt* and not =*t*. Another tendency that the =*t* allomorph has is that it triggers lenition in /t/-final stems, turning /t/ to [s] to prevent a surface [tt] cluster. This process has been described previously in §2.4.1.

### 3.3.2.5.2 Allomorph /=kte/

The potential enclitic typically has the phonetic shape /=kt/ in Mandan. However, in certain constructions, we see remnants of the full Proto-Siouan \*ktE, where a vowel will appear only before particular enclitics.

(3.132) Examples of the allomorph =*kte*

- a. *imate ikxqhkere'sh, ówaxohkerektek*  
 i-wa-te i-kxah=krE=o'sh o-wa-xok=krE=kte=ak  
 PV.INS-1S-stand PV.INS-laugh=3PL=IND.M PV.LOC-1A-swallow=3PL=POT=DS  
 'they made fun of me, so I will swallow them' (Hollow 1973a:149)
- b. *mí'mami'hs kawásukhereki, kishíktek...*  
 w'~i-wa-wi'h=s ka-wa'-suk#hrE=ki ki-shi=kte=ak  
 1POSS-PV.INS-1S-robe=DEF INS.FRCE-INS.PRCE-be.rinsed#CAUS=COND MID-be.good=POT=DS  
 'if my robe is rinsed, it must be all right' (Hollow 1973a:17)
- c. *hakték súhkereseet tamáah tóps ká'hereromako'sh*  
 ha=kte=ak suk=krE=s=ee=t ta-waah top=s ka'#hrE=oowak=o'sh  
 PROV=POT=DS child=3PL=DEF=DEM.DIST=LOC 3POSS.AL-arrow four=DEF possess#CAUS-NARR-IND.M  
 'so, he gave his four arrows to the children' (Hollow 1973a:31)
- d. *áqwena wáa'omiktek íraseko'sh, Kinúma'kshi*  
 aqwe=rá waa-o-wik=te=ak i-ra-sek=o'sh ki-ruwa'k#shi  
 all=TOP NOM-PV.IRR-be.none=POT=DS PV.INS-2A-make=IND.M MID-man#be.good  
 'everything you do will be nothing, Old Man Coyote' (Hollow 1973b:47)

The =*kte* allomorph is exclusively found before a different-subject switch-reference marker =*ak*. A consonant-final stem would yield [=ak] for this marker, but what we see instead is [=k], the allomorph used with stems that end in short vowels. This demonstrates that there is a small vestige of the fully-realized Proto-Siouan \*ktE in Mandan.

Furthermore, this =*kte* allomorph is realized as =*te* when cliticized onto a stem that ends in a consonant, as we see in (3.132d). It is unclear if the loss of /k/ in \*ktE was a regular process in Proto-Siouan or a Mandan-only innovation.

### 3.3.2.5.3 Allomorph /=kti/

Like the allomorph =*kte*, we see additional evidence of residual retention of the ablaut vowel in \*ktE into modern Mandan with =*kti*. Mandan only possesses two ablaut grades: the e-grade and a-grade. The Dakotan branch plus Biloxi have a third: the i/ĭ-grade. This third grade has a very limited distribution, with it being triggered by just the intensifier =*xti* in Biloxi and the future *ktA* and conjunction *na* ‘and’ in Dakotan (Jones 1983a:29). One of the only relics of the i/ĭ-grade ablaut in Mandan appears in the allomorph =*kti*, which itself only occurs before the conditional complementizer =*ki*.

(3.133) Examples of the allomorph =*kti*

- a. *ó'haraani kishiniihktiki, kóoxq'taanashini wahúharaani*  
 o'#hrE=rĭ ki-shriĭh=kti=ki, kooxq'tE=rąsh=rĭ wa-hų#hrE=rĭ  
 be#CAUS=SS MID-be.cold=POT=COND corn=ATT=SS UNSP-be.many#CAUS=SS  
*má'kekereroomako'sh*  
 wą'kE=krE=oowąk=o'sh  
 lie.AUX=3PL=NARR=IND.M  
 ‘when it got cold from there, they had lots of corn and they were there’ (Hollow 1973b:91)
- b. *xamáhe nurúshektiki, ihehka'sh*  
 xwąh=E rų-ru-shE=kti=ki i-hek=ka=o'sh  
 be.small=SV 1A.PL-INS.HAND-hold=POT=COND PV.INS-know=HAB=IND.M  
 ‘when we take a little, he always knows’ (Hollow 1973b:116)
- c. *óparashtaa ishąqtaa ná'kini rokirúherektiki,*  
 o-prash=taa ishąq=taa rą'k=rĭ ro-kru#hrE=kti=ki  
 PV.IRR-be.pointed=LOC across=LOC SIT.POS=SS 1S.PL-be.called#CAUS=POT=COND  
*nuréhka'sh*  
 rų-rEEh=ka=o'sh  
 1A.PL-go.there=HAB=IND.M  
 ‘we always go when he calls us across the ridge there’ (Hollow 1973b:151)
- d. *wará're ikarexwaheréktiki, máamihka'sh*  
 wra'=E i-ka-rex#wá-hrE=kti=ki waa-wĭk=ka=o'sh  
 fire=SV PV.INS-INS.FRCE-glisten#1A-CAUS=POT=COND someone-be.none=HAB=IND.M  
 ‘there was never anyone there when I lit the fire’ (Hollow 1973b:203)

Unlike =*kt* or =*kte*, =*kti* does not lose its /k/ when added onto a consonant-final stem, as we see in (3.133a), where the verb *kishiniih* ‘get cold’ ends in an /h/. We should expect to lose the /k/ to avoid a CCC cluster, like in (3.131a) through (3.131c) above, but that is not the case.



(3.135) Examples of the allomorph =ooti

- a. *manakú'rootiki*,      *róowa'oshi*      *hú*    *íminirats*  
w-rá-kú'=ooti=ki      roo#wá-o-shi      hú    i-w-rj-rat=ss  
1S-2A-give=EVID=COND speak#1A-PV.IRR-be.good many PV.INS-1A-2S-promise=DEF  
*óraka'ro'sh*  
o-ra-ka'=o'sh  
PV.IRR-2A-possess=IND.M  
'when you give it to me, you will have many promises that I made to you' (Hollow 1973a:191)
- b. *míihootiki*,      *rétaa*      *míiptos*    *rushéкто'sh*  
wíih=ooti=ki      re=taa      wíipto=s ru-shE=kt=o'sh  
woman=EVID=COND DEM.PROX=LOC ball=DEF INS.HAND-hold=POT=IND.M  
'if it is a girl, I will take this ball right here' (Hollow 1973a:86)

While most of the data above reflects an action that happened in the past, the completion of the action is not what is being accentuated, but rather that the speaker is expressing that the event has apparently or seemingly happened. Often, this enclitic is translated as 'must' or 'must have' in the corpus, which reflects that the speaker is marking some inferential knowledge. This can also reflect first-hand information where the speaker is witnessing something or someone unexpectedly, as we can see below.

(3.136) Examples of marking unexpected events

- a. *ní'o'roote'sh*  
rj-o'=ootE=o'sh  
2S-be=EVID=IND.M  
'it is you' (Delores Sand p.c.)
- b. *ní'o'roote're*  
rj-o'=ootE=o're  
2S-be=EVID=IND.F  
'it is you' (Delores Sand p.c.)

The data above are a kind of greeting in Mandan, where the speaker is expressing that they can tell it is the listener that they are speaking to. It is not necessarily that they are surprised to see the speaker, but that they may not initially have been sure who it was going to be. A true mirative can be expressed with the =oomak enclitic, as described below.

### 3.3.2.7 Narrative evidential enclitic: =oomak

This enclitic has traditionally been referred to in Mandan literature as the narrative past marker by both Kennard (1936:18) and Hollow (1970:474). They both describe =oomak as being used to describe events in the distant past,

and is seen extensively in traditional narratives. However, Mandan and most other Siouan languages are not truly tense-marking languages. As such, what this enclitic marks is that the speaker is privy to second- or third-hand knowledge of the event being described.

(3.137) Examples of the narrative evidential enclitic =oomak

- a. *Numá'k Máxana éheni Kinúma'kshi ikirookereroomako'sh, kotewé*  
 ruwá'k wəxrə e-he=rj ki-ruwá'k#shi i-ki-roo=krE=oowək=o'sh ko-t-we  
 man one PV-say=SS MID-talk=3PL=NARR=IND.M REL-WH-INDF PV.IRR-be.mature=SV  
*óratoore*  
 o-ratoo=E

'Lone Man and First Creator argued about which one was older' (Hollow 1973a:1)

- b. *Numá'k Máxana nírqmi i'kahekoomaksjh*  
 ruwá'k wəxrə rj=awj i'-ka-hek=oowək=sjh  
 man one PV.RFLX-INCP-know=NARR=INTS

'Lone Man suddenly became aware of himself while walking along' (Hollow 1973a:5)

- c. *Kawóoxohkas óti óo ó'roomaks*  
 ka-wa-o-xok=ka=s o-ti oo o'=oowək=s  
 AGT-UNSP-PV.LOC-swallow=HAB=DEF PV.LOC-dwell DEM.MID be=NARR=DEF

'the Swallower's house was there' (Hollow 1973a:170)

- d. *ú'taaha kóts wáahaaxikereroomako'sh*  
 ú'=taa=haa ko-at=s waa-hE=xi=krE=oowək=o'sh  
 be.close=LOC=INS 3POSS.AL.PERS-father=DEF NEG-see=NEG=3PL=NARR=IND.M

'that way, they did not see their father' (Hollow 1973a:209)

This evidential never appears word-finally, but almost always has an allocutive agreement marker like =o'sh. More sparingly, we see the definite marker =s or the intensifying complementizer =s<sup>jh</sup> in sentence-final position to highlight the fact that while the information is hearsay, the speaker is putting some kind of credence in it.

Indrek Park (p.c.) has noticed that another =oomak parallels the narrative evidential in Hidatsa =waree in that both languages use this evidential as a mirative.

(3.138) Mirative use of =oomak

- a. *ní'o'roomako'sh*  
 rj-o'=oowək=o'sh  
 2s-be=NARR=IND.M  
 'oh, it is you' (Park p.c.)
- b. *rahúuroomako'sh*  
 ra-huu=oowək=o'sh  
 2A-come.here=NARR=IND.M

‘ah, you have come’ (Park p.c.)

The difference between the indirect evidential =*oote* and the narrative =*oomak* seems to be slight in the data above. As Park (2012:256) notes in his dissertation, the narrative =*waree* in Hidatsa has a very similar distribution to the Mandan *oomak*. This may be a case of parallel development in both languages, where a particular evidential marker is able to play different roles. Another possibility is that Hidatsa has influenced Mandan so that the narrative marker in Mandan has taken on a more Hidatsa-like distribution due to the fact that the overwhelming majority of L1 Mandan speakers over the past century have also grown up in households containing fluent Hidatsa speakers.

### 3.3.2.8 Dubitative modal enclitic: =*o’xere*

The dubitative modal enclitic =*o’xere* is first described in Kennard (1936:19), where the enclitic is analyzed as a kind of conditional that expresses wonder or doubt about whether or how an action can be committed. These translations are often accompanied by ‘would,’ as in ‘where would we get to?’ seen below in (3.139a). Kennard also says that there is a shortened form of =*o’xere*, =*o’x*, and that it is much more common, but it does not appear at all in his own transcribed narratives or in the corpus in general. Hollow (1970:460) analyzes this enclitic as an inchoative aspectual instead, stating that it

(3.139) Examples of the dubitative modal enclitic =*o’xere*

- a. *nuhínito’xere’sha?*  
 ru-hi=rjt=o’xrE=o’sha  
 1A.PL-arrive.there=2PL=DUB=INT.M  
 ‘where would we get to?’ (Kennard 1936:19)
- b. *ú’st ó’haraani wáara’xuure túk híkerek’xere’sh;*  
 ú’t=t o’#hrE=rj waa-ra’=xuu=E tu=ak híj=krE=o’xrE=o’sh  
 be.in.past=LOC be#CAUS=SS NOM-INS.HEAT-be.charred=SV be.some=DS drink=3PL=DUB=IND.M  
*máamiko’sh*  
 waa-wík=o’sh  
 PART-be.none=IND.M  
 ‘long ago they could not drink any coffee; there was none’ (Hollow 1973a:204)
- c. *Numá’k Máxana ókapqte íwarooro’xere’sh*  
 ruwá’k wəxrə o-ka-pət=E i-wa-roo=o’xrE=o’sh  
 man one PV.IRR-INS.FRCE-cultivate=SV PV.INS-1A-speak=DUB=IND.M  
 ‘I am going to talk about Lone Man’s origin’ (Hollow 1973a:5)
- d. *tashá wahéréki wawáru’xara’shka*  
 tashka wa-hrE=ki wa-wa-rut=o’xrE=a’shka  
 how 1A-CAUS=COND UNSP-1A-eat=DUB=PSBL  
 ‘how can I go about eating one of those?’ (Hollow 1973b:32)

e. *inák wiráse ítqhqhqq tú ó'xere'sh*  
*irák wi-ras=E i-taq=haq tu o'xrE=o'sh*  
 another 1POSS-name=SV PV.INS-be.different=INS be.some DUB=IND.M  
 'I do not have another different name' (Hollow 1973a:14)

f. *rá'te túki ré'esh númi óxere'sh*  
*r'-at=E tu=ki re-esh ru=awi o'xrE=o'sh*  
 2POSS-father=SV be.some=COND DEM.PROX-SMLT 1A.PL=CONT DUB=IND.M  
 'if you had a father, we would not be this way' (Hollow 1973a:114)

In all the data above, the speaker is conveying a sense of doubt or wonder over whether the action can happen or could have happened. (Hollow 1970:460) notes that =*o'xere* never co-occurs with the indirect evidential enclitic =*oote*, which likely stems from the fact that the former seems to indicate a lack of certainty to whether an action took place versus the latter seeming to mark that the speaker can infer that the action did happen. As such, there is some conjectural presupposition conveyed by both =*o'xere* and =*oote*, though =*oote* comes with a sense of certainty on the part of the speaker, while =*o'xere* does not.

Like several other modal and aspectual enclitics, there is a free form of the dubitative modal enclitic, as seen in (3.139e) and (3.139f). The enclitic itself seems to be composed of the verb *ó'* 'be' plus /xrE/. This second element resembles *xere* 'be safe, out of danger,' which can be used as an auxiliary to modify a verb, as shown below.

(3.140) Auxiliary use of *xere* 'be safe'

*tashkáharaa riikirukxqh óxere'sha?*  
*tashka#hrE=∅ rV-i-k-ru-kxqh o-xrE=o'sha*  
 how#CAUS=CONT 1A.PL-PV.INS-RFLX-INS.HAND-move PV.IRR-be.safe=INT.M

'how else could we cross [the river] safely?' (Hollow 1973b:269)

It is possible that this verb could have served to introduce dubitative propositions periphrastically in Mandan, and this construction gradually became associated more closely with the verb it modified until it became an enclitic associated with the copula *ó'*, which is a common element in many enclitics associated with complementizers. This evolution from lexical verb to modal enclitic is likely how Mandan has acquired much of its rich enclitic field.

### 3.3.2.9 Attitudinal evidential enclitic: =*nash*

The attitudinal evidential enclitic =*nash* is one of the most common enclitics seen in the corpus. It has posed a challenge to past scholars in that its meaning is not easy to explain. Kennard (1936:23) states that =*nash* adds a quality of vagueness to a stem, while Hollow (1970:467) calls =*nash* a typifier, in that it indicates similarity with the named object, state, or action. Mixco (1997a:35) describes this enclitic as an attitudinal marker, reflecting the

attenuated force of the speaker's statements as merely speculative opinion. The work herein adheres to [Mixco's](#) terminology, as this enclitic does reflect some aspect of the speaker's attitude towards a proposition.

(3.141) Examples of the attitudinal evidential enclitic =*nash*

- a. *Kinúma'kshi éheni Numá'k Máxana íwahekanashe wakína'ni éwereco'sh*  
 ki-ruwa'k e-he=rɪ ruwa'k wəxɾə i-wa-hek=rəʃh=E wa-kira'ɾɪ e-w-reh=o'sh  
 MID-man#be.good PV-say=SS man one PV.INS-1A-know=ATT=SV 1A-tell=SS PV-1A-think=IND.M  
 'I want to tell about what I sort of know about First Creator and Lone Man' ([Hollow 1973a:1](#))
- b. *ú'st ówatik wáanixikanasho'sh*  
 ʉ't=t o-wa-ti=ak waa-rɪ-xik=rəʃh=o'sh  
 be.in.past=LOC PV.IRR-1A-arrive.there=DS NOM-2S-be.bad=ATT=IND.M  
 'I would have gotten there a long time ago and you are kind of bad at this' ([Hollow 1973a:152](#))
- c. *má'kahoomaksɬh, súk óheksikanashkeres ú'shka má'kah*  
 wə'kah=oowək=sɬh suk o-hek#xik=rəʃh=krE=s ʉ'sh=ka wə'kah  
 lie.AUX.HAB=NARR=INTS child PV.IRR-know#be.bad=ATT=3PL=DEF be.thus=HAB lie.AUX.HAB  
 'they were living there, those poor children were living so' ([Hollow 1973a:203](#))
- d. *mamáhenashinista!*  
 wə~wə-hE=rəʃh=rɪt=ta  
 R~1S-see=ATT=2PL=IMP.M  
 'you all have got to try to see for me' ([Hollow 1973a:35](#))
- e. *karóotiki kinúuxik túnashoomako'sh*  
 ka=ooti=ki ki-ruʉxik tu=rəʃh=oowək=o'sh  
 PROV=EVID=COND SUUS-ghost be.some=ATT=NARR=IND.M  
 'then he got kind of scared' ([Hollow 1973b:71](#))
- f. *maxópininashishi'sh*  
 wə-xoprɪ=rəʃh=ishi=o'sh  
 UNSP-be.holy=ATT=VIS=IND.M  
 'he must be kind of holy' ([Hollow 1973b:313](#))
- g. *péehanashɬiki, áqwe óshiriihaa*  
 peeh=rəʃh=ti=ki aqwe o-shriih=E=∅  
 be.high=ATT=POT=COND all PV.IRR-be.scattered=SV=CONT  
*ikiruxkekerekaroomako'sh*  
 i-k-ru-xke=krE=ka=oowək=o'sh  
 PV.INS-MID-INS.HAND-pluck=3PL=HAB=NARR=IND.M  
 'whenever he hollered, everyone would pull back and scatter' ([Hollow 1973a:45](#))

Evidentials may be used to specify the degree of precision or the degree of truth that a speaker wishes to bestow upon an utterance, in particular, that the speaker is unsure about the veracity of an utterance, wishes to hedge the precision or truth of an utterance, or simply because the speaker does not have a more precise way to articulating

their point (Mithun 1986:90). It is this use that =*nash* fills: it expresses some aspect of the speaker’s attitude regarding how precise or how true the statement is. What is noteworthy about this evidential is that it can co-occur with other evidentials, as we see in (3.141e) and (3.141f) above. In (3.141e), the narrative evidential notes how the speaker came by the information (i.e., through hearsay or having heard it before), but the attitudinal questions how precise or sure they are about the proposition at hand. Similarly, in (3.141f), the visual evidential =*ishi* shows that the speaker can visually infer that the event has happened, but the =*nash* hedges whether the speaker believes how accurate or appropriate what is being said is. As such, this double evidential marking in Mandan is not contradictory: one evidential serves to inform how the speaker knows about the proposition, while =*nash* serves to depreciate or downplay some aspect of the proposition.

Both Crow and Hidatsa share cognates with Mandan =*nash*, where the approximative =*aachi* in Crow marks similarity or conveys a sense of ‘kind of, sort of, like’ to the affected verb or noun (Graczyk 2007:44), while the compromissive =*raci* in Hidatsa has a nearly identical usage as the attitudinal in Mandan. All these forms seem to be composed of Proto-Siouan \**yą-se*, where \**yą* is a topic marker or distal demonstrative pronoun and \**se*, which marks similarity. In both Mandan and Hidatsa, this enclitic is found often in casual conversations, and is often chided as being informal or ‘slangy.’ Some speakers are more prone to use =*nash* more often than others.

The attitudinal =*nash* also serves to widen the category of a noun.

(3.142) Use of =*nash* to extend the class of nouns

- a. *wáa’oksqhanash*  
waa-o-ksąh=rąsh  
NOM-PV.IRR-WORRY=ATT  
‘sneaky kinds of things’ (Hollow 1973a:80)
- b. *mashkášhkapkanashini*      *katékanashini*      *rútaa*      *má’kahoomako’sh*  
wą-shka~shkap=ka=rąsh=rį      katek=rąsh=rį      rut=E=∅      wą’kah=oowąk=o’sh  
UNSP-DIST~prick=HAB=ATT=SS chokecherry=ATT=SS eat=SV=CONT lie.AUX.HAB=NARR=IND.M  
‘they had been eating rosehips and thing like that, and chokecherries and things like that’ (Hollow 1973b:279)
- c. *kóonashe*  
koo=rąsh=E  
squash=ATT=SV  
‘squash and things like that’ (Hollow 1970:467)
- d. *minísanashe*  
wriś=rąsh=E  
squash=ATT=SV  
‘horses and things like that’ (Hollow 1970:467)

- e. *makxéxanashini...*  
 wə-kxek=rəsh=rj  
 UNSP-throw.out=ATT=SS  
 ‘trash and stuff and...’ (Hollow 1973a:110)

This enclitic does not trigger ablaut, despite the fact it contains a nasal element. The reason why is not clear, especially since it seems to be an older element that is shared between Mandan and Crow-Hidatsa.

### 3.3.2.10 Definite evidential enclitic: =s

Previous works on Mandan have referred to =s as a preterite marker (Kennard 1936, Hollow 1970). Much of the discussion in this part of the chapter has dealt with why Mandan is not a tense-marking language. Given that =s does not mark tense, it must have a different function.

The definite article in Mandan is =s, and is homophonous with the verbal enclitic. This homophony is not coincidental, as =s marks that the speaker is certain that an event has happened. As such, this enclitic marks definiteness on both nouns and verbs.

(3.143) Examples of the definite evidential enclitic =s

- a. *minúike*,      *“riréesike*      *manakú’ki”*      *épeso’sh*  
 wj-rj̄k=E      ri-reesik=E      w-rə-kú’=ki      e-w-he=s=o’sh  
 1POSS-son=SV 2POSS-tongue=SV 1S-2A-give=COND PV-1A-say=DEF=IND.M  
 ‘my son, I said “will you give me your tongue?”’ (Hollow 1973a:190)
- b. *Kinúma’kshiseena*      *Numá’k Máxanas pahúhanashoomaks*  
 ki-ruwə’k#shi=s=ee=rə      ruwə’k wəxrə=s pa-huh=rəsh=oowək=s  
 MID-man#be.good=DEF=DEM.DIST=TOP man      one=DEF INS.PUSH-be.ahead=ATT=NARR=DEF  
 ‘Old Man Coyote got ahead of Lone Man’ (Hollow 1973a:9)
- c. *na’é*,      *éexi wáarahere*      *túso’re*  
 rə’e      eexi waa-ra-hrE      tu=s=o’re  
 mother.VOC belly NOM-2A-CAUS be.some=DEF=IND.F  
 ‘mother, there is some paunch for you to eat’ (Hollow 1973a:72)
- d. *waxtáani*      *ókqəhe*      *warúutekérésə’sh*  
 wa-xtE=rj̄      o-xkəh=E      wa-ruutE=krE=s=o’sh  
 UNSP-be.big=SS PV.IRR-move=SV UNSP-eat=3PL=DEF=IND.M  
 ‘the travelers were really hungry’ (Hollow 1973b:80)
- e. *wáa’qqwe minikú’kəso’sh*  
 waa-əqwe w-rj̄-kú’=ka=s=o’sh  
 NOM-all 1A-2s-give=HAB=DEF=IND.M  
 ‘I always give everything to you’ (Hollow 1973b:98)

- f. *réharaana,*                    *íraheksó're*  
 rEEh#hrE=rą                    i-ra-hek=s=o're  
 go.there#CAUS=IMP.F PV.INS-2A-know=DEF=IND.F  
 'go ahead, you know how to do it' (Hollow 1973b:181)

In all the examples above, the =s serves to emphasize an action that the speaker knows has happened. In the case of (3.143b), the presence of the narrative and the definite together indicate that, although the speaker heard that it happened that way from another source, the speaker can attest that it definitely happened that way. Similarly, in (3.143c), there is no past tense reading, and the speaker is informing their mother that something is indeed the case. The same reading is present in (3.143f), where the speaker is exhorting another person to do something that they know how to do, and that the speaker knows they know how to do.

It is true that this enclitic often appears on propositions that take place in the past, but that is also a side effect of the corpus consisting mostly of traditional Mandan narratives about cultural figures and their past deeds. When present in quoted speech, =s can be used for events in any time setting, provided that the speaker is certain about the truth value of what they are saying.

Mandan shares this definite marker with Crow =sh (Graczyk 2007:156), and with Hidatsa =sh (Park 2012:530). In Crow and Hidatsa, this definite marker can likewise be seen on definite events that have taken place in the past, similar to its use in Mandan, though =sh seems to imply some sequential relationship where the definite event has finished and a subsequent event begins. However, this enclitic is not required to give a past reading, per se, but indicates an event has completed or will be completed. In Mandan, this perfective reading is not inherent, as it serves mostly to emphasize how certain the speaker is of the veracity of an utterance.

### 3.3.3 Number enclitics

All Siouan languages have suffixes or enclitics to distinguish a singular subject from a plural subject (Parks & Rankin 2001:106). Mandan is the only Siouan language besides Catawba to have dedicated postverbal marking for plural subjects and plural objects. Plural marking in Mandan for subjects and objects does not depend on what semantic role that argument plays in a proposition, but rather how that argument is involved in the discourse.

(3.144) Plural enclitics in Mandan

/=rįt/    second person plural

/=krE/    third person plural

These enclitics are explained in greater detail in the subsections below.

### 3.3.3.1 Second person plural: =nit

Whenever a second person plural argument is involved, the enclitic =nit appears on the verb. In addition to marking plurality for second person arguments, =nit is also used for first person plural marking. This behavior is due to the fact that the first person plural typically has an inclusive reading, and thus when the first person plural is used, a second person argument is also involved in the proposition by virtue of being grouped with the first person argument. Given this distribution, this enclitic marks plurality for speech act participants (i.e., both first person and second person arguments) rather than just for second person arguments. We can see this behavior in the data below.

(3.145) Examples of the second person plural enclitic =nit

- a. *súkinite, matewé írasekinito'sha?*  
 suk=rjt=E wa-t-we i-ra-sek=rjt=o'sha  
 child=2PL=SV UNSP-WH-INDF PV.INS-2A-make=2PL=INT.M  
 'children, what are you all doing?' (Hollow 1973a:28)
- b. *o'sh, téehq óminitaa wamá'kahinito'sh*  
 o'sh teehq o-w-rj-taa wa-wa'kah=rjt=o'sh  
 ind.m be.a.long.time PV.LOC-1A-2s-be.with 1A-lie.AUX.HAB=2PL=IND.M  
 'gosh, I have been staying with you all for a long time' (Hollow 1973a:31)
- c. *ishkanashaa írawaxaani ranúunihinitki tóopa ná'hki*  
 i-shka=rash=E=∅ i-ra-waxE=rj ra-ruurjh=rjt=ki toopa ra'k=ki  
 PV.INS-be.a.while=ATT=SV=CONT PV.INS-2A-stop=SS 2A-be.there.PL=2PL=COND four SIT.POS=COND  
*ówahi'sh*  
 o-wa-hi=o'sh  
 PV.IRR-1A-arrive.there=IND.M  
 'if you stop and are there in a little bit, after four days, I will be there' (Hollow 1973a:130)
- d. *rá'tere máa'u'staa óteeniharaanite íratso'nik...*  
 r'-at=re waa-ú't=taa o-tee#rj-hrE=rjt=E i-rat=so'rjk  
 2POSS-father=DEM.PROX NOM-be.in.past=LOC PV.IRR-die#2S-CAUS=2PL=SV PV.INS-promise=COMP.CAUS  
 'because that father of yours promised to kill you (pl.) long ago...' (Hollow 1973a:194)
- e. *nustámi' nukirúshaani manátaa*  
 rj-ista#wj' rj-k-ru-shE=rj wrj=taa  
 1A.PL.POSS-face#stone 1A.PL-SUUS-INS.HAND-hold=SS tree=LOC  
*róokasaanito'sh*  
 rV-o-ka-saa=rjt=o'sh  
 1A.PL-PV.LOC-INS.FRCE-remove.meat.from.bone=2PL=IND.M  
 'we are taking our eyes out and hanging them on a tree' (Hollow 1973a:28)
- f. *wáa'oksqh íseke sjhanashak riihekinito'sh*  
 waa-o-ksqh i-sek=E sjh=rash=ak rV-i-hek=rjt=o'sh  
 NOM-PV.IRR-be.worried PV.INS-make=SV be.strong=ATT=DS 1A.PL-PV.INS-know=2PL=IND.M  
 'we know about the crooked things he does all the time' (Hollow 1973a:43)

- g. *nuk'ikirakshikinisto'sh!*  
 rʉ-ki~ki-ra-kshik=rʉt=t=o'sh  
 1A.PL=RECP~RFLX-INS.FOOT-wrestle=2PL=POT=IND.M  
 'let's all wrestle each other!' (Hollow 1973b:152)
- h. *róorahaanito'sh*  
 rV-o-ra-hE=rʉt=o'sh  
 1S.PL-PV.IRR-2A-see=2PL=IND.M  
 'you are going to see us' (Hollow 1973a:477)

When =*nit* appears, it is typically as a subject plural. Marking object plurality in Mandan is optional, so =*nit* appears to mark objects only sparingly. Since both first and second persons compete for the same marker, it can be unclear in isolation whether the =*nit* pluralizes the first or the second person argument in a proposition. We can see this ambiguity in (3.145h), where it is not immediately clear whether there is a singular second person acting upon more than two first persons, or if there are more than one second persons acting upon a pair of first persons.

Mandan distinguishes between first person plural and first person dual like other Siouan languages with dedicated first person plural prefixes, such as Lakota (Ullrich 2011:761). In the same manner as other Siouan languages, this distinction is realized by first person plural bearing postverbal plural marking along with the first person plural prefix, while first person dual involves only the first person plural prefix and no additional marking following the verb. We can see examples of this dual marking below.

(3.146) Examples of dual marking without =*nit*

- a. *máahsi*      *íip*      *nutáshika'sh*  
 wáʉh#si      iip      rʉ-ta-shi=ka=o'sh  
 arrow#feather tail.feather 1A.PL-AL-be.good=HAB=IND.M  
 'we (du.) always like eagle tail feathers' (Hollow 1973a:215)
- b. *nukípiiro'sh,*      *nutápaqxe*  
 rʉ-ki-pii=o'sh      rʉ-ta-páʉxE  
 1A.PL-SUUS-devour=IND.M 1A.PL-AL-potato  
 'we (du.) at our potatoes up' (Hollow 1973a:55)
- c. *na'é*      *\*eehrohereso'sh*  
 rʉ'e      rEEh#ro-hrE=s=o'sh  
 mother.VOC go.there#1S.PL-CAUS=DEF=IND.M  
 'mother told us (du.) to go' (Hollow 1973a:166)

In each of the sentences above, there is a first person dual subject or object, and the only morphological indication that the number is not plural is the lack of =*nit*. In many situations, it is not possible glean whether the first person argument is plural or dual when it is not a subject. Mandan often relies on context to fill in those kinds of details, and

the language likewise relies heavily upon *pro*-dropping arguments, so listeners must be active to ascertain who is doing what to whom, or speakers must rely on their familiarity with traditional narratives to fill in gaps the speaker is leaving by omitting arguments.

Mandan is the only Siouan language to have a dedicated speech act participant plural marker. This enclitic likely developed from the Proto-Siouan second person stative marker \*y<sub>i</sub>-, which became duplicated as a postverbal element that combined with the Proto-Siouan stem augment \*-tE. The presence of the stem augment suggests that a Pre-Mandan \*\*r<sub>i</sub>tE may have been an unbound element at some point in its development before becoming reanalyzed as an enclitic. The second person plural marker is an ablaut-triggering enclitic, likely stemming from the fact it contains a nasal vowel.

### 3.3.3.2 Third person plural: =kere

The most common manifestation of plurality in the corpus is the third person plural marker =kere /=krE/. It has several cognates across the Siouan language family: Hoocąk uses /-ire/ to mark plurals for third person subjects (Lipkind 1945:6), and Tutelo uses =hele /=hLE/ (Oliverio 1997:41). The Catawban third person plural subject suffix -?i may also be a cognate, since certain verb paradigms have a -hi instead (Rudes 2007:42). This variant suggests that Proto-Siouan could have had \*hirE as a third person plural marker, though the /k/ in Mandan is unexplained. Another possibility is that the *suus* marker \*ki- could have become associated with the \*hirE third person plural at some point in Pre-Mandan. Before stems beginning with sonorants or \*h, the *suus* marker tended to syncopate the \*i, becoming \*k-, a tendency preserved in modern Mandan. Proto-Siouan \*k, \*kh, and \*hk all collapsed into /k/ in Mandan, and short vowels tended to syncopate before a sonorant, so we could achieve the modern Mandan form if this enclitic underwent the following steps:

(3.147) Possible evolution of =kere

\*ki-hirE > \*\*k-hirE > \*\*\*k-hrE > \*\*\*\*k-rE > =kere

There is no posited third person plural marker in Rankin et al. (2015), but the presence of cognates across the Siouan language family suggests that Proto-Siouan had a dedicated third person plural marker. In modern Mandan, this enclitic is used to mark both subjects and objects that are not speech act participants. We can see this behavior in the data below.

(3.148) Examples of third person plural enclitic =kere

a.	<i>kirusanáhanashini</i> k-ru-sraḡ=rāsh=r <sub>i</sub> RFLX-INS.HAND-abandon=ATT=SS	<i>réhkereromaks</i> rEEh=krE=oowāk=s go.there=3PL=NARR=IND.M
----	---	---

'they parted ways and went' (Hollow 1973a:9)

- b. *kíihikaraani náakus íkirookereromako'sh*  
kiihi=krE=rj raaaku=s i-ki-roo=krE=oowaak=o'sh  
meet=3PL=SS road=DEF PV.INS-REFLX-speak=3PL=NARR=IND.M  
'they met and argued about the road' (Hollow 1973a:24)

- c. *numá'kaaki ísek áqwe kǐ'hkere'sh*  
ruwa'k-aaki i-sek aaawe kǐ'k=krE=o'sh  
man-COLL PV.INS-make all finish=3PL=IND.M  
'they were all finished making people' (Hollow 1973a:13)

- d. *káni súhkeres istámi' kirúshaani ímanastaa*  
ka=rj suk=krE=s ista#wǐ' ki-ru-shE=rj i-wra=s=taa  
PROV=SS child=3PL=DEF face#stone SUUS-INS.HAND-hold=SS PV.DIR-tree=DEF=LOC  
*iku'tekereromako'sh*  
i-ku'tE=krE=oowaak=o'sh  
PV.DIR-throw=3PL=NARR=IND.M  
'and then, the children took their eyes and threw them toward the tree' (Hollow 1973a:29)

- e. *i'ųutahǎ'kt íku'tekereromako'sh*  
i-ųutahǎ'k=t i-ku'tE=krE=oowaak=o'sh  
PV.DIR-east=LOC PV.DIR-throw=3PL=NARR=IND.M  
'he threw them to the east' (Hollow 1973a:13)

- f. *wáarakaakirikaraanitinox'sh*  
waa-ra-k-aa-kri=krE=rjt=rjx=o'sh  
NEG-2A-VERT-PV.TR-arrive.back.here=3PL=2PL=NEG=IND.M  
'you did not arrive back here with them having started out with them' (Hollow 1970:447)

We see =*kere* used as an object marker in (3.148e) and (3.148f), but it is more common to omit the =*kere*. Context plays a large role in how =*kere* is interpreted, as both (3.148d) and (3.148e) feature the same verb *iku'tekereromako'sh*, where the meaning of the verb can be 'they threw it,' 'they threw them,' 'he threw them,' etc. The meaning is apparent when contextualized within the discourse, but separately, the dual use as subject and object plural marker can create ambiguous statements.

When not used in matrix clauses, there is a strong tendency to omit =*kere*, as we see in (3.148a) where both verbs involve the same subjects, but only the matrix verb is marked with =*kere*. When switch-reference markers are involved, there are far more instances of verbs without =*kere* than there are verbs that include third person plural marking. Again, much of the informational load is left to context within the discourse.

### 3.3.4 Negation enclitics

Negation in Mandan involves multiple exponents. As discussed in §3.1.2.5, the negative inflectional prefix *waa-* appears on a negated verb. In addition to that negation prefix, there are two different negation enclitics that must be used in Mandan: *=nix* and *=xi*. Both of these enclitics comes from Proto-Siouan negation markers. The Proto-Siouan negation enclitic is reconstructed as *\*=aši*, with the initial vowel become reanalyzed as part of the stem in many modern Siouan languages, where it triggers ablaut (Rankin et al. 2015). Proto-Siouan and most modern Siouan languages have a fricative sound symbolism where an action or state can be increased or diminished depending on which frication is used: e.g., *síire* ‘yellow,’ *shúire* ‘tawny,’ *xíire* ‘brown’ in Mandan. The enclitic *=xi* is an x-grade reflex of *\*aši*, and it definitely triggers ablaut in Mandan. The enclitic *=nix* is actually a combination of a different Proto-Siouan negative enclitic, *\*=rj*, plus the other negative enclitic, *\*=aši*: i.e., *\*=rj=aši* ~ *\*=rj=axi* > *\*\*=rj=xi* > *=nix*.

We can see the conditions under which each of these enclitics must appear below.

#### 3.3.4.1 Allomorph /=*rjx*/

Kennard (1936:23) states that *=nix* appears on any consonant-final stem, as well as on any vowel-final stem ending in a non-high vowel. Hollow (1970:31) states that *=nix* is only for consonant-final stems. The distribution observed in the corpus is that *=nix* actually appears on any stem that does not end in a short vowel. Hollow analyzes all underlying heavy open syllables as having a /r/ at the end because he does not perceive the difference between long and short vowels, where [r] only arises through epenthesis at an enclitic boundary involving an open heavy syllable. We can see this behavior for *=nix* below.

(3.149) Examples of the negative enclitic *=nix*

- a. *tí áakit ó'haraani háa ná'kaa wáa'otinixoomako'sh*  
 ti aaki=t o'#hrE=rj hE rą'kE=∅ waa-ot=rjx=oowąk=o'sh  
 dwell be.on.top=LOC be#CAUS=SS see sit.AUX=CONT NEG-mix=NEG=NARR=IND.M  
 ‘looking from on top of the house, she was not in it’ (Hollow 1973a:126)
- b. *kotámiihseena inák miní hú*  
 ko-ta-wj̄h=s=ee=rą inąk wrj̄ hų  
 3POSS.PERS-AL-male's.sister=DEF=DEM.DIST=TOP again be.many PV.TR-arrive.back.here=ss  
*áaki'hini wásukinixkereromako'sh*  
 aa-ki'h=rj̄ waa-suk=rj̄x=krE=oowąk=o'sh  
 NEG-exit=NEG=3PL=NARR=IND.M  
 ‘his sister also brought a lot of water and they did not go out’ (Hollow 1973a:200)
- c. *kowóorooxikanash ée wáa'o'nixishi're*  
 ko-wooroo#xik=rąsh ee waa-o'=rj̄x=ishi=o're  
 3POSS.PERS-husband#be.bad=ATT DEM.DIST NEG-be=NEG=VIS=IND.F

‘that one must not be her no-good husband’ (Hollow 1973a:133)

- d. *wáakų́nixishiso’sh*  
 waa-ku’=rix=ishi=s=o’sh  
 NEG-give=NEG=VIS=DEF=IND.M  
 ‘I knew he did not give it to him’ (Hollow 1970:441)
- e. *kashká’nik, wáateenixkaroomako’sh*  
 ka=shka’rik waa-tee=rix=ka=oowak=o’sh  
 PROV=DISJ NEG-die=NEG=HAB=NARR=IND.M  
 ‘however, she would never die’ (Hollow 1973b:287)
- f. *máaminihjijnixo’sh*  
 waa-wri#hji=rix=o’sh  
 NEG-water#drink=NEG=IND.M  
 ‘he fasts [lit. he does not drink water]’ (Hollow 1970:303)

When it comes to determining whether to use =*nix* or =*xi*, =*nix* has a wider distribution: it appears after consonant-final stems, long vowel-final stems, and glottal stop-final stems. Of the two realizations of negativity in the enclitic field, =*nix* is the default negative enclitic in Mandan.

### 3.3.4.2 Allomorph /=xi/

As discussed above, =*nix* is used in nearly every context to express negation on a proposition except for when a stem ends in a short vowel. This fact is somewhat obscured by the fact that both =*nit* and =*xi* are ablaut-triggering enclitics, and as such, any ablaut vowel that precedes them becomes [a:]. We can see this behavior in the data below for those speakers whose Mandan treat negation as an ablaut-triggering process. For example, of Hollow’s (1970) two main consultants, Mrs. Annie Eagle consistently ablauts /E/ and /EE/ before a negative enclitic, but Mrs. Otter Sage does not. This was previously discussed in §2.4.3.1. The data included below is restricted to examples that feature ablaut, as that is more common throughout the corpus across a greater amount of speakers.<sup>7</sup>

(3.150) Examples of the negative enclitic =*xi*

- a. *wáa’eetaa ná’kak wáawahixi’sh*  
 waa-ee=taa ra’k=ak waa-wa-hi=xi=o’sh  
 NOM-be.far.off=LOC POS.SIT=DS NEG-1A-arrive.there=NEG=IND.M  
 ‘because he was sitting far off, I did not get there’ (Hollow 1973b:10)
- b. *wáaroskaaxi áakit ó’haraani há’keroomako’sh*  
 waa-roskE=xi aaki=t o’#hrE=rj ha’ke=oowak=o’sh  
 NEG-jump.down=NEG be.on.top=LOC be#CAUS=SS stand.AUX=NARR=IND.M

<sup>7</sup>This omission does not signify that there is anything incorrect about not ablauting before a negative enclitic, but it is unclear whether this lack of ablaut is due to idiolectal or dialectal differences.

'he did not come down from on top of there and stayed there' (Hollow 1973b:143)

- c. *nitámi'tis*                      *wáateehqxi'sh*  
 r̥i-ta-wi' #ti=s                      waa-teehq=xi=o'sh  
 2POSS-AL-stone#dwell=DEF NEG-be.far=NEG=IND.M  
 'your village is not far' (Hollow 1973b:29)
- d. *Kinúma'kshis*                      *shí máa'qke wáahixiroomako'sh*  
 ki-ruwá'k#shi=s                      shi waa'qk=E waa-hi=xi=oowák=o'sh  
 MID-man#be.good=DEF foot earth=SV NEG-arrive.there=NEG=NARR=IND.M  
 'Old Man Coyote's feet did not touch the ground' (Hollow 1973b:49)
- e. *mí'shak maná'teki,*                      *wáa'oraxaraaxi'sh*  
 w'ishak wa-rá'tE=ki                      waa-o-ra-xrE=xi=o'sh  
 1POSS-PRO 1A-stand.up=COND NEG-PV.IRR-be.safe=NEG=IND.M  
 'if I get up, you are not going to live' (Hollow 1973b:123)
- f. *wáa ní'o'na máanitashixi*                      *áshka?*  
 waa r̥i-o'=r̥á waa-r̥i-ta-shi=xi                      ashka  
 uh 2s-be=TOP NEG-2POSS-AL-be.good=NEG PSBL  
 'uh, was it you who did not like him?' (Hollow 1973b:237)

Because of its status as an ablaut-triggering enclitic, =xi often appears after phonetically long vowels despite the fact that it targets stems with underlyingly short vowels. Once a vowel ablauts, we do not see a switch from =xi to =nit instead. Mixco (1997a:37) is the first scholar to suspect some connection between vowel lengthening and =xi, though he did not ascribe this lengthening to ablaut alone, which is the case.

### 3.3.5 Complementizer enclitics

Mandan typically requires that some element fill the complementizer spot within a syntactic tree structure for a complete utterance. I argue here that Mandan has some kind of FILL C requirement, which accounts for the large amount of complementizer-level morphology. Furthermore, previous stages of Mandan must have had a similar requirement, as we see vestiges of auxiliary verbs that have moved from T to C within the CP domain. The evolution of these enclitics is explained below. This requirement to have some element in C also helps explain the distribution of the stem vowel /=E/, which Kennard (1936:26) incorrectly calls an indefinite article and which (Hollow 1970:39) deems optional. That complementizer, and the other listed below, are certainly not optional.

The most common complementizers that appear in the corpus and in conversational Mandan involve allocutive agreement (i.e., marking agreement with the sex of the listener) or switch-reference marking (i.e., marking the clause as having the same or different subjects as the one that follows). Other complementizers exist, including those that

carry some kind of aspectual or modal reading. A list of the complementizers discussed within this chapter appears below.

(3.151) List of complementizer enclitics in Mandan

/=ak/	different-subject switch-reference marker (DS)
/=a't/	hypothetical mood complementizer (HYP)
/=E/	stem vowel (SV)
/=haa/	simultaneous aspectual complementizer (SIM)
/=hak/	politeness marker (POL)
/=ki/	conditional complementizer (COND)
/=o'ra/	female-addressee interrogative marker (INT.M)
/=o're/	female-addressee indicative marker (IND.F)
/=o'sh/	male-addressee indicative marker (IND.M)
/=o'sha/	male-addressee interrogative marker (INT.M)
/=ra/	female-addressee imperative enclitic (IMP.F)
/=ri/	same-subject switch-reference marker (SS)
/=rik/	iterative aspectual complementizer (ITER)
/=rikuk/	incredulitive complementizer (INCD)
/=shka'rik/	disjunctive complementizer (DISJ)
/=sih/	intensive indicative complementizer (??)
/=so'rik/	causational complementizer (COMP.CAUS)
/=ta/	male-addressee imperative marker (IMP.M)

Most of the complementizers that appear in (3.151) are relatively rare in the corpus. Most clause-final marking contains switch-reference markers or allocutive agreement markers. As such, some of these complementizers have very few examples compared to others.

### 3.3.5.1 Allocutive agreement markers

Almost every sentence in Mandan requires that the sentence end with an allocutive agreement marker. The term “allocutive” was coined by Prince Bonaparte (1862:19) to describe the kind of agreement in Basque that marked the sex or social status of the listener. One major distinction between the allocutive agreement in Mandan versus other

Siouan languages is that Mandan uses allocutivity to agree with the sex of the listener, while other Siouan languages agree with the sex of the speaker. Most sentences are ungrammatical if there is no allocutive agreement marker on the matrix verb. We can organize these allocutive agreement markers by the sex of the speaker and the illocutionary force behind the utterance as shown on Table 3.6 below.

Table 3.6: Mandan allocutive agreement markers

	Indicative	Interrogative	Imperative
Male	= <i>o'sh</i>	= <i>o'sha</i>	= <i>ta</i>
Famel	= <i>o're</i>	= <i>o'na</i>	= <i>na</i>

The non-imperative allocutive markers are made up of the copular *ó'* 'be' plus a determiner, locative, or discourse particle. Given the FILL C constraint in Mandan, *ó'* must have at one point been used as an auxiliary along with finite verbs. Inflectional morphology must have remained on the lexical verb, as there is no evidence in the corpus that this *ó'* ever bore person marking. Over time, instead of being analyzed as an independent word, the copula became reanalyzed as being an integral whole with its corresponding allocutive marker. The behavior of each allocutive agreement marker is explained in the following subsections.

### 3.3.5.1.1 Female-addressee interrogative marker: =*o'na*

When asking a question of a woman or a group of women (including one or more people who identify as *míirek* 'two-spirit'), the female-addressee interrogative marker must be used. It appears is historically a combination of the copula *ó'* and the topic marker =*na*. There is no known cognate with this allocutive agreement marking in any other Siouan language, though other Siouan languages have their own We can see the female-addressee interrogative marker in the data below.

(3.152) Examples of the female-address interrogative marker =*o'na*

- a. *ítewetaa rarého'na?*  
i-t-we=taa ra-rEEh=o'ra  
PV.DIR-WH-INDF=LOCC 2A-go.there=INT.F  
'where are you going?' (Hollow 1973a:103)
- b. *wárapakiriio'na?*  
waa-ra-pa-krii=o'ra  
something-2A-INS.PUSH-count=INT.F  
'are you counting something?' (Hollow 1970:457)
- c. *manakíky'tekto'na?*  
w-ra-kíky'tE=kt=o'ra  
1s-2A-help=POT=INT.F

‘will you help me?’ (Hollow 1970:457)

- d. *nuréehto’na?*  
rɥ-rEEh=t=o’rɔ  
1A.PL-go.there=POT=INT.F  
‘let’s go’ (Hollow 1970:458)

Very few examples of this enclitic exist in the corpus, but it is obviously quite common in everyday speech. Most of the dialog in the corpus involves men speaking to other men, which explains the paucity of natural data involving =o’na. Pedagogical materials, such as in Hollow, Jones & Ripley (1976) who have paradigms for learners, feature this and the other female-addressee markers heavily.

### 3.3.5.1.2 Female-addressee indicative marker: =o’re

The female-addressee indicative marker is used when stating facts to a woman or a group of women. This marker is historically a combination of the the verb ó’ ‘be’ and another element. This second element may be the proximal demonstrative *re*, which seems to be cognate with the Hidatsa focus marker =*ri* (Boyle 2007:70), as well as Rankin’s (2010) reconstruction of the Proto-Dhegihan female-speaker assertion marker \**ǰe*. The Biloxi focus marker *-di* is likewise cognate (Torres 2010:39), as well as the indicative marker *-re(e)* in Catawba (Rudes 2007:53). This wide range of cognates suggests that there was some element in Proto-Siouan that served to mark a topicalized or focused element or indicate the indicative. It is possible that the same element performed both duties, giving us the range of reflexes that we see across the Siouan language family.

We can see this enclitic in use below.

(3.153) Examples of the female-addressee indicative marker =o’re

- a. *ptamiíhe,*                      *wawákte’re*  
w-ta-wíjh=E                      wa-wa-ktE=o’re  
1POSS-AL-male’s.sister=SV UNSP-1A-kill=IND.F  
‘my sister, I killed something’ (Hollow 1973a:221)
- b. *wá’iwakisekaa*                      *maná’ke’re*  
waa-i-wa-ki-sek=E                      wa-rɔ’kE=o’re  
something-PV.INS-1A-ITR-make=SV 1A-sit.AUX=IND.F  
‘I am fixing something’ (Hollow 1973a:222)
- c. *míkaa*                      *téero’re,*    *éheerak*  
wíj=k=E=∅                      tee=o’re    e-hee=ak  
be.none=SV=CONT die=IND.F PV-say=DS  
‘he died having said nothing’ (Hollow 1973a:63)

- d. *rarúshaa*                      *namá'kektó're*  
 ra-ru-shE                      ra-wá'kE=kt=o're  
 2A-INS.HAND-hold 2A-lie.AUX=POT=IND.F  
 'you should be taking them' (Hollow 1973a:75)

This enclitic is uncommon in the corpus, as much of the corpus consists of traditional narratives involves male figures. Like the other non-imperative illocutionary markers, no other enclitic can appear after =*o're*; it is the final element in a matrix clause.

### 3.3.5.1.3 Male-addressee indicative marker: =*o'sh*

Of all the morphology present in the corpus, the male-addressee indicative marker =*o'sh* is one of the most frequent items to appear. It is used whenever speaking to a man, a group of men, or a mixed group. The reason this marker appears most often in the corpus is that the majority of scholars who have worked on Mandan have been men, and as such, their consultants have used male-addressee marking when speaking to them. It is interesting to note that Trechter's (2012b) data also features male-addressee marking despite the fact she is a woman, but Mr. Edwin Benson seems to be telling his narratives not to her, but to people in general. This choice indicates that speakers have some pragmatic control over which allocutive agreement markers they use; the allocutive agreement is not restricted to those in earshot, else Trechter's data would feature mostly female-addressee morphology. We can see the behavior of =*o'sh* in the data below.

(3.154) Examples of the male-addressee indicative marker =*o'sh*

- a. *manáhinii áqwe tutúharaani*                      *ki'hoomako'sh*  
 wraḡ#inijj áqwe tu~tu#hrE=rj                      ki'h=oowak=o'sh  
 tree#grow all DIST~be.some#CAUS=SS arrive.back.here=NARR=IND.M  
 'he made the springs all over the place and came back' (Hollow 1973a:3)
- b. *numá'kaaki sikereki,*                      *miní hǰjre*                      *óma'kekere'sh*  
 ruwá'k-aaki si=krE=ki                      wrij hǰj=E                      o-wá'kE=krE=o'sh  
 man-COLL travel=3PL=COND water drink=SV PV.IRR-lie.AUX=3PL=IND.M  
 'there will be water there to drink when people travel' (Hollow 1973a:4)
- c. *Numá'k Máxana ókapqte*                      *íwarooro'xere'sh*  
 ruwá'k wáxrǰ o-ka-pǰt=E                      i-wa-roo=o'xrE=o'sh  
 man one PV.IRR-INS.FRCE-cultivate=SV PV.INS-1A-speak=DUB=IND.M  
 'I am going to talk about Lone Man's origin' (Hollow 1973a:5)
- d. *ímaataht*                      *waréeh*                      *íwateero'sh*  
 i-wáqatah=t                      wa-rEEh                      i-wa-tee=o'sh  
 PV.DIR-river=LOC 1A-go.there PV.INS-1A-like=IND.M  
 'I would like to go to the river' (Hollow 1973a:35)

This enclitic, like the other non-imperative allocutive agreement markers, contains a fossilized *ó* ‘be’ plus another element. The /ʃ/ in the coda is a cognate with the declarative marker in Hidatsa, =c (Boyle 2007:197). This element is also a cognate with the Tutelo assertion marker -se (Einaudi 1976:121). All three languages show reflexes of a Proto-Siouan \*se. It is not clear if this declarative \*se is related to the simulative \*se, whose reflex is the fricative in the attitudinal =nash in Mandan, or if these were two homophonous elements. What is clear is that the geographical distance between the Tutelo of Virginia and the Mandan and Hidatsa of North Dakota for this similarity to be ascribed to contact.

### 3.3.5.1.4 Male-addressee interrogative marker: =o’sha

When asking a question of a man, a group of men, or a mixed group, the male-addressee interrogative marked =o’sha is required. It is similar in phonetic shape to the indicative marker for male addressees, and given the tendency to cease phonation towards the end of the word, the final vowel is sometime not as audible as the preceding vowel. Unlike the female-addressee markers, there is no oral-nasal contrast in the indicative and interrogative for male addressees. Examples of =o’sha appear in the data below.

(3.155) Examples of the male-addressee interrogative marker =o’sha

- a. *tashká reheré’sha, wáa’ireseke?*  
 tashka re-hrE=o’sha waa-i-re-sek=E  
 how 2A-CAUS=INT.M NOM-PV.INS-2A-make=SV  
 ‘how did you do it, what you made?’ (Hollow 1973a:3)
- b. *mashkáshkapka, riráse tashkáhaa éheero’sha?*  
 wá-shka~shkap=ka ri-ras=E tashka=haa e-hee=o’sha  
 UNSP-DIST~prick=HAB 2POSS-name=SV how=INS PV-say=INT.M  
 ‘tomato, how does one say your name?’ (Hollow 1973a:14)
- c. *matewé óraruky’ro’sha?*  
 wa-t-we o-ra-ru-ky’=o’sha  
 UNSP-WH-INDF PV.IRR-2A-INS.HAND-give=INT.M  
 ‘what will you give for it?’ (Hollow 1973a:29)
- d. *rahjiktó’sha?*  
 ra-hjj=kt=o’sha  
 2A-drink=POT=INT.M  
 ‘are you going to drink it?’ (Hollow 1970:454)

This enclitic seems to have a similar origin as the male-addressee indicative marker =o’sh in that it has a fossilized copular *ó*, along with another element. What is not clear is whether the /ʃa/ element at the end is historically one

formative or two. That is, it is not clear if the interrogative originates from the indicative plus another element, or if the morphological material after /oʔ/ comes from a single formative.

If the interrogative was formed from the indicative, then the likely candidate for what the final vowel is could be the Proto-Siouan demonstrative \*ʔa, which has reflexes as both a prefixing and suffixing element across the Siouan language family (Rankin et al. 2015). All /CʔV/ sequences in Mandan and Proto-Missouri Valley result in the glottal element undergoing metathesis with the following vowel to create a /CVʔ/ sequence. This utterance-final glottal could have been lost, giving us the the modern interrogative marker =o'sha.

Rankin (2010) posits that the material after the fossilized copula is a cognate with the Lakota dubitative enclitics =so and =se. The fricatives match up if they are both descended from Proto-Siouan \*s, but it is not clear what has caused the differences in the vowels. Further study is needed of cross-Siouan verbal and nominal morphology to determine cognates for non-lexical material.

### 3.3.5.1.5 Female-addressee imperative marker: =na

Unlike the indicative or the interrogative markers, the imperative =na has no fossilized ó' 'be' as part of the enclitic. Phonetically, the female-addressee imperative marker is identical to the topic enclitic =na, but unlike the topic enclitic, the imperative triggers ablaut. It is not clear if the imperative marker shares a common origin with the topic enclitic, but it would be consistent with other Siouan clause-level morphology to appropriate determiners and locatives as complementizers and other utterance-level morphology. Biloxi has a hortative *na* and a homophonous strong negative imperative *na*, though this enclitic does not encode features of the listener or speaker (Einaudi 1976:91). Greer (2016:222) reports that the polite command marker for female speakers in Chiwere is *-nɛ* and the direct command marker can be *-rɛ* or *-ræ*. Both of last two these forms seem similar to the underlying phonological shape of the Mandan /=*rɑ*/, but it is unclear if the relationship between these markers is circumstantial or not. We can see how =*na* is used in the data below.

(3.156) Examples of the female-address imperative marker =*na*

- a. *“húunitana!”*                      *éheroomako'sh*  
 huu=rjt=rɑ                      e-he=oowaʔk=o'sh  
 come.here=2PL=IMP.F PV-say=NARR=IND.M  
 'he said "come on!"' (Hollow 1973b:10)
- b. *múupes*                      *inák wó'kiharaana!*  
 wųųpE=s                      irɑk w-o'ki#hrE=rɑ  
 cornmush=DEF again UNSP-be.cooked#CAUS=IMP.F  
 'cook the cornmush again! (Hollow 1973b:178)

- c. *hiré máatahtaá réhmaharaana!*  
 hire wáątah=taa rEEh#wá-hrE=rą  
 now river=LOC go.there#1S-caus=IMP.F  
 ‘put me in the river now!’ (Hollow 1973b:322)
- d. *káare ké’na!*  
 kaare ke’=rą  
 IMP.NEG dig=IMP.F  
 ‘do not dig!’ (Hollow 1973b:305)

When negating an imperative, the negative imperative proclitic *káare* will appear in first position within a CP. No negation marking appears on the verb. Making the imperative plural simply requires the second person plural =*nit* before =*na*. The only element that can follow the imperative =*na* is the politeness marker =*hak*.

### 3.3.5.1.6 Male-addressee imperative marker: =*ta*

A command given to a man, a group of men, or a mixed group will involve =*ta*. It may appear with the politeness marker =*hak* when speakers wish to soften the command or give a more jocular exhortation.

(3.157) Examples of the male-addressee imperative marker =*ta*

- a. *mamáhenashinista*  
 wa-wá-he=rąsh=rít=ta  
 UNSP-1S-see=ATT=2PL=IMP.M  
 ‘you (pl.) have got to try to see for me’ (Hollow 1973a:35)
- b. *shúyushuka ráahta!*  
 shúyushuka rEEh=ta  
 be.direct go.there=IMP.M  
 ‘go straight ahead!’ (Hollow 1973a:35)
- c. *káare q’skaharaata*  
 kaare q’ska#hrE=ta  
 IMP.NEG be.near#CAUS=IMP.M  
 ‘do not do it that way’ (Hollow 1973a:38)
- d. *ishuyhe qąwe rusháa makú’ta*  
 i-shuyh=E qąwe ru-shE wá-kú’=ta  
 PV.POSS-sinew=SV all INS.HAND-hold 1S-give=IMP.M  
 ‘take all the sinew for me’ (Hollow 1973a:78)

The male-addressee imperative marker =*ta* is an ablaut-triggering enclitic, just like the female-addressee imperative marker =*na*. However, there is no over nasal element to this enclitic to explain why it triggers ablaut. Several researchers have raised possibilities over the origin of ablaut in Siouan, but all proposals to date have been very

preliminary or simply do not have enough cross-linguistic data to support a strong conclusion about the morpho-phonological motivation behind the manifestation of ablaut in modern Siouan languages (Rood 1983, Jones 1983a, Rankin 1995). It is worth noting that these cursory studies on ablaut show that imperatives are one of the few conditions under which ablaut occurs across the Siouan language family. The Mandan =*ta* has the cognate *ta* ‘male to male imperative’ in Biloxi (Einaudi 1976:88). What is not obvious is whether this element stems from the Proto-Siouan locative \**ta*(a) or if it is a variant on a reduced form of the future or potential \**ktE*.

### 3.3.5.2 Switch-reference markers

Several Siouan languages feature a system of switch-reference, including Crow (Graczyk 1987), Biloxi (Graczyk 1997), and Hidatsa (Boyle 2011). In a seminal work on the topic, Haiman & Munro (1983:ix) define canonical switch-reference as category on the verb where there is a morphological indication of whether the subject of that verb is identical with the subject of another verb. Mixco (1997b) identifies Mandan as a switch-reference language, though he states there is a distinction between realis and irrealis switch-reference marking. That point of view is not supported by the data, as there is separate irrealis marking elsewhere in the verbal complex. However, the data do corroborate Mixco’s hypothesis that Mandan distinguishes between same-subject and different-subject clauses through switch-reference marking. As such, we can identify two switch-reference markers in Mandan:

(3.158) Switch-reference markers in Mandan

/=ak/ different-subject switch-reference marker

/=ri/ same-subject switch-reference marker

The precise syntax and methods of interclausal agreement between switch-reference markers and a superior clause is beyond the scope of the work presented herein.

#### 3.3.5.2.1 Different-subject switch-reference marker: =*ak*

The different-subject switch-reference marker is =*ak* appears whenever the subject of the following verb is different from the subject of the verb bearing =*ak*. These subjects can contain all the same  $\varphi$ -features (i.e., identical number, gender, gender and the like), but they will always be coindexed for different subjects. We can see examples of its use below.

(3.159) Examples of the different-subject switch-reference marker =*ak*

- |    |                   |                      |
|----|-------------------|----------------------|
| a. | <i>óshik</i>      | <i>íwaseko’sh</i>    |
|    | o-shi= <i>ak</i>  | i-wa-sek=o’sh        |
|    | PV.IRR-be.good=DS | PV.INS-1A-make=IND.M |

‘it<sub>i</sub> would be good and I<sub>j</sub> made it’ (Hollow 1973a:4)

- b. *éheerak* “*kotewé nurátoora’shka éheki, komíma’o’rak,*” *éheka’ehe*  
 e-hee=ak ko-t-we r̥-ratoo=a’shka e-he=ki ko-w̥j~w̥a-o’=ak e-he=ka’ehe  
 PV-say=DS REL-WH-INDF 1A.PL-be.old=PSBL PV-say=COND REL-1S~1S-be=DS PV-say=QUOT  
 ‘he<sub>i</sub> said it and he<sub>j</sub> said “if someone<sub>k</sub> says who<sub>l</sub> among us is the oldest, that person<sub>j</sub> is me,” it is said’

(Hollow 1973a:6)

- c. *máamanapak wáakanaarósh, míihq’t*  
 waa-wa-r̥ap=ak waa=krḁa=o’sh w̥j̥h=a’t  
 UNSP-1A-dance=DS UNSP-sing=IND.M woman=dem.dist  
 ‘I<sub>i</sub> danced and that woman<sub>j</sub> sang’ (Mixco 1997b:224)

- d. *ní’mahq̥pak wahé’sh*  
 r̥j̥-iw̥ah̥ap=ak wa-hE=o’sh  
 2S-be.lost=DS 1A-see=IND.M  
 ‘I<sub>i</sub> see that you<sub>j</sub> are lost’ (Mixco 1997b:233)

The most likely reason that =ak is used so extensively throughout Mandan discourse is that third person subjects come up quite often in traditional narratives, and there is no morphological marking of third person singular. As such, when multiple individuals are involved in the discourse, it can become confusing to keep track of who did what. When the listener hears =ak they know that the next action or state involves a different subject.

The different-subject switch-reference marker has cognates in Missouri Valley languages: =ak/=k in Crow (Graczyk 2007), and =ag/=g in Hidatsa (Boyle 2007). While these forms are all cognates, there is a semantic distinction: the different-subject marker in Mandan is the same-subject marker in both Crow and Hidatsa. This term may originate from the Proto-Siouan term \*ake ‘across, over.’ No other Siouan languages share this element as a switch-reference marker, so it quite likely an innovation from a proto-language ancestral to both Mandan and Missouri Valley, used to signaling a literally change in topic that became associated with a change in subject. If this proposed evolution from \*ake to =ak holds, that means that Mandan is more in line with the original semantics of \*ake, and that Missouri Valley Siouan altered the meaning to mean the opposite.

### 3.3.5.2.2 Same-subject switch-reference marker: =ni

In contrast to the different-subject switch-reference marker =ak, the same-subject switch-reference marker =ni indicates that the verbs being this complementizer shares the same subject as the following verb. This enclitic is the most common piece of morphology in the corpus, given that much of the corpus involves certain figures undertaking deeds or going on travels alone. We can see the behavior of =ni in the data below.

(3.160) Examples of the same-subject switch-reference marker =ni

- a. *Kinúma'kshi ishák máa'ų'st íwahuure rá'shotini*  
 ki-ruwạ'k#shi ishak waa-ų't=t i-wa-huu=E ra'-shot=rj  
 MID-man#be.good 3PRO NOM-be.in.past=LOC PV.POSS-UNSP-bone=SV INS.HEAT-be.white=SS  
*má'koomako'sh*  
 wạ'k=oowạk=o'sh  
 LIE.POS=NARR=IND.M  
 'First Creator's bones<sub>i</sub> already turned white and they<sub>i</sub> were lying there' (Hollow 1973a:1)
- b. *háki nuráahini ríixatinisto'sh*  
 ha=ki rų-rEEh=rj rV-i-xat=rjt=t=o'sh  
 PROV=COND 1A.PL-go.there=SS 1A.PL-PV.INS-inspect=2PL=POT=IND.M  
 'so, we<sub>i</sub> will go over there and we<sub>i</sub> will look over it' (Hollow 1973a:11)
- c. *minís éena waháani waptého'sh*  
 wrj̄s ee=rạ wa-hrE=rj̄ wa-ptEh=o'sh  
 horse DEM.DIS=TOP 1A-see=SS 1A-run=IND.M  
 'I saw the horse and I ran away' (Mixco 1997b:5)
- d. *wáapshixini wáashotinixo'sh*  
 waa-pshi=xi=rj̄ waa-shot=rj̄x=o'sh  
 NEG-be.black=NEG=SS NEG-be.white=NEG=IND.M  
 'it<sub>i</sub> is not black and it<sub>i</sub> is not white' (Mixco 1997b:5)

In each of the examples above, we can see that the subjects are coindexed. The only determining factor over using =*ni* or =*ak* lies in whether the following subject matching the current subject. It is perfectly possible for a subject to switch its reference and then switch it back to the previous subject. We can see an example of this phenomenon below.

(3.161) Switching between switch-reference markers

*miníseena ráahini maná ná'kak máapehaa réeho'sh*  
 wrj̄s=s=ee=rạ rEEh=rj̄ wrạ rạ'k=rj̄ wạape=haa rEEh=o'sh  
 horse=DEF=DEM.DIST=TOP go.there=SS tree under=SIM go.there=IND.M

'the horse passed beneath the tree [lit. the horse<sub>i</sub> went and a tree<sub>j</sub> stood there and the horse<sub>i</sub> went under it<sub>j</sub>]'  
 (Mixco 1997b:226)

The horse in the above example is the subject of the initial verb *ráahini* 'went' and the matrix verb *réeho'sh* 'went,' while the subject of the second verb *ná'kak* 'sit' is the tree. Even though the first and last verbs have coindexed subjects, the fact that there is an intervening subject necessitates the use of a different-subject switch-reference marker to indicate a transition from one subject to another. There is nothing about the construction in (3.161) that automatically tells the listener that the different-subject switch-reference marker is switching the reference back to the previous subject; it merely indicates that the same subject (i.e., the tree) is not the subject of the following verb. It

is left to inference that the horse is the subject of the final verb, as it is equally plausible that a third subject could be involved. As such, the speaker and the listener are relying on the information that is already available in the discourse to both indicate and understand what subject is taking what action and when.

Historically, the same-subject switch-reference marker evolved from the Proto-Siouan verb \*rj 'be, exist.' Clauses bearing switch-reference marking are more morphologically reduced than matrix verbs, so it is likely the case that switch-reference clauses in Mandan are not finite. Kennard (1936) first proposes that switch-reference markers are really participles, given the fact that speakers tended to translate them in English as adjunct clauses using participles. This analysis is not too far from the truth, given the origin of =ni.

### 3.3.5.3 Hypothetical mood complementizer: =q't

The hypothetical mood complementizer is derived from the determiner q't 'that.' Like many other Siouan languages, determiners and locatives are often reanalyzed as clause-level morphology. In this case, the hypothetical =q't indicates a kind of conditional reading where the speaker is expressing the conditions that could lead to an event or to mark contrary conditions. It is sparsely attested in the corpus. We can see examples of this enclitic below.

(3.162) Examples of the hypothetical mood complementizer =*q't*

- a. *kiríkerekí*, *ókina'kara't*  
 kri=krE=ki o-kirā'=krE=q't  
 arrive.back.there=3PL=COND PV.IRR-tell=3PL=HYP  
 'they would say so if they were to get back' (Kennard 1936:20)
- b. *róo wakxúhki ó'iraheka't*  
 roo wa-kxúh=ki o-i-ra-hek=q't  
 DEM.MID 1A-lie.down=COND PV.IRR-PV.INS-2A-know=HYP  
 'you would know it if I were to lie down here' (Hollow 1973a:1)
- c. *téehq̄t waréehq̄'t*  
 teeḥq̄=t wa-rEEh=q't  
 be.far=LOC 1A-go.there=HYP  
 'I would go a long way' (Hollow 1973b:146)
- d. *hiré tashká'eshkak q̄'ska rahereka'sha, mí'he táqhqq*  
 hire tashka-eshka=ak q̄'ska ra-hrE=ka=o'sha wí'h=E taq̄=hq̄q̄  
 now how-SMLT=DS be.near 2A-CAUS=HAB=INT.M robe=SV be.different=INS  
*ní'hka't*  
 r'-j̄ih=ka=q't  
 2S-wear.about.shoulders=HAB=HYP  
 'how come you are always doing it this way now, would you always cover yourself with a different robe?'  
 (Hollow 1973b:240)

In terms of usage, the hypothetical is often accompanied by a conditional complementizer =*ki*, creating a construction where a condition is raised and then what would hypothetically happen is proposed. The hypothetical can also appear without a conditional, but in those cases, there is some implied conditional, like in (3.162c), where the speaker is tied up, high above the ground and then looks down and wonders how far he would have to travel to get back down. The hypothetical can also be used independent of a conditional when soliciting reasons why someone does something, as we see in (3.162d). The speaker confronts the listener who is always wearing a different a different robe after he comes home from sneaking out all night, and remarks why is it that he always would be wearing a different robe.

The hypothetical complementizer triggers ablaut for most speakers, but as we can see in (3.162c), this is not the case for all speakers. As we have previously discussed with negation, it seems that not all Mandan speakers treat ablauting enclitics the same. There is also a tendency for the nasalization in =*q't* to be pronounced very weakly, and it may be the case that nasal-initial enclitics in Mandan tend to lose nasality when cliticized.

#### 3.3.5.4 Stem vowel: =e

One of the largest outstanding issues with Mandan morphology has been the status of the [e] that appears word-finally on nouns and verbs alike. Speakers have not been able to articulate a meaning for this ending. Kennard (1936:26) says that it is an indefinite article, while Hollow (1970:39) says that it has no meaning and can just be optionally added at the end of any consonant-final stem. Mixco (1997a:15) just calls it a stem vowel, and does not assign it any meaning and matches Hollow's opinion that it has no meaning of its own. However, when we start to match up the transcribed data with audio, a pattern begins to emerge. Namely, the stem vowel appears at the boundary of an intonational phrase, and there is a prosodic break between the item bearing the stem vowel and the rest of the utterance.

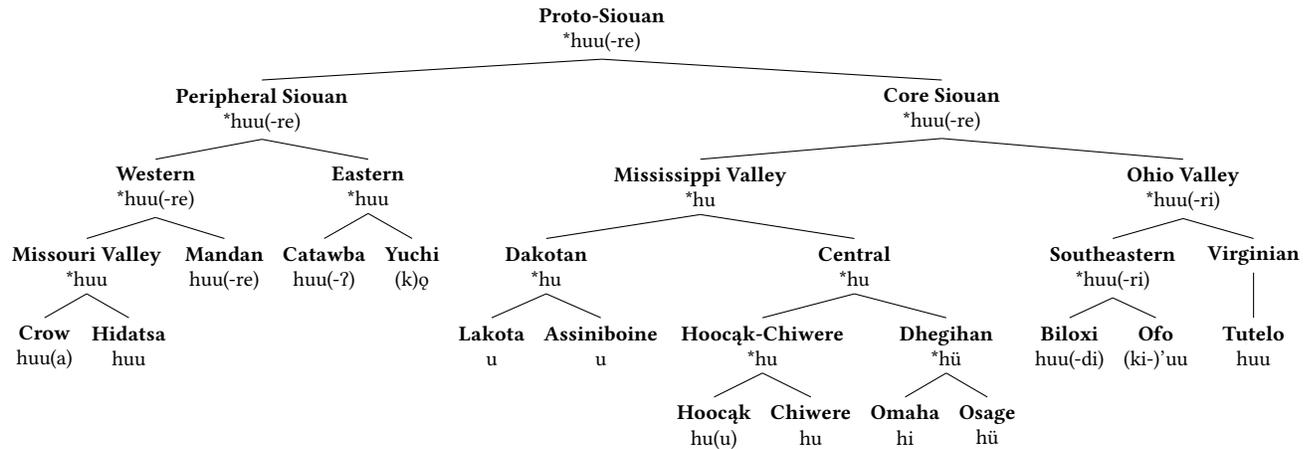
When working with learners, this piece of morphology is quite challenging to explain when it must appear and when it must not. When eliciting words for a word list, items ending in a consonant or a long vowel usually have a stem vowel at the end. When these words are placed in the context of a sentence, the stem vowel does not appear unless there is some prosodic break. This distinction resembles the issue of citation form versus stem forms in Crow. The citation form is used for free word forms when someone asks how to say something in Crow or give a one-word answer. The stem form is the form upon which all other morphology is added, and as such, citation forms are not common in daily discourse (Graczyk 2007:30). The citation forms in Mandan are merely words bearing a stem vowel, because Mandan requires that some material be present in C. The stem vowel acts as a complementizer, serving to mark the edge of an intonational phrase if no other material is available. In this way, we can tell the difference between a fragment in Mandan and a complete utterance, because the fragment would lack the stem vowel.

The stem vowel, appearing in C, triggers epenthetic [r] when following a stem ending in a long vowel or a glottal stop. When looking across the language family, we see that this [r]-epenthesis is not solely a Nu'etaare innovation,<sup>8</sup> but may ultimately be grounded in a similar process in Proto-Siouan. Numerous reconstructed stems in Proto-Siouan typically end in what Rankin et al. (2015) call a "common suffix," \*-re. This common suffix is almost exclusively found after long vowels in Proto-Siouan, and in the cases that it is not, there is debate over the vowel's length. In most Siouan languages, this common suffix is not present, but in disparate branches of the family, we see that it survives and exists in contextually-dependent doublets much like Mandan.

---

<sup>8</sup>As previously discussed by Carter (1991a), the Ruptaare dialect does not have [r]-epenthesis, but uses [ʔ]-epenthesis for both word-internal hiatus resolution as well as at enclitic boundaries.

(3.163) Reconstruction of PSi \*huu(-re) ‘come here’



As (3.163) illustrates, remnants of common suffix \*-re posited by Rankin et al. (2015) in PSi \*huu(-re) is only preserved in Mandan and Biloxi.<sup>9</sup> In both cases, some reflex of PSi \*r appears between a long vowel and some postverbal element. In Mandan, this postverbal element is the stem vowel -E, which appears in citation forms of words as well as a complementizer in subordinated clauses. Biloxi morphology has not been studied enough to tell whether the -di is truly a single formative or is similar to Mandan, but the fact that this process appears in two disparate members of the Siouan language family suggests that this so-called common suffix, which only appears after long vowels, may not be a suffix at all.

Rankin (2010) remarks that Mandan has been difficult to contextualize within the Siouan language family because so much of its morphology can be attributed to Proto-Siouan rather than being a total innovation. In this respect, Mandan shows itself to be particularly conservative, morphologically-speaking. My proposal is that this common suffix represents a productive process in Proto-Siouan whereby there was some restriction on the environments where a long vowel could appear, and that this process is still productive in Mandan. Namely, there is a restriction against long vowels appearing at the right edge of some structural or prosodic domain, and as such, there is some epenthetic element that is generated to repair such illicit constructions. In Mandan, intonational phrases cannot end in a long vowel, which necessitates the insertion of the short stem vowel -E, as demonstrated in the example below.

(3.164) Stem vowel insertion at the edge of intonational phrases

*Arikara kirúuhka'eheero'sh, óhuure.*  
 arikra kiruuh=ka'ehe=o'sh o-huu=E  
 Arikara refuse=QUOT=IND.M PV.IRR-come.here=SV

<sup>9</sup>Note that some of the forms in (3.163) feature reflexes of vertitive morphology that can be traced back to PSi \*ki-huu(-re): i.e., Yuchi and Ofo.

‘The Arikara refused to come, they say’ (Hollow 1973a:48)

Mandan allows the action being refused to be elided normally, so *Arikara kirúuhka’eheero’sh* in of itself is a complete utterance that is better translated as ‘The Arikara refused to do so, they say,’ and the *óhuure* ‘to come’ is dislocated to the right as parenthetical information, indicating that it is an afterthought by the speaker. These two clauses are nested within different intonational phrases, and as such, the stem vowel is required with the right dislocated clause, and the presence of the stem vowel next to the long vowel triggers [r]-epenthesis.

This same process has fossilized in other Siouan languages where the form with the stem vowel has become reanalyzed as being a single morphological item: e.g., Proto-Siouan \*sii(-re) ‘yellow’ becomes *shíili* in Crow and *cíiri* in Hidatsa, *síidi* in Biloxi, and *siri* ‘clear’ in Catawba. The Mandan reflex of this is either *síi* or *síire*, depending on its context. Further research is needed into other Siouan languages to confirm this, but given the strong tendency among Siouan languages to have some manner of morphological material following the verb in complete sentences, it is likely that these unexplained “optional” vowels are not really optional at all, and that this common suffix in Siouanist literature is not a suffix at all, but a phrasal enclitic that is filling the complementizer slot.

### 3.3.5.5 Simultaneous aspectual complementizer: =*haa*

As previously discussed in §3.3.1.2.2 above, many previous scholars have misanalyzed the ablauted stem vowel or the initial vowel in =*qmi* for =*haa*, the simultaneous aspectual complementizer. In reality, this enclitic is quite rare in the corpus. The paucity of times that =*haa* appears in the corpus lines up with the rarity of the adverbial subordinator or simultaneous marker =*haa* in Hidatsa (Park 2012:530). This formative has cognates across the Siouan language family, typically realized as =*ha* or =*hq* (Rankin et al. 2015). The behavior of this enclitic is observed below.

(3.165) Examples of the simultaneous aspectual enclitic =*haa*

- a. *inák kináakaha*      *kiná’hka*      *kawópq̄x*,      *K̄j̄núma’kshi*,      *ishák*  
 ir̄ak ki-raq̄aka=haa      ki-raq̄’k=ka      ka-wop̄ax      ki-ruw̄ak#k#shi      ishak  
 again MID-be.new=SIM MID-POS.SIT=HAB INS.FRCE-stand.upright MID-man#be.good 3PRO  
*máa’yst*      *íwahuure*      *rá’shootini*      *má’koomako’sh*  
 waa-ut=t      i-wa-huu=E      ra’-shoot=r̄i      w̄ak#k=oow̄ak=o’sh  
 NOM-be.in.past=LOC 3POSS-UNSP-bone=SV INS.HEAT-be.white=SS POS.LIE=NARR=IND.M  
 ‘while becoming like new again, [his staff] was there, he put it up, First Creator, his bones already turned white and were lying there’ (Hollow 1973a:1)
- b. *ú’shkaherek*,      *kikínaakaha*,      “*mimíratoo’o’sh*,”      *éheni...*  
 u’sh=ka#hrE=ak      ki-ki-raq̄aka=haa,      “w̄i~w̄i-ratoo=o’sh      e-he=r̄i  
 be.thus=HAB#CAUS=DS ITR-MID-be.new=SIM R~1S-be.mature=IND.M PV-say=SS  
 ‘having so done it, while it got new again, he said ‘I am the oldest’ and...’ (Hollow 1973a:2)

- c. *xamáhaa*    *óxast*                      *óotaa*                      *haráani* *kohúyxihoona*  
 xwəh=haa    o-xat=t                      oo=taa                      hrE=rj    ko-huɣ#xih=oo=rə  
 be.small=SIM PV.IRR-society=LOC DEM.MID=LOC CAUS=SS 3POSS.PERS-mother#be.old=DEM.MID=TOP  
*í'pataxteka'sh*  
 i'-pa-ta-xtE=ka=o'sh  
 PV.RFLX-INS.PUSH-push-AUG=HAB=IND.M  
 'while he was small, when they had society doings, she made him be in them and his grandmother was  
 always really proud of him' (Hollow 1973a:64)
- d. *ímashute*                      *kú'shtaahaa*                      *íwatarakini*                      *ká'ni*                      *ná'kaa*  
 i-wəshut=E                      ku'sh=taa=haa                      i-wa'-traak=rj                      ka'=rj                      rə'kE=∅  
 PV.INS-clothe=SV be.inside=LOC=SIM PV.INS-INS.PRCE-shut=SS possess=SS sit.AUX=SV  
 'her dress, while she had it inside, she sewed it on and she had it there' (Hollow 1973a:106)
- e. *ikų'taahaa*                      *makú'ta!*  
 i-kų'tE=haa                      wə-ku'=ta  
 PV.DIR-throw=SIM 1s-give=IMP.M  
 'throw it to me!' (Hollow 1973a:132)
- f. *weréxanash írapawehaa*                      *hijimanaherektore*  
 wrex=rəsh i-ra-pa-we=haa                      hij#w-rə-hrE=kt=o're  
 kettle=ATT PV.INS-2A-INS.PUSH-hold.up=SIM drink#1s-2A-CAUS=POT=IND.M  
 'you should let me drink while you hold out the pail' (Hollow 1973a:131)

It is easy to confuse this enclitic with the ablauted continuative in casual speech, given that they both end in a long /aa/, in particular when the stem ends with /h/ as is the case in (3.165c). This marker triggers ablaut in /E/- and /EE/-final stems as we see in (3.165e).

### 3.3.5.6 Politeness marker: =hak

The Mandan language is very explicit and transparent when it comes to communication. The word for 'good-bye' is just to tell the people you are with that you are leaving: i.e., *warého'sh* or *warého're* 'I am going.' When issuing commands or requests, speakers may use the politeness marker =hak after the imperative marker. This is the closest equivalent to the word 'please.' We can see its usage in the data below.

(3.166) Examples of the politeness marker =hak

- a. *húutahak;*                      *manakikų'tekto'sh*  
 huu=ta=hak                      w-rə-kikų'tE=kt=o'sh  
 come.here=IMP.M=POL 1s-2A-help=POT=IND.M  
 'come on, please; you can help me' (Hollow 1973a:41)
- b. *waráahthak!*  
 wa-rEEh=ta=hak  
 UNSP-go.there=IMP.M=POL

‘go right on ahead!’ (Hollow 1973b:265)

c. *makína’nahak*

wą-kirá’=rą=hak

1S-tell=IMP.F=POL

‘please tell me’ (Hollow 1970:436)

d. *káare pawéshinistahak*

kaare pa-wesh=rít=ta=hak

IMP.NEG INS.PUSH-cut=2PL=IMP.M=POL

‘please don’t any of you cut it’ (Hollow 1970:436)

In the corpus, this enclitic is very rare, but it is not uncommon in daily conversations. The police marker =*hak* can be used to soften a command, to demonstrate friendliness, or show respect. Even when used when speaking to elders, =*hak* is not inherently used with formal register, so it is not the case that one must use =*hak* exclusively when using imperatives with people to whom you are showing respect. This enclitic is not used outside of imperatives, and there is no equivalent of ‘please’ when used with questions or entreaties.

### 3.3.5.7 Conditional complementizer: =*ki*

The conditional complementizer =*ki* is often translated as ‘if’ or ‘when’ in the corpus. Mixco (1997a,b) argues that this formative is a different-subject irrealis switch-reference marker. However, the =*ki* is used with both same-subject and different-subject clauses, so that analysis does not hold. The conditional complementizer is a reflex of Proto-Siouan definite article \**kj*, which also serves as a subordinator. Mandan no longer uses a reflex of \**kj* as a definite article, but it has continued to use it as a complementizer, though its semantics have changed to only be used in conditional clauses. We can see how =*ki* is used in the data below.

(3.167) Examples of the conditional complementizer =*ki*

a. *áakoteweki órookti óshik íwaseko’sh*

aakotewe=ki o-rootki o-shi=ak i-wa-sek=o’sh

shelter=COND PV.IRR-camp PV.IRR-be.good=DS PV.INS-1A-make=IND.M

‘it would be good if they had a shelter for camping and I made it’ (Hollow 1973a:3)

b. *numá’kshiki ráse núpo’sh, ótu’sh*

ruwá’k#shi=ki ras=e rúp=o’sh o-tu=o’sh

man#be.good=COND name=SV two=IND.M PV.IRR-be.some=IND.M

‘if he is a chief, then he has two names’ (Hollow 1973a:14)

c. *ínina’hki ó’ų’ka’sh*

i-rį-rą’k=ki o-ų’=ka=o’sh

PV.INS-2S-SIT.POS=COND PV.IRR-be.thus=HAB=IND.M

‘when you are out of sight, that will be enough’ (Hollow 1973a:25)

- d. *Kinúma'kshi kasúhki súk hú'na mináaa má'kaho'sh*  
 ki-ruwá'k#shi ka-suk=ki suk hú=o'=ra wriX=E wá'kah=o'sh  
 MID-man#be.good INS.FRCE-exit=COND child be.many=be=top play=sv lie.AUX.HAB=IND.M  
 'when Old Man Coyote peeked out, there were a lot of children who were playing there' (Hollow 1973a:28)
- e. *sikereki miní kíikaraakere'sh*  
 si=krE=ki wrj kíikraa=krE=o'sh  
 travel=3PL=COND water look.for=3PL=IND.M  
 'when they travel, they look for water' (Hollow 1970:451)
- f. *numá'kaaki éena máaskap írukapkerektiki, ptijj*  
 nuwá'k-aaki ee=ra wáaskap i-ru-kap=krE=kti=ki ptijj  
 man-COLL DEM.DIST=TOP meat PV.INS-INS.HAND-lack=3PL=POT=COND buffalo  
*híherekaroomako'sh*  
 hi#hrE=ka=oowák=o'sh  
 arrive.here#CAUS=HAB=NARR=IND.M  
 'whenever the people were hard up for meat, he always made the buffalo come' (Hollow 1973b:301)

As we can see in the data above for (3.167b) and (3.167e),

Unlike the hypothetical modal enclitic, the conditional complementizer relies on temporal subordination. That is, it invoke a condition, and if met, the action or state in the superior clause does or would happen. Furthermore, this conditional is not restricted to irrealis propositions, as we see in (3.167e) and (3.167f), which describe situations that happen habitually or customarily.

### 3.3.5.8 Iterative aspectual complementizer: =nik

Mandan has several morphological markers of iterativity: the prefix *ki-*, the aspectual enclitic =*skee*, as well as the complementizer =*nik*. It marks a subordinated clause and typically is used with superior clauses expressing habits or customs. It can be roughly glossed as 'when,' 'whenever,' or 'each time.' We can see examples of =*nik* below.

(3.168) Examples of the iterative aspectual complementizer =*nik*

- a. *ruptáahaa súkinik, réehkaroomaksjh*  
 ru-ptEh=haa suk=rjk rEEh=oowák=sjh  
 INS.HAND-run=SIM exit=ITR go.there=NARR=INTS  
 'he always leaves when he goes out turning around' (Hollow 1973a:88)
- b. *kirútiniitaanik, ú'sh há'ke'sh*  
 k-rut=rjEtE=rjk ú'sh há'kE=o'sh  
 SUUS-eat=CEL=ITR be.thus stand.AUX=IND.M  
 'that was the way it was when she would be nibbling at it' (Hollow 1973a:126)
- c. *óo íwaxekerektiki, órootkinik, ú'sh núunihkerekat*  
 oo i-waxE=krE=kti=ki o-rootki=rjk ú'sh ruurih=krE=ka=a't  
 DEM.MID PV.INS-stop=3PL=POT=COND PV.IRR-camp=ITR be.thus be.PL.AUX=3PL=HAB=HYP

‘whenever they stopped there, they were always there like that when they would camp’ (Hollow 1973a:203)

- d. *kimáto* *í'haraanik* *íruxaxq̄hka'sh*  
 ki-wą̀to i'-hrE=r̄ik i-ru-xa~xq̄h=ka=o'sh  
 MID-bear PV.RFLX-CAUS=ITR PV.INS-INS.HAND-AUG~be.torn=HAB=IND.M

‘every time he changes into a bear, he always tears them up’ (Hollow 1973b:156)

Like the conditional, there is a causal relationship between a clause bearing the =*nik* complementizer and its superior clause. The majority of the data show that =*nik* occurs when something usually or always happens. It can be used with both realis and irrealis proposition. Most instances of =*nik* involve the same subject for both the clause bearing =*nik* and the superior clause, but as we see in (3.168b), this complementizer is not like a switch-reference marker that depends on having or not having coindexed subjects.

It is likely that this complementizer is actually a combination of a reflex of Proto-Siouan \*r̄i ‘be, exist’ and the habitual =*ka*, where the final vowel has been lost. This enclitic triggers ablaut in all possible instances in the corpus, which is to be expected, given the fact that it contains a nasal segment.

### 3.3.5.9 Incredulative complementizer: =*nikuk*

In his description of the incredulative in his grammar, Kennard (1936:20) notes that this enclitic expresses disbelief about a proposition, real or imagined, on the part of the speaker. Hollow (1970:473) amends this description by pointing out that a speaker can also use the incredulative to report second-hand information that the speaker does not believe or that an event has happened that is so surprising that the speaker cannot believe that it really happened and remains unconvinced. These descriptions encompass all the uses of the incredulative =*nikuk* found in the corpus. We can see some examples of this complementizer in the following data.

(3.169) Examples of the incredulative complementizer =*nikuk*

- a. *ré'esh* *úkahanashe* *túkerenikuk!*  
 re-esh uk#ah=r̄ash=E tu=krE=r̄ikuk  
 DEM.PROX-SIM hand#be.covered=ATT=SV be.some=3PL=INCD  
 ‘there couldn’t have been some of his fingernails’ (Hollow 1973a:150)
- b. *ináa, réhq'k* *ímahq̄pinikuk!*  
 ir̄aą re=ha'k i-w̄ah̄ap=r̄ikuk  
 yikes.F DEM.PROX=STND.POS PV.INS-be.lost=INCD  
 ‘yikes, I can’t believe this one has gotten lost!’ (Hollow 1973a:172)
- c. *wáanuma'kaaki h̄únus* *wakaráahkakerenikuk*  
 waa-nuwa'k-aaki h̄u=r̄u=s wa-kraah=ka=krE=r̄ikuk  
 NOM-man-COLL be.many=ANT=DEF UNSP-be.afraid=HAB=3PL=INCD  
 ‘that bunch of people sure must have been afraid’ (Hollow 1973a:178)



- b. *tópha kiná'shka, wáapaksqhe mikáa ná'kini...*  
 top#ha kirá'=shka waa-pa-ksáh=E wík=E rá'k=rí  
 four#times tell=DSJ NOM-INS.PUSH-be.worried=SV be.none=SV SIT.POS=SS  
 'even though he told it four times, he was not paying attention and...' (Hollow 1973a:156)
- c. *q'shka'shka'nik, óminikiri'ro'sh*  
 á'shka=shka'rík o-w-rí-kri'=o'sh  
 be.near=DSJ PV.IRR-1A-2S-defeat=IND.M  
 'that may be so, but I will beat you' (Hollow 1973b:59)
- d. *úkereshka'nik, wáateenixka'sh*  
 u=krE=shka'rík waa-tee=ríx=ka=o'sh  
 wound=3PL=DSJ NEG-die=NEG=HAB=IND.M  
 'they shot him, but he does not die' (Hollow 1973b:117)

The complex =*shka'nik* looks to be made up of several elements. This formative includes the simple disjunctive =*shka*, but we can see the presence of a glottal stop, which indicates an elided /o/ from the copula *ó* 'be.' The final element that makes the last syllable is the iterative complementizer =*nik*. Historically, this enclitic seems to have been made up of /=shka=o'=rík/, but this enclitic is a discrete enclitic unto itself for modern speakers. It is not clear what the origin of the simple disjunctive =*shka* is, as it could itself be made up of multiple Proto-Siouan elements: e.g., the /ka/ could be the attributive \*-ka or even the habitual =ka. Further examination of interclausal morphology across the Siouan language family is needed to determine if this element has roots in Proto-Siouan or if it is a Mandan innovation.

### 3.3.5.11 Intensive indicative complementizer: =*sih*

The allocutive agreement markers =*o'sh* and =*o're* mark matrix verbs in the overwhelming majority of complete utterances in the corpus. However, if a speaker wishes to emphasize their point, they may chose to use the intensive complementizer =*sih*. This complementizer is homophonous and semantically similar to the intensifier suffix described in §3.2.3. Instead of intensifying the action or the state, as the suffix does, the intensive complementizer intensifies the entire proposition. This can indicate that the speaker wishes to emphasize their point, or that they are vouching for the veracity of the statement. Both Hidatsa and Crow have a similar clause-final element: =*sht* in Crow (Graczyk 2007:394), and =*shd* in Hidatsa (Park 2012:231). Both of these forms are reflexes of the Proto-Siouan augmentative \*-xtE, whereas the intensive complementizer in Mandan comes from the Mandan verb *sih* 'be strong.' Several examples of the intensive complementizer appear below.

(3.171) Examples of the intensive indicative complementizer =*sih*

- a. *minís waká'kasjh*  
 wɾɪs wa-ka'=ka=sjh  
 horse 1A-possess=HAB=INTS  
 'I used to have a horse' (Mixco 1997a:27)
- b. "Okípa" *wáa'eheenixanashkasjh*  
 okipa waa-e-hee=rɪx=rash=ka=sjh  
 Okipa.ceremony NEG-PV-say=NEG=ATT=HAB=INTS  
 'he never said "Okipa"' (Mixco 1997a:29)
- c. *máa'qk íxatanashini* *réehoomaksjh*  
 wəq'ək i-xat=rash=rɪ rEEh=oowək=o'sh  
 land PV.INS-look.around=ATT=SS go.there=NARR=INTS  
 'he went looking around the land once' (Hollow 1973a:6)
- d. *tawáa'irukirihs,* *ishák ná'hka'ehesjh*  
 ta-waa-i-ru-kriih=s ishak rə'k=ka'ehe=sjh  
 3POSS.AL-nom-pv.INS-INS.HAND-smooth=DEF 3PRO SIT.POS=QUOT=INTS  
 'his staff, it was right there, it is said' (Hollow 1973a:7)

This intensive indicative =*sjh* is able to co-occur with evidentials that indicate that the speaker does not have first-hand knowledge of the event in the utterance. However, in a similar way to the definite =s, speakers may use =*sjh* to proclaim the truth of the statement. In this way, the intensive indicative produces a stronger assertion than one involving the definite =s. This enclitic appears in the corpus rather sparingly. Mixco (1997a:28) is the first to point out this formative, though he describes it as a combination of the definite =s and what he describes as a coordinating conjunction *hɪ*. In Mandan, *hɪ* is used as a hedge in discourse, similar to English 'uh,' 'um,' or 'well.' Mixco translate it as 'and,' but it is not a true coordinator or sentence connector. Hollow (1973a,b) recognized this and almost never transcribed *hɪ* in his narratives, which also carried over to him omitting all hedges and filler elements like *hɪ* from the corpus. The use of instrumentation like Praat allows us to see that there is frication at the end of this formative (Boersma & Weenik 2016). The presence of /h/ after the vowel indicates that it cannot be a series of enclitics, but a single element that comes from a reanalysis of the word *sjh* 'be strong.'

### 3.3.5.12 Causational complementizer: =*so'nik*

The causational complementizer in Mandan is often used where 'because' or 'since' would be used in English. The enclitic =*so'nik* indicates that a subordinated proposition B has happened as a result of proposition A being the case. We can see examples of this subordinator in the data below.

(3.172) Examples of the causational complementizer =*so'nik*

- a. *wáashinashso'nik,*                      *q't*                      *kirúto'xere'sh*  
 waa-shi=rash=so'rjk                      a't                      k-rut=o'xrE=o'sh  
 NEG-be.good=ATT=COMP.CAUS DEM.DIST MID-eat=DUB=IND.M  
 'since he is no good, he will not get to eat that' (Hollow 1973a:43)
- b. *koshúykas*                                      *míih*                      *áakiso'nik,*                                      *ikxqhini...*  
 ko-shuyka=s                                      wíih                      aa-ki=so'rjk                                      i-kxqh=rj  
 3POSS.PERS-male's.younger.brother=DEF woman PV.TR-arrive.back.here=COMP.CAUS PV.INS-laugh=SS  
 'since his brother brought a woman back, he was laughing at him and...' (Hollow 1973a:73)
- c. *karóotiki,*                      *kú'hsó'nik,*                                      *má'keroomako'sh*  
 ka=oote=ki                      k'-uyh=so'rjk                                      wá'kE=oowak=o'sh  
 PROV=EVID=COND 3POSS.PERS-wife=COND.CAUS lie.AUX=NARR=IND.M  
 'and so, because she was his wife, he stayed there' (Hollow 1973b:28)
- d. *íwapashiriihso'nik,*                                      *óshi'sh*  
 i-wa-pa-shriih=so'rjk                                      o-shi=o'sh  
 PV.INS-1S-INS.PUSH-think.about=COMP.CAUS PV.IRR-be.good=IND.M  
 'because I thought it over, it will be good' (Hollow 1973b:210)

Clauses containing =*so'nik* cannot exist without a superior clause. That is, the causative complementizer introduces a reason for why the following proposition is the case. Without a superordinate clause, a clause bearing =*so'nik* is an incomplete utterance.

Like other complementizers, =*so'nik* appears to contain a fossilized remnant of the copula *ó'* 'be.' At some earlier stage in Mandan's development, this sequence was composed of three distinct elements: /=*s*=*o'*=*rjk*/, where =*s* is the definite evidential, *o'* is 'be,' and =*nik* is the iterative complementizer. It is not clear how an iterative marker fits within the semantics of a causal subordinator like =*so'nik*, though it could be the case that =*nik* was at one point semantically broader and could be used for different kinds of subordination.

### 3.4 Syntactically-conditioned affixation

Over the course of this chapter, I have described the range of morphology present on Mandan verbs. While Mandan has a large inventory of prefixes, suffixes, and enclitics, its relatives Crow and Hidatsa boast a larger array of verbal morphology, as does Mandan's more distant cousin, Lakota. Mandan has a greater amount of distinct verbal morphology than other Siouan languages, like Tutelo or Biloxi. One factor that might be motivating Mandan from not having as diverse an amount of verbal morphology as other Siouan languages is that it has had a relatively small population of speakers since the early 1800s due to successive waves of smallpox (Fenn 2015:223).

### 3.4.1 Status of enclitics

One of the most potentially-controversial tasks completed within the previous chapter is the distinction between affixes and clitics. In this chapter, I have outlined what those affixes and clitics are. Specifically, I have detailed different allomorphs for various prefixes in §3.1 and the inventory of enclitics in §3.3. Here, I go one step further and propose that the enclitics in Mandan are what Zwicky (1977, 1985) refers to as simple clitics, or what Anderson (2005:10) calls phonological clitics. Instead of moving to a particular spot within the CP domain, a phonological clitic will stay where it is generated in the syntax. A phonological clitic relies on an adjacent prosodic word in order to be realized.

Given that I have ruled out ascribing a phonological solution to the issue of affix ordering in Mandan, what can we say about the syntax? If morpho-phonology cannot motivate the ordering of affixes, perhaps morpho-syntax is driving the surface order of affixes in Mandan. To investigate how well the syntax is able to account for this, let us look at the following example.

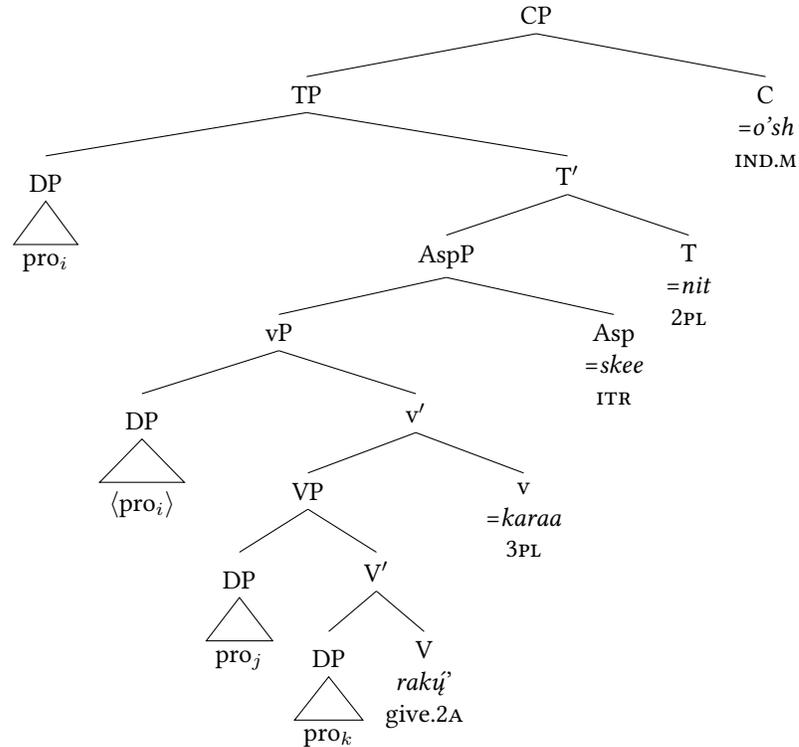
(3.173) Sample sentence with inflectional prefixes and enclitics

*rakú'karaaskeenitošh*  
ra-ku'=krE=skee=rjt=o'sh  
2A-give=3PL=ITR=2PL=IND.M

'you (pl.) are giving it to them again' (Hollow 1970:457)

The data in (3.173) features both an inflectional prefix plus several inflectional enclitics. These enclitics, as phonological clitics, are assumed to not undergo any movement and are realized *in situ*. That is, the ordering of enclitics is indicative of the order in which those enclitics appear within the syntax. We can use the example above and create a tree to illustrate this process.

(3.174) Tree based on the data in (3.173)



In the tree above in (3.174), we see several assumptions. Firstly, if we follow Chomsky (2000, 2001) in that *v* has  $\phi$ -features to regulate object agreement, and that *T* has  $\phi$ -features to regulate subject agreement, then it stands to reason that enclitics that represent a phonological representation of a bundle of those features should be generated where said features are checked. For this reason, we can see the third person plural object realized as the enclitic /=krE/ in *v*, and the second person plural subject is realized as the enclitic /=rɪt/ in *T*.

Secondly, the ordering of non-agreement enclitics in Mandan seems to line up more or less with the proposed adverb hierarchy given by Cinque (1999). While the interative aspectual =skee is represented here as the head of an AspectP, it is also possible that =skee is simply a prosodically-reduced adverb that relies on the preceding prosodic word to be fully realized. I remain agnostic as to whether this is an AspP or AdvP between TP and vP, and ultimately, whichever it is makes little difference in the grand scheme, because the outcome is the same: a prosodically weak element generates in the head of a functional projection and, as a phonological clitic, becomes prosodically adjoined to the word to its left.

In the end, we have the inflected verb *raku'* 'you give' remaining low in *V*. It is not able to move up to *v*, because there is already overt material there to prevent it from undergoing head movement to the higher functional head. While there are different agreement enclitics occupying space elsewhere in the tree, there is also inflectional

agreement on the verb in the form of the second person marker *ra-*.

One possibility is that Mandan is a language with upward Agree as described by Baker (2008:74), where the probe is c-commanded by the goal. With upward agreement, Mandan verbs can stay low in the structure due to the fact that upward movement is often blocked by agreement and adverbial enclitics but still acquire their  $\phi$ -features. If this is the case, the appearance of *ra-* along with the matching number enclitic *=nit* is not insurmountably problematic, but we are left with multiple exponents that mark the second person plural subject. How to account for the motivations behind multiple exponence has long been an issue, as it is often described as a marginal phenomenon and can be inconvenient for some theories of morphology (Harris 2017:6).

Halle & Marantz (1993:138) claim that there can be no multiple exponence of features from a single syntactic node, and Steele (1995:280) makes a similar claim, though allows for multiple exponence when multiple exponents contribute additional information. Thus, under the latter's theory, *ra-* is permitted because it simply marks a second person active argument, while *=nit* adds the number information for that second person active argument.

The semantico-syntactic structure in (3.174) helps show why enclitics are ordered in the way they are: i.e., object-marking enclitics manifest in *v*, subject-marking enclitics manifest in *T*, adverbial enclitics manifest in their own respective functional heads, etc. However, a syntactic explanation may not be sufficient to account for the ordering of prefixes. Let us consider the following sentence:

(3.175) Sample sentence with alternating inflectional and derivational prefixes

*róorahaanito'sh*  
rV-o-ra-hE=rjt=o'sh  
1S.PL-PV.IRR-2A-see=2PL=IND.M

'you (pl.) are going to see us' (Hollow 1970:477)

The first person stative plural prefix for vowel-initial stems is *rV-* and the second person active prefix is *ra-*. The enclitic *=nit* in this context tells us that the second person argument is being pluralized.<sup>10</sup> The irrealis preverb *o-*, a derivational prefix, interrupts the two inflectional prefixes.

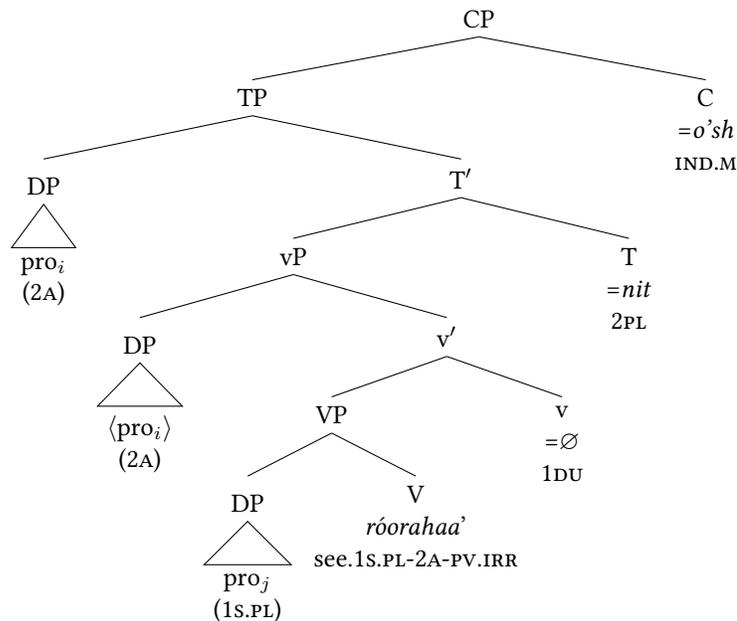
Assuming the Split-Morphology Hypothesis per Anderson (1977, 1982) is correct, derivation should be restricted to the lexicon, while inflection is 'precisely the domain in which the systems of syntactic and morphological rules interact' (Anderson 1992:74). This hypothesis precludes the ability to jump back and forth between inflection and derivation in a word, and that seems to be exactly what we see in the data in (3.175): an inflectional prefix, then a derivational prefix followed by another inflectional prefix, and finally the root. We should expect /o-hE/ 'PV.IRR.see'

<sup>10</sup>Another possible reading is that a second person singular active argument is acting upon a first person plural stative argument. This alternative reading does not affect the argumentation above, however, since the ordering of the prefixes would be unchanged.

to be the stem upon which these inflectional prefixes appear. But the data above show that the surface ordering of prefixes does not match up to this expectation. An example of the syntactic structure for (3.175) appears in (3.176) below.

In this tree, we see the expected positions of the phonological enclitics =*nit* and =*o'sh* in T and C, respectively. A null enclitic occupies v to represent number agreement for the object, since a first person dual argument does not take a corresponding number enclitic. If we assume that the verb in V is able to look upwards for  $\phi$ -features, we have not one but two problems: first, the second person prefix *ra-* is able to bypass the preverb and affix directly onto the stem, and second, the ordering of the inflectional prefixes does not mirror the underlying order of the arguments they represent.

(3.176) Tree based on the data in (3.175)



The first problem with the placement of *ra-* in (3.176) is that it is able to somehow enter its stem, /o-hE/. Instead of having an underlying sequence of /ra-rV-o-hE/ or even /rV-ra-o-hE/, we have /rV-o-ra-hE/. I have argued extensively in Chapter 2 that the prefixes in Mandan are true prefixes and not proclitics. As such, we should not expect to see an *ad hoc* organization of prefixes in the same way that we see language-specific orders of proclitics within a clitic field. The prefix *ra-* likewise cannot be an infix, as there would be little phonological motivation for it to appear in the second syllable in *róorahaanito'sh* as it has to ignore two other prefixes to appear where it does.

The second problem with the *ra-* in (3.176) is that there is nothing syntactically motivating it to appear in the

position it does within the verb; its status as a subject marker should logically require it to appear at the leftmost edge of the word, and the *rV*- prefix should be closer to the stem, given its status as a direct object. We should expect to see object marking closer to the stem, given the fact that the direct object appears as a complement of the verb, but this is not the case.

### 3.4.2 Ordering of enclitics

In previous discussions of the template in Mandan, it has been assumed that the template is immutable. This observation holds for prefixes and true suffixes, but not so for enclitics, which do not have the same fixed ordering. I argue that enclitic order reflects the semantico-syntactic configuration of a proposition and that a change in enclitic order reveals the scopal relationships between that enclitic and its constituents.

In the examples below, we see two examples of Mandan sentences. The prospective aspectual enclitic =*naate* appears in both, but its ordering with respect to subject marking and negation is different. This aspectual enclitic is shown in bold, the subject enclitic is underlined, and the negative enclitic appears with a double underline.

(3.177) Variable positioning of enclitics

- a. *wáa'okikashkaxinashanaatekere'sh*  
 waa-o-ki-kashka=xi=rash=rąatE=krE=o'sh  
 NEG-PV.IRR-MID-be.same=NEG=ATT=PRSP=3PL=IND.M  
 'they were **almost** sort of not the same' (Mixco 1997a:30)
- b. *wáarakų'karaanitinxanaate'sh*  
 waa-ra-ku'=krE=rjt=rjx=rąatE=o'sh  
 NEG-2A-give=3PL=2PL=NEG=PRSP=IND.M  
 'you (pl.) **just about** did not give it to them' (Hollow 1970:468)

In (4.50a), the negative enclitic appear immediately after the verb root and before the prospective aspectual enclitic, which in turn appears before the third person plural subject marker. A drastically different enclitic order appears in (4.50b), where the prospective enclitic appears after all plural marking, both subject and object, as well as after the negation enclitic =*nix*. Where as negation appeared as teh first postverbal element in (4.50a), it appears much farther into the enclitic field in (4.50b).

The order of enclitics in (4.50) above is far from random. Both the negation enclitic and the prospective aspectual enclitic in these examples illustrate where each of these functional projections are in the structure and over what they have scope. The fact that negation is marked immediately after the first but before subject marking in (4.50a) shows that negation appears low in the structure, scoping over just the verb, while its presence after the subject plural marker in (4.50b) means that negation is taking place much higher in the structure and has scope over not just

the verb but the whole inflectional phrase. Similarly, the prospective aspectual enclitic in (4.50a) appears before the subject plural marker, which indicates that this aspect has scope over the verb but not the entire TP. We can contrast this limited scope reading with a wide scope reading in (4.50b), where the aspectual enclitic appears after all person marking and negation, showing that it has scope over the entire proposition.

From these examples and other like them in the corpus, we can reinforce the notion that enclitics in Mandan are truly phonological clitics (i.e., clitics that remain in place within their phrase structure) and not morpho-syntactic clitics (i.e., clitics that must appear at a specific location within a phrase structure) (Anderson 2005). A morpho-syntactic clitic would be expected to align itself to a particular edge within the structure in a certain order, as Romance proclitics do around T (Kayne 1991:649). A morpho-syntactic clitic could never just appear in any order, so the order of these enclitics must therefore be driven by the fact that they are remaining where they appear in the structure and becoming dependent on the preceding word to be prosodically realized.

### 3.4.3 Conclusion

At the conclusion of Chapter 2 I argue that inflectional morphology in Mandan is not simply targeting the left edge of the word. Instead, the prefixes are sensitive to word-internal boundaries. Using Anderson's (1992) notion of a composite word, where a word has internal boundaries plus additional morphological material that is not a word unto itself, we can reinterpret the data in (3.175) as follows:

(3.178) Internal structure of (3.175)

*róorahaanito'sh*

[rV- o [ra- hE]<sub>H</sub>] =rɪt =o'sh  
 INFL- DERIV- INFL- ROOT =INFL =INFL  
 1S.PL- PV.IRR 2A- see =2PL =IND.M

'you (pl.) are going to see us' (Hollow 1970:477)

The prefix *ra-* is affixing onto the head of the composite word /hE/ 'see/, while *rV-* is affixing onto the left edge of the overall word. While the syntax is clearly providing the necessary  $\varphi$ -features for these features to be realized, the syntax is not able to yield the surface ordering of these prefixes. I affirm that the ordering of enclitics in Mandan mirrors the semantic scope that those enclitics represent in a way similar to Rice's (2000) hypothesis. Per this hypothesis, formative order reflects semantic scope in Athapaskan languages. However, we cannot appeal to semantico-syntactic scope to justify the surface order of prefixes in Mandan. This is the over-arching issue presented in Chapter 1: how are we able to account for affix order in Mandan? At the conclusion of Chapter 2, we explored the notion of whether the phonology had any control over affix order, and the case for phonologically-motivated

affix order did not hold. Throughout this chapter, I have described the kind of verbal morphology that appears in Mandan, but the argument above is that syntax or semantics alone cannot account for the ordering of affixes. After discounting the morpho-phonology and the morpho-syntax, we are left with a third avenue to explore: the morphology alone is motivating the affix order in Mandan.

## Chapter 4

# Morphologically-motivated affix order

This chapter serves to resolve the three questions posed in Chapter 1 in (1.1), (1.2), and (1.3). Those questions are repeated below.

(4.1) The three research questions at hand

- a. **Question 1:** According to [Manova & Aronoff \(2010:110\)](#), affix ordering could be either motivated (i.e., governed by rules) or unmotivated (i.e., inexplicable). They deem “templatic” to be a subtype of unmotivated affix order, but is affix ordering in languages with templatic morphology truly unmotivated, or can there be at least some motivating factors with respect to affix order?
- b. **Question 2:** [Rice \(2000:1\)](#) questions the notion of a template as a word-formation device in Athabaskan languages and argues that affix ordering is constrained by semantic scope. Since Athabaskan languages are often held up as exemplars of templatic morphology (i.e., unmotivated affix ordering), does this necessitate that all languages therefore have motivated affix ordering?
- c. **Question 3:** [Anderson \(1982:609\)](#) states that derivation takes place in the lexicon, after which inflectional affixation can occur, with inflected forms thereafter being unable to undergo additional derivation. Given that inflectional and derivational affixes are frequently interspersed in templates, does this distribution of affixes indicate that inflection and derivation are cyclical morphological processes, or can we account for this interweaving of affix types some other way?

The overall purpose of this chapter is to demonstrate that Mandan (and thus any language with templatic morphology) has motivated affix order. I have laid out the claim in Chapter 2 that affixation in Mandan is not phonologically motivated, and I concluded Chapter 3 by likewise ruling out a syntactic motivation for affix ordering.

Therefore, I propose that we can look to the morphology itself to account for why affixes are ordered the way they are, specifically, the prefix field in Mandan due to the interspersion of derivational morphology between inflectional prefixes.

While the overall ordering of inflectional affixes in Mandan seems to stem from an affix-specific sensitivity to a particular domain within the word, there must still be some principled way for these affixes to line up with their designated domain edges. In particular, there must be a way for the morphology to determine which affix must precede another in the case where multiple affixes are competing for the same boundary edge. Namely, even if we can explain away the motivation for why certain affixes appear where they do, we still must explain why they appear where they do in the ordering they do. For that, we can appeal to an Optimality-Theoretic (OT) approach (Prince & Smolensky 1993).

The notion of applying an OT account to morphological realization is not a new one (McCarthy & Prince 1986, 1993b; Benua 1995; *inter alios*). However, I propose a newer synthesis of previous work, incorporating elements of the morphological framework that Anderson (2005) employs in his treatment of clitics and the Realization OT framework of Aronoff & Xu (2010). Each affix *af* is associated with an alignment constraint, which requires either the left or right edge of the domain  $\mathcal{D}$ . A single domain edge can be the target of several different *af*-specific alignment constraints. The ranking of these these alignment constraints with respect to one another determines the order of affixes; the affix associated with the highest-ranked constraint will appear closest to the edge of  $\mathcal{D}$  than an affix associated with a lower-ranked constraint in a constraint hierarchy. This section lays out the basic machinery to which I appeal in order to explain the motivation for affix order in Mandan, as well as to point out areas within this framework upon which we can improve.

I provide background on previous attempts to account for affix order in Siouan languages in §4.1, then I examine the composition of the template in Mandan and show what makes the ordering of affixes so problematic in §4.2. The diachronic motivations for why affixes appear in the order they do is addressed in §4.3, as does the structure that allows inflectional prefixes to seemingly be blind to the presence or previous inflectional or derivational morphology and appear after the preverb. An Optimality Theoretic approach of how the morphology is able to order prefixes in the way they appear in the Mandan template is provided in §4.6, while a survey of prefix templates across the Siouan language family appears in §4.7 to demonstrate that the same solution for affix ordering in Mandan can be applied to the rest of the Siouan language family.

## 4.1 Issue of templatic morphology

Manova & Aronoff (2010:125) remark that no language has been documented with truly arbitrary order, which means that templatic morphology remains the only real member of the set of unmotivated affix orders within their typology of affixation. Thus, if we can demonstrate that templatic morphology is genuinely motivated with respect to affix order and satisfy question one in (4.1a), the answer to question two in (4.1b) must logically be that all languages have motivated affix ordering. By showing that affix order in templatic languages is motivated, we show that all language have motivated affix orders.

Chapter 3 concludes with evidence that enclitics in Mandan are ordered in a way that reflects the semantico-syntactic relationships each enclitic has on the preceding material: i.e., the farther to the right edge of a word an enclitic is, the great its semantic scope. The same statement cannot be made about prefixes.

### 4.1.1 Previous analysis of the Siouan template

Mandan is far from the only language whose affix ordering raises theoretical problems. In their paper on morphology in Hoocak, a Mississippi Valley Siouan language, Helmbrecht & Lehmann (2008:271) argue that the complexity of Hoocak's verbal structure is problematic for our understanding of morphology in the following ways:

- (4.2) Issues that Hoocak pronominals raise per Helmbrecht & Lehmann (2008)
- a. The ambivalent morphemic or submorphemic status of preverbs,
  - b. The discontinuous nature of many roots,
  - c. The existence of sizable paradigms of internal affixes,
  - d. The sequential order of affixes,
  - e. The syntagmatic interdependence of said affixes.

A verb in Hoocak like *giruk'as* 'take off quickly (as in a race)' appears as a single morphological unit in the third person, i.e., 'he takes off quickly,' but the verb has the following form in the second person. The verb in (4.3) has a second person marker that splits what Helmbrecht & Lehmann (2008:272) call the initial stem component (ISC) from the root.

- (4.3) Interaction between ISC and inflectional morphology

*ragišuruk'as*  
**ra-gi-šu-ruk'as**  
**2A.SG-ISC-2A.SG-take.off**

‘you take off’ (Helmbrecht & Lehmann 2008:272)

They postulate that the actual structure of the verb as being *gi\_ruk’as* to reflect the ability of this verb to take what appears to be infixal morphology between the ISC—or what I call the preverb throughout this work—and the verb. Furthermore, since preverbs in Hoocak appear to be lexically selected, the authors ascribe submorphemic status to units such as *gi-*, which the authors also say do not add any “independently identifiable contribution to the meaning of the form” (Helmbrecht & Lehmann 2008:272). Despite this assertion, the authors then go on to say that *gi-* often confers a benefactive reading to verbs, as in (4.4) below:

(4.4) Semantics of *gi-* in Hoocak

- a. *gúys* ‘to counsel’
- b. *gi-gúys* ‘to teach someone’

Thus, the formative *gi-* at least sometimes give a benefactive reading, even if in (4.3) that reading is not present. This last point notwithstanding, Helmbrecht & Lehmann (2008) cite Bybee’s (1985) principle of proximity iconism, whereby a morphemic order is iconic by which derivational affixes are closer to the root than inflectional affixes, to point out that the ordering in Hoocak is counter-iconic. This counter-iconicism is shown in (4.3), in that person marking occurs twice within the Hoocak verb provided, and these two verbal slots must be filled with concomitant morphology. That is to say, both second person markings in (4.3) must be present in order to have a well-formed sentence for that particular verb.

#### 4.1.2 Verbal template in Mandan

Mandan displays a similar issue as Hoocak does with pronominal prefixes and preverbs. As discussed throughout this dissertation, certain prefixes appear to the right of a preverb and other prefixes appear between the preverb and the verb. We can see this distribution in the example below, where a first person plural active prefix *rV-* appear to the left of the transitivizer preverb *aa-*, while the second person stative prefix *ni-* appears trapped between the preverb and the verb.

- (4.5) *ráaniraahinito’sh*  
*rV-aa-rĭ-rEEh=rĭt=o’sh*  
**1A.PL-TR.PV-2S-go.there-2PL-IND.M**  
‘we all brought you there’ (Kasak 2014b:2)

The transitivizing preverb *aa-* in (4.5) seemingly “traps” the second person object pronominal between it and the

verb. In addition, the first person plural pronominal appears to the left of the preverb. This ordering would be the same even if the  $\theta$ -roles of both arguments were reversed, as we can see in (4.6) below.

- (4.6) *ráararaahinito'sh*  
rV-aa-ra-rEEh=rít=o'sh  
1s.PL-TR.PV-2A-go.there=2PL=IND.M  
'you all brought us there' (Kasak 2014b:3)

According to Helmbrecht & Lehmann (2008), we lack appropriate concepts to account for phenomena such as those seen in the Hooçak and Mandan data above. However, I argue that despite the typologically marked constructions seen thus far, the tools exist to both account for a structural analysis of the word-building process in Siouan languages synchronically, and also an explanation for how such an affix ordering arose through reanalysis and grammaticalization diachronically.

## 4.2 Templatic morphology and Mandan preverbs

The focus of this dissertation revolves around the issues presented by the phenomenon of so-called trapped pronominals in Siouan languages, and given that these pronominals are exclusively within the realm of the preverbal domain, the question of suffixes will not be addressed, as the few suffixes identified in Chapter 3 were quite limited and were all derivational in nature. Furthermore, the suffix field in Mandan is uncontroversial in that the ordering of suffixes corresponds to the order of semantic scope in a way consistent with the Scope Hypothesis proposed by Rice (2000:20), wherein global uniformity (i.e., similar affix ordering across a language family) originates from some principle of universal grammar that may be diachronically or synchronically motivated. For the rest of this chapter, when I discuss the issue of ordering in Mandan's template, I refer exclusively to the prefix field.

### 4.2.1 Infixation is really prefixation

Traditional Siouan literature holds that affixation in Siouan languages happens according to what positional class a particular affix has, which often gives rise to large and cumbersome tables in various Siouanist publications to describe what slot in a paradigmatic template a particular affix falls under. Rankin et al. (2003:186) remark that Siouan languages "really do not lend themselves to description in terms of templatic morphology," but it still the case that the ordering of affixes with respect to each other is far from fluid, and as such, referring to Siouan languages as having a templatic morphology is useful in conveying the general sense of the ordering of affixes in a paradigmatic template. As such, I shall continue to use the term templatic morphology to refer to this kind of phenomenon, as the

term the term adequately conveys a sense of predictability and proscribed order.<sup>1</sup>

Helmbrecht & Lehmann (2008:275) describe the Hoocak affix *šu-* 2A.SG in (4.3) as originally being a prefix on the root *ruk'as* 'take off.' This prefix *šu-* eventually becomes preceded by a derivational ISC prefix *gi-*, and the combination of *gi-* and *ruk'as* at some point in the history of Hoocak came to be lexicalized as a unit, effectively turning the prefix *šu-* into an infix. They describe this process as entrapment. Rankin et al. (2003:187) refer to these verbs as infixing verbs, stating that pronominals interrupt a single verb root. McCarthy & Prince (1993b) likewise analyze the analogous placement of pronominals in Dakota as infixes. However, I submit that the aforementioned analyses of such pronominals as infixes are not accurate, and point to the phonological evidence discussed in Chapter 2 to motivate this argument. The remainder of this chapter serves to bolster the morphological evidence for why I argue that there is no infixation in Mandan, and by extension, the rest of Siouan.

The prefixes in Mandan are true prefixes, never infixes, as these affixes do not meet the definition of an infix per Yu (2007:10), who holds that an infix "appears as a segmentally distinct entity between two strings that form a meaningful unit when combined but do not themselves exist as meaningful parts." This definition expands somewhat to include those infixes that can appear between two morphological entities (e.g., a prefix and a root) due to phonological restrictions on syllable shape, as is the case with the famous Tagalog *-um-* infix (McCarthy & Prince 1993a:102). There are no phonological restrictions on syllable shape motivating the ordering of prefixes in Mandan.

There are several claims about the morphology of Mandan so far: We are to discount this phenomenon of trapped pronominals as being due to infixation; we do not wish to say that this affix ordering is truly templatic in the sense that these affixes are being concatenated in the order they appear by switching between inflection and derivation and back to inflection again; and we can assert that these trapped pronominals are true prefixes. What then can we say that they are prefixing onto?

Looking across the entire corpus of Mandan narratives, one striking pattern emerges: it is not the case that these trapped pronominals are just appearing after a preverb. Rather, what we are seeing is that they are blind to preverbs because these prefixes must adjoin to a particular element within the verbal complex, which in this case is the verb stem itself. This stem can be the bare root, or it can contain derivational prefixes such as instrumentals, aspectuals, or voice markers. These elements can appear to the left of the verbal root and to the right of these trapped pronominals, as we can see in the example below. The inflectional prefix is underlined, and the derivational prefixes are bolded.

(4.7) A trapped pronominal preceding derivational prefixes in Mandan

---

<sup>1</sup>The use of the term "templatic morphology" here should not be confused with the process of transfixation in Semitic languages, which is also referred to as templatic morphology in McCarthy & Prince (1990).

*íwakiþka'uxo'sh*  
 i-wa-ki-k-pa-ux=o'sh  
 PV.IRR-1A-SUUS-ITR-INS.PUSH-be.broken=IND.M

'I am going to break something of my own again' (Hollow 1970:450)

The inflectional prefix *wa-* ignores the irrealis preverb *o-* and prefixes onto the verbal stem *kipká'ux* 'break something of one's own again,' even though there are three other derivational prefixes between that verbal stem and the *wa-* inflectional prefix. Mandan speakers must therefore be able to determine that the preverb is less integrally part of the overall verb than *kipka'ux* 'break something of one's own again' is. This behavior is not happening because of a phonological or syntactic principle, but because the prefixes that make up the set of trapped pronominals are specifically targeting a specific zone within the verbal complex and preverbs exist outside of this zone.

A recurring issue in the descriptions of Siouan grammars is how each Siouan language deals with the entrapment of pronominals by what Helmbrecht & Lehmann (2008) call ISCs, or which Rankin et al. (2003:187) call locatives and instrumentals. This class of prefixes are often just called applicatives in Siouanist literature as well (Helmbrecht 2006, 2008). For the purposes of my own analysis and throughout the previous chapters of this work, I have employed a more general term for this kind of morphology, simply calling it a preverb, as the applicative semantics that these elements may have provided at some point are often bleached and are now lexically selected for by many verbs, as we can see in the Mandan word *téero'sh* 'he died' versus *iteero'sh* 'he loved it,' which simply is the verb 'die' prefixed by the instrumental preverb. Somehow, these preverbs exist as part of the verb, but are not integral to it in the same way other derivational morphology is, as demonstrated in the Hoocak example below:

(4.8) Preverbs and inflectional morphology in Hoocak

- a. *kqané*  
 kqare  
 fall.over  
 'to fall over' (Helmbrecht 2008:136)
- b. *hakané*  
 ha-kqare  
 PV.TR-fall.over  
 'to fall on something' (Helmbrecht 2008:136)
- c. *hanikqane*  
 ha-nij-kqare  
 PV.TR-1A>2S-fall.over  
 'I fall on you' Helmbrecht (Helmbrecht 2008:136)

The base verb *kqané* is intransitive, but its valency increases with the addition of the superessive preverb *ha-*,

which means that the action is taking place onto an object, as is the case in (4.8c). In the case of this particular preverb, it indicates that the object pronominal has the  $\theta$ -role of a goal, rather than the normal theme or patient that being marked as a stative argument would typically denote in Siouan languages.

A similar process occurs to some degree in all Siouan languages. The superessive or transitivity preverb *ha-* in Hoocąk corresponds with the Proto-Siouan postposition \*aa. [Helmbrecht \(2008:138\)](#) gives a likely account of how these constructions arose through grammaticalization of preverbs onto verbs at some stage in Proto-Siouan or Pre-Proto-Siouan.

Pronominals in Siouan and Catawban are typically organized as being marked as either active or stative; active signifies the argument that bears the agent  $\theta$ -role, while stative typically signifies a theme or patient  $\theta$ -role, though the addition of preverbs can cause the  $\theta$ -roles of the stative pronominals to denote goals or other non-core roles. These are not case markings on nouns, but a manner of dividing up inflectional prefixes. These first person singular and second person pronominals are expected appear between the preverb and the verb stem, which demonstrates that Siouan has a firmly-established pattern that these particular prefixes must adjoin to the main stem of the verb and ignore preverbs entirely.

### 4.3 Determining prefix order

If one were to wonder if the predilection of first person singular and second person pronominals becoming trapped is solely a phenomenon in Mississippi Valley Siouan, which includes both Hoocąk and Lakota, we need only turn to Mandan. Unlike other languages in the Siouan family, Mandan had no existing closely-related languages that were spoken at the time of European contact. The Mandan people have shared close contact with the distantly-related Hidatsa and Crow in the Missouri River Valley for many centuries and are the groups Mandan is most closely related to, despite the long time depth between the when the common ancestor of these three languages was spoken ([Kasak 2015a](#)). The Mandan endured frequent conflict with nearby bands of Lakota and Dakota over the centuries before the Reservation period, and despite the frequent contact between allied and non-allied peoples, the Mandan language remains distinct enough that previous researchers have argued that it should constitute its own branch of the Siouan language family ([Rankin 2010](#)). Therefore, if Mandan shares this peculiarity of trapped pronominals with distant relatives like Hoocąk and Lakota, we can surmise that it is a deeply-rooted fact about the morphological nature of Proto-Siouan for all its daughter languages to inherit this template. Furthermore, this templatic morphology must be easily learnable for it to have remained so prolifically entrenched within the grammatical systems of its daughter languages for possibly thousands of years. If Mandan children are able to acquire this template, there must be some

motivation behind its ordering.

The prefix template for Mandan appears below.

Table 4.1: Prefix field in Mandan

11	10	9	8	7	6	5	4	3	2	1	0
REL	NEG	UNSP	1PL	PV.IRR	PV.LOC	1SG	2SG/2PL	SUUS	ITER	INS	STEM
					PV.INS			MID	INCP		
					PV.TR			RECP			

The first person plural in slot 8 and unspecified argument marker in slot 9 are separated from the other pronominal agreement morphology by the intervening preverbs in slot 6. Further complicating matters is the future marker *o-* in slot 7, which is trapped between the first person plural marker slot and the preverb slot. We can see examples of this pattern below:

(4.9) Separation between inflectional prefixes within the template

- a. *rorárusanq̄hini...*  
**ro-ra**-ru-sraq̄h=r̄j̄  
**1s.PL-2A**-INS.HAND-leave.behind=ss  
 ‘you leave us and...’ (Hollow 1973a:31)
- b. *róorahaanito’sh*  
**rV-o-ra**-hE=r̄jt=o’sh  
**1s.PL-PV.IRR-2A**-see=2PL=IND.M  
 ‘you (pl.) will see us’ (Hollow 1970:456)
- c. *wáa’iwaseko’sh*  
**waa-i-wa**-sek=o’sh  
**UNSP-PV.INS-1A**-make=IND.M  
 ‘I am busy’ (Hollow 1970:203)

The data in (4.9a) lack a preverb, and as such, the inflectional prefixes are contiguous. We can contrast this behavior with the data in (4.9b) and (4.9c), where inflectional prefixes are interrupted by a preverb.

### 4.3.1 Preverbs and pronominals

The number of verbs that obligatorily take preverbs in Mandan is quite significant, with many verbs not being present in the language without their preverb. Mandan also displays a limited degree of object incorporation onto the verb, as seen from the examples below with the preverbs shown in bold where present and the nominal elements underlined.

(4.10) Nominal incorporation in Mandan

- a. *wáawe'xi'ohixi'sh*  
 waa-w'-eexi#o-hi=xi=o'sh  
 NEG-1POSS-belly#PV.LOC-be.full=NEG=IND.M  
 'I am not full' (Hollow 1973b:119)
- b. *máaminihijnixo'sh*  
 waa-wri#hij=rjx=o'sh  
 NEG-water#drink=NEG=IND.M  
 'he is fasting' (Hollow 1970:74)
- c. *ihokisop*  
 iih#o-ki-sop  
 mouth#PV.LOC-MID-suck  
 'to kiss' (Hollow 1970:85)

In the examples in (4.10a), the incorporated nominal appears to the left of the preverb, which follows the same pattern as incorporated nominals in Hidatsa per Boyle (2007:365). All incorporated DPs are nearly always bare like in (4.10b) and (4.10c), though incorporated possessed DPs are possible, as seen in (4.10a). Incorporation is not common in Mandan, and it seems to be limited to a small number of lexical items. It is not clear how productive incorporation is from the corpus.

The data below contain pronominals that appear in an ordering consistent with Mixco's (1997) description of prefix ordering in Mandan from Table 4.1. Specifically, the first person prefix occurs to the left of the second person prefix, regardless of the semantic role to which these affixes are mapped.

(4.11) First-person preceding second-person

- a. *wáa'imanasqpekto'sš*  
 waa-i-w-**ra**-sqaPE=kt=o'sh  
 NEG-PV.INS-**1s-2A**-go.around=POT=IND.M  
 'You should not go around me' (Hollow 1973a:147)
- b. *óminikiri'ro'sh*  
 o-w-**ri**-kri'=o'sh  
 PV.IRR-**1A-2s**-defeat=IND.M  
 'I will beat you' (Hollow 1973b:59)

The data in (4.11) demonstrate the presence of trapped pronominals in Mandan in their predicted positions, appearing between the preverb and the verb stem. Unlike other Siouan languages, Mandan pronominals do not have fixed positions for agents and patients, but rather are ordered by person: first person pronominals will always precede second person pronominals. However, first person plural pronominals will always precede the preverb, as seen in (4.12):

(4.12) Placement of first-person plural marker in Mandan with a preverb

- a. *róo'inikyte'sh*  
**rV-o-i-rj=ku'tE=o'sh**  
**1A.PL-PV.IRR-PV.INS-2s-help=IND.M**  
'we will help you' (Hollow 1973a:143)
- b. *róorahekto'na?*  
**rV-o-ra-hE=kt=o'ra**  
**1s.PL-PV.IRR-2A-see=POT=INT.F**  
'will you see us?' (Mixco 1997a:18)
- c. *riikihekto'sh*  
**rV-i-ki-hE=kt=o'sh**  
**1A.PL-PV.INS-ITR-see=POT=IND.M**  
'we will wait for him' [also 'he will wait for us'] (Hollow 1973b:195)

(4.13) Placement of first-person plural marker in Mandan without a preverb

- a. *nunúkina'kto'sh*  
**ru-ru-kira'=kt=o'sh**  
**1A.PL-2s-tell=POT=IND.M**  
'we will tell you' (Kennard 1936:10)
- b. *roráhaanito'sh*  
**rV-ra-hE=rjt=o'sh**  
**1s.PL-2A-see=2PL=IND.M**  
'you see us' (Kennard 1936:10)

The data in (4.12) and (4.13) contain examples featuring preverbs and those without preverbs. In (4.13), we see that the first person plural will always precede the second person. When preverbs are involved, what role a first person plural plays in a sentence is not nearly as obvious. Regardless of whether the first person plural is the agent or has some other  $\theta$ -role, that distinction will neutralize before preverbs as the allomorph for both *nu-* and *ro-* before vowels is *rV-*, leaving the denotation of what roles other arguments are play up to context, as in (4.12c), or by looking at any pronominal that is trapped between the preverb and the verb, as in (4.12a) and (4.12b).

The unspecified argument marker *wa-* likewise also appears before preverbs.

(4.14) Placement of outer pronominals in Mandan

- a. *wa'iraratijha'shka?*  
**wa-i-ra-ra-tijh=a'shka**  
**UNSP-PV.INS-2A-INS.MTH-stick.out=PSBL**  
'perhaps you are mad at him?' (Hollow 1973b:237)

- b. *waríisekini...*  
 wa-rV-i-sek-rj  
 UNSP-1A.PL-PV.INS-make=SS  
 ‘we will make it and...’ (Hollow 1973a:183)

The location of where the unspecified argument marker appears in the verbal template appears in Mandan to be analogous to the position of its counterpart in Hidatsa. Unlike Hidatsa, Mandan has overt first person plural markers, *nu-* and *ro-*. Mandan shares this first person plural marking with every other language in the Siouan family, along with the positioning of the first person plural before any preverbs.<sup>2</sup>

### 4.3.2 Status of preverbal morphology

In the discussion above in §4.3.1, we can see that prefix orderings in Mandan and that certain pronominals will always precede the preverb while certain pronominals will always follow, neither language discussed here shares the same prefix ordering. The literature written on Siouan languages vacillate on the exact morphological status of these prefixes. In Hidatsa, Boyle (2007:205) describes all prefixal material as inflectional morphology, while Mixco (1997a:15) refers to pronominals in Mandan as being agreement markers without elaboration as to whether they are prefixes or proclitics.

Earlier work in Kasak (2013b) argues that all preverbal material in Mandan is composed of proclitics, but this position is later abandoned in Kasak (2014b,c), where these formatives are argued to be prefixes, with only the prefixes discussed in §4.3.1 being truly inflectional: i.e., slots 4-5 and 8-11. We have seen in §2.5.1 that there are two different strategies for dealing with hiatus in Mandan, depending on whether the element is an affix or an enclitic: [ʔ] resolves epenthesis within a word boundary, while [r] resolves hiatus across a word boundary that involve an enclitic. This process of hiatus resolution through epenthesis is a crucial piece of evidence that prefixes in Mandan are truly prefixes and not clitics at all.

To fully discount the notion that we are just dealing with a proclitic field, we must examine what the definition of a clitic is. In several Siouan grammars (Mixco 1997a:14, Rood & Taylor 1996:455), the term clitic is used to describe various morphology without much explanation for what exactly qualifies those morphs as clitics. Bandyng the term “clitic” about without any explanation is not exclusive to Siouanist literature. However, it is worthwhile investigating whether the any prefixal morphology discussed in Chapter 3 qualifies as a clitic.

---

<sup>2</sup>Missouri Valley Siouan has lost the Proto-Siouan first person plural markers \*rų- and \*ų-. Instead of having a devoted first person plural mark, Crow and Hidatsa will mark the verb with the first person singular prefix to show person, and then will apply a plural enclitic to mark number for the subject. Park (2012:214) shows that Hidatsa permits plural object marking as well using the same plural enclitic, but it cause ambiguity over whether the plural enclitic has domain over the subject or object.

#### 4.3.2.1 Pronominals as clitics

Zwicky (1985) stands out as a seminal foundation for the discussion of clitics, wherein he outlines two varieties of clitics: simple clitics and special clitics. As Anderson (2008:169) points out, the so-called contracted auxiliaries in English are examples of such clitics.

##### (4.15) Simple clitics in English

- a. Who do you think's going to come?
- b. Who do you think **is** going to come?

The = 's cannot exist on its own, as it is prosodically subordinate to the word *think*, and it appears in the same place in the syntax as its fully prosodically-realized form *is*. There is no movement on the part of = 's; it simply becomes prosodically bound to the word on its left. Special clitics are so called because they have a special position to which they seem to be bound. The most common example of special clitics are those in Romance languages, where clitics typically accumulate before a finite verb. We can see this behavior in the Catalan example below, where clitics are shown in bold.

##### (4.16) Proclitics in Catalan

**te me n'hi** has anat tota sola?  
 2.SUB= 1.OBJ= ABL=LOC= have.2.SG gone.PAST.PTCP all.FEM alone.FEM

'did you go off there all alone on me?' (Wheeler, Yates & Dols 1999:214)

Another example of special clitics are the second position—or Wackernagel—clitics, which appear after the first word in a clause. The Russian =*li*, which denotes a yes-no question, is one such clitic (Billings 2002:53), and we can see how it aligns itself to the second position within the sentence: i.e., it immediately follows the first word.

##### (4.17) Wackernagel clitics in Russian

a. znáeš'            **li** ty,                    gde Sáša?  
 zná-eš'            =**li** ty                    gde Sáš-a  
 know-2SG.INFM =Q you.SG.INFM.NOM where Alex-NOM

'do you know where Alex is?

b. govórite    **li** vy                    po-rússki?  
 govor'-ite =**li** vy                    po-rússki  
 speak-2.PL =Q you.2PL.NOM in.Russian

'do you speak Russian?'

Anderson (2005) builds upon Zwicky’s (1985) theory of clitics by rechristening simple clitics as phonological clitics and special clitics as morphosyntactic clitics, as defined below:

(4.18) Andersonian clitic definitions

- a. **Phonological clitic:** A linguistic element whose phonological form is deficient in that it lacks prosodic structure at the level of the (Prosodic) Word (Anderson 2005:23).
- b. **Morphosyntactic clitic:** a linguistic element whose position with respect to the other elements of the phrase or clause follows a distinct set of principles, separate from those of the independently motivated syntax of free elements in the language (Anderson 2005:31)

The nomenclature that Anderson (2005) employs has already been used throughout this dissertation, as the terms ‘special’ and ‘simple’ clitics are somewhat opaque as to what distinguishes one kind of clitic from another. Furthermore, Anderson & Zwicky (2003:328) argue that being one kind of clitic does not rule out also being another, as it is typical for a morphosyntactic clitic to also be prosodically deficient. It stands to follow that many clitics are both phonological and morphosyntactic clitics, so they are certainly not in complementary distribution.

For the prefixal morphology in Siouan languages to be considered phonological clitics, their position in the surface representation would have to coincide with where in the syntax such a clitic would be. For example, looking at the English data in (4.15), the clitic form =’s and the non-clitic form *is* are both assumed to exist in T, where auxiliaries in English are permitted to raise to from *v*. The clitic =’s is not moving to a special position within the sentence, such as before a finite verb like in Catalan. Rather, the clitic is staying put but is nonetheless forced to “lean” on the word preceding it to be realized, given its weak prosodic status. If the prefixes in Siouan languages were phonological clitics, then their positioning would mirror their underlying position in the syntax, as seen in the Wakashan language K<sup>w</sup>ak<sup>w</sup>’ala below. Clitics appear in bold.

(4.19) Phonological clitics in K<sup>w</sup>ak<sup>w</sup>’ala

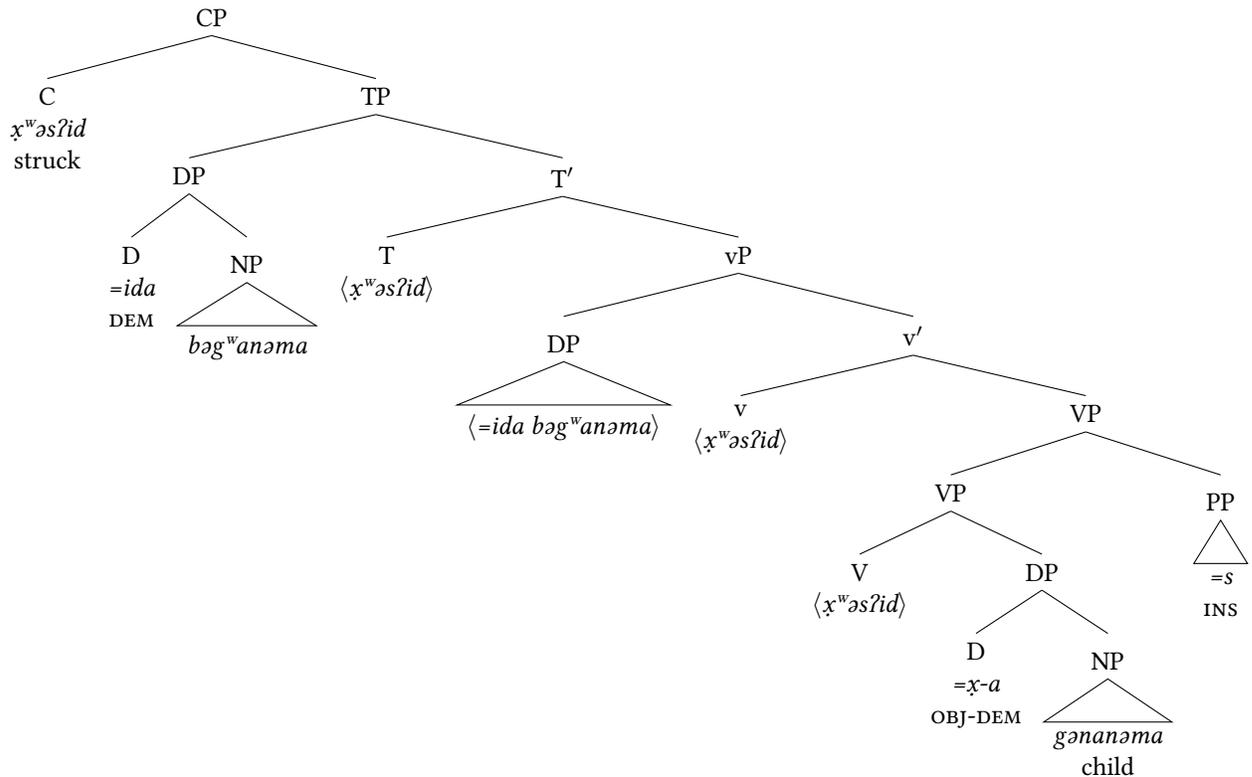
- a.  $\text{ʃ}^w\text{əs}ʔid=\mathbf{ida} \text{ bəg}^w\text{anəma}=\mathbf{x-a} \text{ gənanəma}=s$   
 struck=DEM man=OBJ-DEM child=INS  
 ‘the man struck the child with it’ (Anderson 2005:16)
- b.  $\text{ʃ}^w\text{əs}ʔida=\mathbf{\emptyset}=\mathbf{q}=s$   
 struck=he=OBJ=INS  
 ‘he struck him with it’ (Anderson 2005:16)

The default sentence order in K<sup>w</sup>ak<sup>w</sup>’ala is VSO. In (4.19), we can see that the ordering of the clitics in (4.19b) lines up with the expected word order as in a sentence where most of the nominals are explicitly mentioned in the

discourse, as in (4.19a). Thus, we can show that the ordering of the clitics in (4.19b) has nothing to do with any kind of clitic ordering. Rather, the placement of these clitics is just the result of a prosodically weak formative that leans on the word to its left, causing several determiner or pronominal clitics to pile up due to the lack of intervening nominals between them and the verb.

A tree appears in (4.20) below with my interpretation of the underlying structure to illustrate that the structure of the sentence is relatively uncomplicated, despite the SVO word order and the fact that the demonstrative clitics in Kwak'w'ala lean leftward on the word preceding them. The verb  $\dot{x}^w\acute{a}s?id$  'struck' undergoes head movement from V until it reaches C at the left edge of the sentence, while the subject  $=ida\ b\acute{a}g^w\acute{a}n\acute{a}ma$  'the man' moves from [Spec,vP] to [Spec,TP] due to the EPP. The subject determiner  $=ida$  has only one word before it in the sentence, the verb, and as such, it encliticizes onto that element. The noun 'man' acts as the nearest element to the left of the direct object  $=\acute{x}a\ g\acute{a}n\acute{a}n\acute{a}ma$  'the child,' which allows  $=\acute{x}a$  to encliticize onto the subject. Lastly, the instrumental  $=s$ , having only the direct object before it, must encliticize onto that word to be prosodically realized. No controversial movements or post-syntactic mergers under adjacency are required in order to get the surface ordering of these phonological clitics to match up with the underlying structure; the phonological clitics are already where they are supposed to be.

(4.20) Structure of (4.19)



Returning to the issue of Mandan prefixes and the possibility of them being phonological clitics, it is the case that they simply cannot be phonological clitics, as their ordering is not related to the underlying syntax, which was demonstrated earlier in §3.4, and more explicitly in the trees appearing in (3.174) and (3.176). That is, for Mandan where first person plural appears at the left edge of the word ahead of a preverb and an inner pronominal of some kind, there is no way for the underlying word order to be such that wherever the pronominals are generated, that is where they appear in the surface form of the word.

(4.21) Mismatch between affix order and underlying syntax

- a. *ráaniraahinito'sh*  
**rV**-aa-**rj**-rEEh=rj̄t=o'sh  
**1A.PL**-PV.TR-**2s**-go.there=2PL=IND.M  
 'we all brought you there'
- b. *ráararaahinito'sh*  
**rV**-aa-**ra**-rEEh=rj̄t=o'sh  
**1s.PL**-PV.TR-**2A**-go.there=2PL=IND.M  
 'you all brought us there'

In the Mandan sentences above in (4.21), the fact that the first person plural and second person prefixes do not change places despite the subject and object being swapped between both sentences highlights the reason why they simply cannot be phonological clitics. Unlike the K<sup>w</sup>ak<sup>w</sup>'ala data, there is nothing in the underlying structure to suggest that first person arguments always occupy one place in the structure, while second person arguments occupy another. Given that Mandan has very strict SOV word order, if these were phonological clitics, then we would expect to see faithfulness to that word order in the ordering of pronominals. The data in §?? as well as those above have shown, however, that it is not the case that there is any faithfulness between the underlying syntax and the surface form of prefixes in Mandan.

Perhaps, then, what we are dealing with is a series of morphosyntactic clitics. As the Catalan and Russian examples in (4.16) and (4.17) show, such clitics are able to appear in locations outside of where they originate in the underlying structure. Furthermore, it is a typologically robust generalization that the ordering of such clitics do not have to be syntactically motivated, as the examples from Anderson (2005:109) below show.

(4.22) Clitic order in French and Hittite

a. French clitic ordering:

*me, te, se, nous, vous* » *le, la, les* » *lui, leur* » *y* » *en*

b. Hittite second position clitic ordering:

Sentence connectives » quotative » dative/accusative plural » 3rd person nominative/accusative singular » 1st/2nd person dative/accusative singular » 3rd person dative singular » reflexive » locative/aspectual particles

While one may be able to argue some kind of animacy hierarchy for the ordering of French proclitics, the Hittite second position clitic ordering is opaque. The fact that a first and second person dative/accusative singular clitic is sandwiched between two different first person singular clitics has no clear motivation from a syntactic point of view. As such, if Kasak's (2013b) analysis of prefixes in Mandan really being morphosyntactic proclitics is correct, then we can simply say that the ordering of the preverbal morphology can simply be attributed to clitics having language-specific orderings. There are various syntactically-driven proposals arguing that clitics can be arranged within a functional projection FP that exists somewhere between the CP and TP layers (Kayne 1994, Terzi 1999), or that there are a series of functional projections specific to a particular grammatical case to which a particular clitic is drawn (Cattaneo 2009, Ciucivara 2009). We have evidence of proclitics in the Siouan language Catawba, as Rudes (2007) argues, where object proclitics precede locative proclitics that in turn precede instrumental proclitics. If a proclitic field exists in Catawba, perhaps its distant relative Mandan simply has a much, much more crowded

proclitic field.

When /r/ in Catawba appears word-initially, it fortifies to [d]. This process of word-initial fortition is very common among Siouan languages, and Mandan has a similar process for word- and utterance-initial fortition as described previously in §2.4.2. The proclitics in Catawba are able to distinguish themselves from prefixes in that all proclitics trigger word-initial fortition (Rudes 2007:35). We can see this behavior in the data below.

(4.23) Catawba clitics and word-initial fortition

- a. *takdáadee!*  
tak=raa-dee  
in.front=go.ahead=IMP  
'go ahead!' (Rudes 2007:35)
- b. *haapdáaree*  
haap=raa-ree  
up=go-IND  
'one goes up' (Rudes 2007:35)

No such word-initial fortition is triggered by the presence of any preverbal material in Mandan. The context of the word (i.e., utterance-initially) causes initial fortition of /r/ and /w/ to [n] and [m], respectively. The lack of any word-initial fortition due to the addition of preverbal material is another piece of evidence that these formatives are not clitics, as does the robust differentiation in strategies for resolving hiatus between affixes and a stem and between enclitics and a stem. These formatives are certainly not independent words either, as evidenced by the fact that pauses are not possible between any prefixes in the verbal complex without having to re-start the word from the beginning. As such, both proclitics and independent words preceding the verb can be ruled out.

#### 4.3.2.2 Pronominals as affixes

The only option that remains is that the preverbal morphology in Mandan is affixal in nature. Of particular note is how to deal with the difference between the treatment of outer pronominals, which are always realized as prefixes, while the inner pronominals have previously been described as either prefixes or infixes, depending on the presence of preverbs (Rankin et al. 2003, Helmbrecht & Lehmann 2008). Given that the cliticness and wordhood of these pronominals have been ruled out, we must conclude that they are affixes. However, we are still left with the issue of why some pronominals are always prefixes, while others are variably prefixes or infix-like.

Helmbrecht & Lehmann (2008) repeatedly state that Hoocąk's inner pronominals present a challenge to morphological theory. Namely, they hold that grammaticalization can turn a morpheme into a submorpheme, and that two affixes may be reanalyzed and lexicalized as a discontinuous affix. One example of this process that they give

is the formation of German past participles in particle verbs. These particle verbs involve a preverbal element that separates from the verb stem when undergoing certain morphological operations. Examples of this phenomenon appear below, where the past participle circumfix *ge-...-t* is able to interrupt the particle and the root.

(4.24) German past participle circumfixation

- a. *bau-en* → *ge-bau-t*  
‘build’ → ‘built’
- b. *auf-bau-en* → *auf-ge-bau-t*  
‘build up’ → ‘built up’
- c. *hör-en* → *ge-hör-t*  
‘hear’ → ‘heard’
- d. *auf-hör-en* → *auf-ge-hör-t*  
‘stop’ → ‘stopped’

Without getting into the origin of these preverbs, the point stands that both Mandan and German seem to have a peculiar morphological process in common. Namely, they appear to have a kind of infix that appears between a preverb and a verb.<sup>3</sup> There are many preverbs in German, which are often called particles in the literature. Nonetheless, their function is the same; they act as subunits of a larger unit. They analyze the past participle as a transfix *ge-...-t*, which affixes itself to the stem, bypassing the preverb. This process is highly reminiscent of the process in which the inner pronominals in Siouan languages appear trapped by a preverb.

#### 4.3.2.3 Word-internal structure and affixation

According to [Helmbrecht & Lehmann \(2008\)](#), morphological theory is incomplete because inner pronominals are not inserted at a certain phonological position within a morpheme. They then say that the stems are discontinuous, which explains the internal inflectional affixation. Despite their claims that Hoocak remains a challenge for morphological theory, [Helmbrecht & Lehmann 2008](#) do not particularly elucidate what the exact problem is. Under their analysis, pronominals affix themselves to a particular element within the verbal complex that contains a preverb. On this, both they and I agree. However, I disagree with their analysis of preverbs and verbs being submorphemic units of a larger single formative.

---

<sup>3</sup>I am referring here to separable prefixes in German, whose preverbs originate in adpositions that are phonologically dependent on a verb until that verb undergoes movement, stranding it in a lower position as the verb in a matrix clause moves to second position. [Anderson \(1992:282\)](#) also points out that the *ge-* prefix does not occur on inseparable prefix verbs in German due to the fact that *ge-* can only appear before a syllable with primary stress, so *ge-* is not always expressed on past participles.

#### 4.3.2.3.1 Mandan preverbs create a word boundary

Their problem consists of five components first brought up in (4.2). They say in (4.2a) and (4.2b) that preverbs have “ambivalent” morphemic or submorphemic status and that roots are discontinuous in nature. One solution to these two points is that verbs containing preverbs in Hoocak are really two words, and that that inflectional morphology can only appear on the verb itself, as seen below.

(4.25) Structure of a Hoocak word with a preverb

[ *ho* ] [ *ša- rák* ] → *hošarák*  
PV.INES 2A- tell

‘you tell something’ (Helmbrecht & Lehmann 2008:272)

(4.26) Structure of a Mandan word with a preverb

[ *o* ] [ *ra- kʉh* ] =*o’sh* → *órakʉho’sh*  
PV.INES 2A- want.something =IND.M

‘you want something’ (Hollow 1970:124)

A very similar process allows for the German past participle marker *ge-* to seemingly skip past the preverb and affix onto the verb.

(4.27) Structure of a German word with a preverb

[ *auf* ] [ *ge- bau -t* ] → *aufgebaut*  
up PTCP- build -PTCP

‘built up’

Müller (2003:284) holds that the preverb in particle constructions is a dependent of the verb, and that inflectional material combines with the head after inflection and derivation take place. What I propose is that preverbs in Siouan languages are composites: i.e., a term used by Anderson (1992:300) to describe a class of words with internal structure that have constituents in a particular domain within a larger prosodic word, on which I shall elaborate in §??.

Moving on to the point in (4.2c), the existence of sizable paradigms of internal affixes, the presence of these internal affixes can simply be explained by that particular morphology seeks to affix itself to the head of a composite. In (4.25), (4.26) and (4.27), the inflectional information seemingly circumvents the preverb and prefixes onto the verb. This is due to the status of the verb as the head of a word and the status of particular morphology that is in turn drawn specifically to the head of a word, regardless of any intervening material between the left edge of the greater

word and the head. We see a similar kind of treatment of compounds in English, where the head of the word receives inflection. We can observe this behavior below, where the head of each compound can take plural morphology. That is, while the plural -s typically appears word-finally in compounds, it is the case that the plural marker is really suffixing onto a head word.

(4.28) English compounds

- a. [ [ hedge ] [ hog -s ] ]
- b. [ [ passer -s ] [ by ] ]

Thus, the structures in the previous English, German, and Mandan examples exhibit inflectional morphology that is head-sensitive. Some morphology may not be head-sensitive, however, as seen in the case of complex words that take derivational morphology, such as *pass-by-able* as in ‘that painter is no Diego Rivera; all his murals are very pass-by-able.’ The *-able* suffix does not suffix onto the head *pass-by*, as *\*passable-by* is not grammatical.<sup>4</sup> As such, we can put forth two possibilities for suffixes like *-able*: 1) it either affixes onto an entire prosodic word, complex or simplex, or 2) it is sensitive to the right boundaries of the word and affixes itself there. Both possibilities present different structures, as seen below in (4.29a) and (4.29b), respectively.

(4.29) Possible structures for English compounds with additional morphology

- a. [ [ [ pass ] [ by ] ] -able ]
- b. [ [ pass ] [ by ] -able ]

It is not clear if the suffix above is simply adjoining to a greater stem that includes the whole compound as in (4.29a), or if the suffix is attracted to the rightmost edge of the overall word without creating new brackets around an existing compound as in (4.29b). Either scenario raises the same point: English has morphology that is capable of ignoring the head of a compound, which in this case is *pass*, as that is the word in the compound that would receive morphology (e.g., *passer-by*). This ability to ignore a head and affix directed to the edge of an overall word mirrors the behavior of outer pronominals in Mandan, where they prefix onto the left edge of the overall word and appear left of any preverbs, rather than onto the verbal stem itself to the right of a preverb. We can see this behavior below.

(4.30) [ waa- [ i        ] [ wa- sek    ] ] =o’sh → wáa’iwaseko’sh  
           waa- i            wa- sek        =o’sh  
           UNSP PV.INS 1A make    =IND.M  
           ‘I am busy’ (Hollow 1970:203)

---

<sup>4</sup>The word *passable-by* may be grammatical for some speakers. A simple Google search for *pass-by-able* turns up with tens of thousands of results, but *passable-by* does turn fewer than one hundred, showing that this kind of affixation is possible for some English speakers.

In (4.26) and (4.30), I equate Mandan preverbs with German separable prefixes in their structure. Namely, I am assigning the status of full prosodic word to a preverb. However, we do not have clear evidence that their composition is truly analogous. German separable prefixes have the ability to exist on their own when their associated verb is finite and moves to V2 position in a matrix clause. Similarly, it is possible for the separable prefixes to be topicalized.

(4.31) Wordhood of German separable prefixes

- a. *Die meisten Leute reisen aus.* (← *ausreisen* ‘to leave’)  
 the most people travelled **PV.OUT**  
 ‘Most people left the country.’ (Zeller 2003:184)
- b. *Ein ist dieses Jahr noch niemand gereist.* (← *einreisen* ‘to enter’)  
**PV.IN** is this year still nobody travelled  
 ‘Nobody has entered the country this year.’ (Zeller 2003:184)

In the examples above, the two German verbs *ausreisen* ‘leave [a country]’ and *einreisen* ‘enter [a country]’ are separable prefix verbs. The data in (4.31) show not only that separable prefixes in German are able to exist as separate prosodic words, as seen in (4.31a), but they are also able to be fronted like in (4.31b), showing that the separable prefixes in German are both visible to and manipulable by the syntax.

#### 4.3.2.3.2 Mandan preverbs have composite structures

For the preverbs in Mandan, however, we do not see any evidence of a similar distribution where preverbs and verbs both have word-level status. Preverbs cannot appear apart from their associated verbs in the same way as they can in German, nor can they be moved to a higher position within the structure to the left periphery through focusing or topicalization. If the preverb and verb do not represent two different words, then the alternative is that they represent a single word: a composite. Anderson (1992, 2005) gives several examples of words that likely have internal structure that have inflectional patterns that resemble that we have seen for Mandan: morphological material appears outside the domain of the verbal stem, but inflectional morphology is able to bypass that non-core material and affix directly onto said stem. The examples from (1.14) in Chapter 1 are repeated below.

(4.32) Composite words and examples of their inflection

- a. *bojals’a* [Russian]  
 [[boj -a] s’a]  
 ROOT -INFL DERIV  
 be.afraid -PST.M REFL  
 ‘[I] was afraid’

b. *kölluðumst* [Icelandic]

[[kall -að -um] st]  
ROOT -INFL -INFL DERIV  
call -PST -1PL MID

‘[we] were called’

c. *movk’lav* [Georgian]

[mo [v- k’lav]]  
DERIV INFL- ROOT  
PERF 1SG- kill

‘I will kill him’

For each of the examples in (4.32), inflectional morphology appears only on the verb itself, rather than on the edge of the overall prosodic word. In Icelandic and Russian, the *-st* and *-s’a* respectively follow any suffixes that mark tense or subject. The reason for this is that the process of inflection is blind to the presence of *-st* and *-s’a*, caring only about marking agreement on the head of the composite word: the verb. Similarly, aspect marking in Georgian and Russian with *mo-* and *po-* respectively permit inflection to occur on the verb regardless of their presence. This process is most evident in Georgian, where the first person subject marker *v-* is able to prefix onto the verb, seemingly bypassing the preverb *mo-*.

Many languages of the Americas feature trapped pronominals or other internal affixes (Craig & Hale 1988, Dryer 2009, Mithun 1991), as do languages of the Caucasus (Harris 2003). As such, Mandan is not alone in the problem raised by internal affixes. However, as Anderson (1992, 2005) shows, the internal affixation issue that Helmbrecht & Lehmann (2008) raise for morphological theory can be accounted for rather simply by stating that the verb, as head of a composite, is able to receive inflectional affixes that ignore the morphological material outside the head. The placement of pronominals in Georgian verbs containing preverbs like in *movk’lav* ‘I will kill him/her/them’ mirrors that of the inner pronominals in Mandan.

The answer to this problem is that the inflectional affixes in Siouan that seemingly become trapped between the preverb and verb are really just prefixes that target the head of a word: the verb. The outer pronominals, on the other hand, are prefixes that target the left edge of a prosodic word, without preference for whether it is adjacent to the head of the word or not. By analyzing Siouan verbs that have preverbs as being composed of multiple constituents within a larger prosodic word, the issue of syntagmatic interdependence of the affixes from (4.2e) in Hoocąk can be explained: i.e., the preverb is not an affix and as such, does not play a part in the ordering of affixes, whereas the pronominals and instrumentals, both inner and outer, all have different targets for what they can affix onto, as we can see in this restructured account of (4.30) below.

(4.33) Composite analysis of the structure of (4.30)

[ <i>waa- i</i>	[ <i>wa- sek</i>	] ] =o'sh	→	<i>wáa'iwaseko'sh</i>
<i>waa- i</i>	<i>wa- sek</i>	=o'sh		
UNSP PV.INS	1A make	=IND.M		

'I am busy' (Hollow 1970:203)

In (4.33), the inner pronominal *wa-* 1A prefixes onto the head of the composite like the pronominal *v-* 1.SUBJ in Georgian. Unlike any of the other inflectional processes seen so far in the discussion of composites, outer pronominals in Mandan target the left edge of the entire word, regardless of whether or not the word is a composite or simplex. That is to say, Mandan is noteworthy in that they exhibit two different manners of inflectional affixation.

The point raised in (4.2d), the issue of the sequential order of affixes, certainly is one of the biggest problems that Helmbrecht & Lehmann (2008) propose. Indeed, the ordering of affixes in Mandan seems very opaque and is unrelated to the underlying structure of a sentence. In a manner similar to the ordering of morphosyntactic clitics in French and Hittite mentioned earlier, Mandan prefixes seemingly are combined in an arbitrary manner. Given this arbitrariness, how then can we explain the motivation behind the ordering of inflectional prefixal morphology? In other words, if we are to address the first guiding question of this dissertation from (1.1), can we say that there are truly motivating factors with respect to affix order in a templatic language like Mandan?

## 4.4 Problem of affix ordering

In Baker's (1985) seminal paper relating to the interaction between the syntax and the morphology of words, he proposes the Mirror Principle, which holds that the surface ordering of affixes mirrors the ordering in which associated syntactic operations apply. Alsina (1999:6) holds that the Mirror Principle is "an exceptionless generalization, with strong empirical content given the constraints on word formation." In the data Baker (1985) looks at throughout his investigation into the relationship between syntactic structure and the surface ordering of affixes, the order of affixal morphology is transparent, given the underlying syntax.

No such transparency is apparent in Mandan, as argued at the conclusion of Chapter 3 of this dissertation. The underlying syntactic structure of arguments in Mandan does not yield the expected ordering of affixes, nor does it account for why a preverb can intervene between inner pronominals and outer pronominals. At the conclusion of Chapter 2, I likewise argue that phonology has no motivating influence of the order of affixes in Mandan, and some other factor must be at work if affix order is truly motivated.

#### 4.4.1 Reconciling surface affix order with underlying structure

The discussion of how affixes are ordered is not unique to Mandan or Siouan in general. The Athabaskan languages of North America are celebrated for their complex verbal constructions and are often cited as being problematic for Baker's (1985) Mirror Principle. To address this perennial problem of affix order in Athabaskan, Harley (2010) argues that it is possible for the affix ordering to be reflective of the syntax in Navajo, thus preserving the Mirror Principle.

The mechanisms she outlines that can affect the formation of complex words appear below.

(4.34) Syntactic and post-syntactic mechanisms used in Harley (2010)

- a. **Head movement:** combines morphemes under one mother node in the syntax.
- b. **Affix-specific linearization requirement:** morpheme is a suffix/prefix with respect to its sister constituent.
- c. **Merger Under Adjacency:** combines morphemes that are adjacent but not under one mother node at the end of the syntax.

Harley (2010:166) proposes that these three mechanisms are able to account for the ordering of prefixes in Navajo, even in words like (4.35), with the verb and preverb shown in bold. Unlike the relationship between preverbs and verbs in Mandan, the preverb and the verb in Navajo allows for much more morphological material to appear between them. We can see this behavior below.

(4.35) Trapped pronominals in Navajo

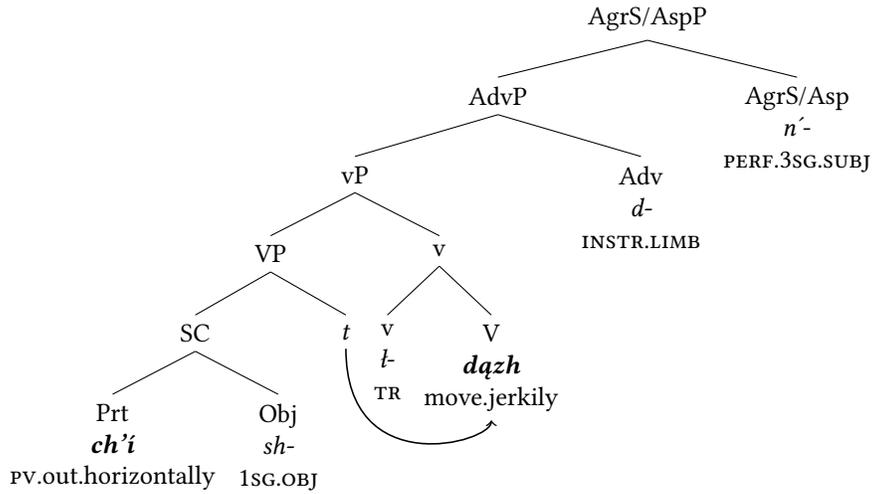
*ch'ishidinildqzh*  
**ch'i**-sh-d-n'-l-**dqzh**  
DERIV-INFL-DERIV-INFL-DERIV-ROOT  
PV.out.horizontally-1SG.OBJ-INS.LIMB-PERF.3SG.SUBJ-TR-**move**.**jerkily**  
'he jerked me outdoors' (Hale 2001:678)

In (4.35), we see a large amount of morphology trapped between the preverb and the verb, similar to what we see in Mandan. The prefix *n'* is a portmanteau aspect- and third person subject-marker, which looks like a trapped pronominal as it is inflection trapped between a verb root and a derivational prefix *d-*, a thematic instrumental prefix relating to arms or legs. To the left of this derivational prefix is the object marker *sh-*, showing that the object is first person and singular. The preverb *ch'i* is an adverbial, indicating that the action happened on a horizontal plane towards the outdoors. Similar to Mandan, we have inflectional prefixes with intervening derivational morphology in Navajo. Harley (2010:189) argues that the surface prefix order can be accounted for in three steps.<sup>5</sup>

---

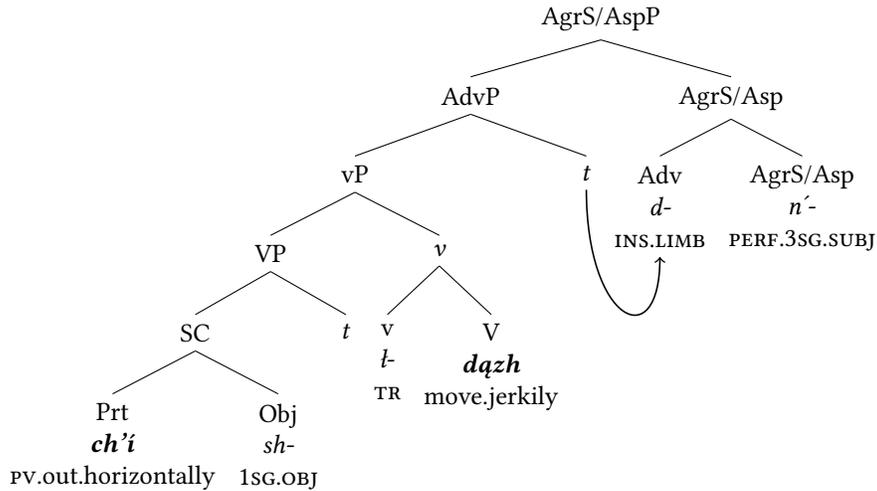
<sup>5</sup>Harley (2010) assumes that preverbs in Navajo are structured like Germanic particle verbs and make up a small clause (SC).

(4.36) Step 1: V to v head movement:



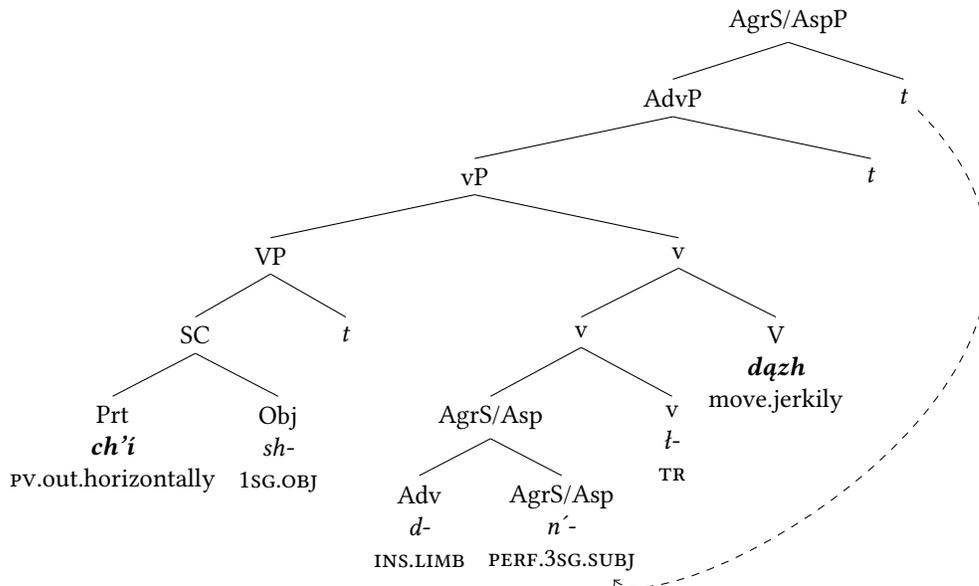
Step 1 involves simple head movement of the verb *dqzh* in V up to v. Unlike [Kayne's \(1994\)](#) analysis of adjunction, [Harley \(2010\)](#) does not assume that all adjunction is left-adjunction, which is why the verb appears to the right of the transitivizer *t-*. In step 2, another round of head movement takes place, but this time with Adv to AgrS/Asp. This movement is depicted in the tree below.

(4.37) Step 2: Adv to AgrS/Asp head movement:



Finally, Merger Under Adjacency takes place, with the two complex heads adjoining across phrase boundaries and giving the appearance of affixation of a structurally superordinate element to a structurally subordinate one.

(4.38) Step 3: Merger Under Adjacency of v complex and AgrS/Asp complex:



Bobaljik (1994) proposes that this Merger Under Adjacency operation is what allows Affix Lowering in English to occur. That is, a post-syntactic operation takes place in English allowing for the tense morphology in T to adjoin onto the verb complex in v, giving us the surface ordering of affixes without head movement from v to T. With

that analogous operation in mind, we are able to get the ordering of prefixes in *ch'ishidinildqzh* to line up with the post-syntactic structure as shown above in (4.38).

Harley's (2010) analysis provides an account of a very difficult issue: how can the complex morphology of a language like Navajo be brought in line with Baker's (1985) Mirror Principle? At least for the examples she utilizes, the three mechanisms in (4.34) allow for the morphology of Navajo verbs to be mirrored in the syntax, as the end result above shows. One issue with this hypothesis is what is regulating the kind of variability in adjunction that we see in the structures above: both left- and right-adjunction are present?

It is relatively uncontroversial to say that a language permits *v* to T movement for verbs, but under this analysis we have Adv to T movement in Navajo. Furthermore, it is unclear why the movement of the verb from V to *v* is permitted, but not *v* to Adv above. If one were to counter that the presence of an adverb blocks the upward movement of a verb in the structure, then it stands to reason that verb that lacks an instrumental adverb might be permitted to move to T from *v* unimpeded. Once the verb reaches T, however, it would have to adjoin on the right in order to get the surface order of affixes to line up.

While the sequence of steps as argued by Harley (2010) above do yield the actual ordering of prefixes in Navajo, it is unclear what motivates certain morphology like the adverbial and the subject and aspect prefixes from forming a unit and then lowering to left-adjoin onto the verb. There does not seem to be anything structurally about the morphology present in (4.35) to suggest that the verb should right-adjoin to the complex in *v*. If anything, this process appears to make the verb "suffix" onto the transitive marker *l-*. There is nothing constraining the directionality of these Head Movements and Mergers Under Adjacency as we can tell from the structure. As such, this analysis is still lacking in that we have nothing constraining Head Movement; we simply are able to shift affix bundles up and down the tree, right-adjoining or left-adjoining with no clear reason why, and then moving those bundles again to adjoin onto a different head or bundle. Could there be a less ad hoc process to determine affix order in languages like Navajo?

#### 4.4.2 Constraint-driven motivation for affix order

While the account for employing syntactic hierarchies to drive surface affix order may nominally work in the account above for Navajo, the same case cannot be made in certain Bantu languages, which also pose a serious threat to the universality of the Mirror Principle. In Bantu, Hyman (2003) claims that neither Baker's (1985) Mirror Principle nor Rice's (2000) compositionality-based concept of affix-ordering by way of semantic scope can account for the suffix ordering. Namely, in most Bantu languages there is a default template known as CARP: causative, applicative, reciprocal, passive. These suffixes appear in this specific order in most Bantu languages, which can lead to issues

when the scopal qualities of each affix change but their ordering in the verbal template does not, as can be seen in the Chicheŵa data below. The bracketing represents the intended semantics of each sentence.

(4.39) CARP template in Chicheŵa

- a. Applicativized causative: *-lil-its-il-* [ with [ cause cry ] ]

*alenyé a-ku-lil-its-il-a mwaná ndodo*  
 hunters 3PL-PROG-cry-CAUS-APP-FV child sticks  
 ‘the hunters are making the child cry with sticks’ (Hyman 2003:248)

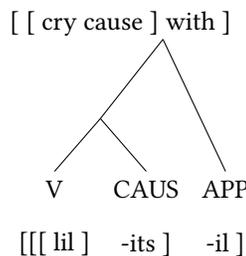
- b. Causativized applicative: *-takas-its-il-* [ cause [ stir with ] ]

*alenyé a-ku-tákás-its-il-a mkázi mthíko*  
 hunters 3PL-PROG-stir-CAUS-APP-FV woman spoon  
 ‘the hunters are making the woman stir with a spoon’ (Hyman 2003:248)

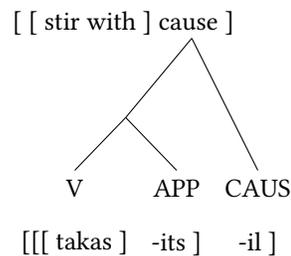
In (4.39a), the ordering of affixes lines up with the semantic scope that they have: i.e., the sequence is compositional in that the applicative instrument is used for the causation of an action, not for the action itself. This situation contrasts sharply with the ordering of affixes in (4.39b), which has the same sequence of suffixes, but those suffixes have scope over different elements of the sentence. The trees below in (4.40) help to visualize this issue. Namely, despite the fact that the causative has scope over the applicative and the verb in (4.39b), the causative and applicative have the same ordering as in (4.39a), where the applicative has scope over the causativized action.

(4.40) Compositional mismatch between causatives and applicatives in Chicheŵa

- a. Applicativized causative



- b. Causativized applicative



The causative and applicative suffixes in (4.40b) appear in an order contrary to the syntactic structure; the causative *-its* remains closest to the verb, while the applicative *-il* is farther away. Thus, it is more important that Chicheŵa maintain adherence to an affixal template than it is to adhere to the Mirror Principle. To account for this, Hyman (2003) suggests that this conflict be resolved through an Optimality-Theoretic manner. He proposes that there are two kinds of constraints that are determining the order of suffixes: *TEMPLATE* licenses the CARP ordering

and causes the causative suffix to precede the applicative suffix regardless of semantic scope, and MIRROR, which is a compositionality faithfulness constraint.

The constraints that produce the output seen in (4.39) appear below, though modified for ease of assigning violations.

(4.41) Chicheŵa templatic constraints

- a. TEMPLATE: A morphosyntactic input {CAUS, APP} is realized according to CARP, i.e., *-its-il-*. Assign one violation for at least one suffix does not appear in CARP order.
- b. MIRROR(A, C): The morphosyntactic input [[[...] APP] CAUS] is realized *-il-its-*. Assign one violation if causative *-its* appears before applicative *-il-*.

The fact that the Mirror Principle is violated at the expense of maintaining adherence to the template order in Chichewa means that TEMPLATE dominates MIRROR(A, C). The tableaux below from Hyman (2003:256) depict this ranking, where the presence of suffixes in the

(4.42) TEMPLATE ≫ MIRROR(A, C)

a. Applicativized causative

[[[ <i>mang</i> ] CAUS ] APP ]	TEMPLATE	MIRROR(A, C)
☞ a. <i>mang-its-il-</i>		
b. <i>mang-il-its-</i>	*!	

b. Causativized applicative

[[[ <i>mang</i> ] APP ] CAUS ]	TEMPLATE	MIRROR(A, C)
☞ a. <i>mang-its-il-</i>		*
b. <i>mang-il-its-</i>	*!	

A substantial portion of his paper is devoted to argumentation supporting the concept of templatic morphology, as opposed to concatenative morphology, going so far to conclude that “Bantu suffixation provides strong evidence for the autonomy of morphology” (Hyman 2003:272). Mandan also seem to support the case for morphological autonomy in that the ordering of their prefixes are rigidly set and are not dependent upon the underlying syntactic structure.

Let us consider the Mandan data below involving the distribution of pronominal prefixes that demonstrate a robust preference for first person marking to appear before second person marking, regardless of what semantic role

each argument plays:<sup>6</sup>

(4.43) Mismatch between subject- and object-marking prefixes in Mandan

- a. *pro pro manahé'sh*  
pro pro w-rą-hE=o'sh  
2A 1s 1s-2A-see=IND.M  
'you see me'
- b. *pro pro minihé'sš*  
pro pro w-rĭ-hE=o'sh  
1A 2s 1A-2s-see=IND.M  
'I see you'

As we have already seen in the discussion of the prefix template throughout this dissertation, inner pronominals in Mandan are always ordered with the first person singular preceding the second person marker, regardless of which argument is the agent and which is the patient. The overt prefix order does not match up with the overt word order. We might be able to employ a similar method as Harley (2010) and argue that we have some kind of Merger Under Adjunction for (4.43a), where the subject marker *na-* somehow lowered and adjoined the verb complex in such a way that we can get the linear ordering of affixes, but then we would have to come up with a reason for why only that one kind of subject marker lowers and the other one does not. Such an explanation would seem somewhat *ad hoc* and not have much predictive power as to where in the structure we can predict Head Movement and Merger Under Adjacency, and would thus be dispreferred over an analysis that is more predictable.

Just like the Chicheŵa examples, the Mandan examples above have a semantic scope mismatch; regardless of whether the first person singular is the agent or the patient of an verb, it will always precede a second person *ya-* or *ni-*. Given Mandan's templatic nature, we can borrow from Hyman (2003) and employ a TEMPLATE and a MIRROR constraint of our own.

- (4.44) a. TEMPLATE: A morphosyntactic input {1.SG, 2} is realized according to animacy, i.e., 1>2>3.<sup>7</sup> Assign one violation if a first person pronominal does not precede a second person pronominal.
- b. MIRROR(S, O): The morphosyntactic input [ SUBJ [ OBJ [...]] ] is realized SUBJ-OBJ-V. Assign one violation if a subject pronominal does not precede an object pronominal.

---

<sup>6</sup>Mandan does not use overt pronouns in the same way languages like English do; pronouns are purely emphatic or serve some pragmatic function. Two pronouns never appear within the same clause, so it is difficult to say without a doubt what the sentences below would look with overt pronoun arguments.

<sup>7</sup>An animacy hierarchy may not be the underlying reason for the first person singular always preceding second person, but it is sufficient to motivate the ordering for the time being.

Given that first person singular always appears as the leftmost element in both Mandan examples in (4.43), it must be the case that we have  $\text{TEMPLATE} \gg \text{MIRROR(S, O)}$ .

We can see this ranking tested below for both situations above: a first person acting upon a second person and a second person acting upon a first person.

(4.45)  $\text{TEMPLATE} \gg \text{MIRROR(S, O)}$

a. First person acting upon second person

[ 1 [ 2 [ he ]]]	TEMPLATE	MIRROR(S, O)
☞ a. <i>mi-ni-he</i>		
b. <i>ni-mi-he</i>	*!	*

b. Second person acting upon first person

[ 2 [ 1 [ he ]]]	TEMPLATE	MIRROR(S, O)
☞ a. <i>ma-na-he-</i>		*
b. <i>na-ma-he-</i>	*!	

Unlike the Bantu suffixes discussed here, much of the prefix field in Mandan involves pronominals and instrumentals. As such, we must figure out a way to account for their ordering, especially because it involves the interweaving of inflectional morphology with derivational morphology, as opposed to the Chicheŵa template, which appears exclusively derivational.

## 4.5 Realization OT

Hyman's (2003) usage of OT to explain the motivation for why the underlying syntactic structure has no effect on the overt ordering of suffixes in Bantu languages is one possible solution to the suffix ordering problem; instead of trying to come up with some alternate morphosyntactic account involving the semantic scope of functional heads à la Rice (2000), he ascribes the process of word-building to the morphology proper, without interference from the syntax proper.

While it is generally true that the Mirror Principle has a very strong empirical grounding (Alsina 1999, Harley 2010), the fact that languages exist wherein the Mirror Principle seems to not hold suggests that it is not a universal. Rather, as Hyman (2003:260), puts it, "the Mirror Principle may not be universal in the 'no exceptions' sense, but rather in the (violable) OT sense." It is precisely this sense of faithfulness and markedness with respect to the

morphology that we need to capture in a theory of word construction.

#### 4.5.1 Morphological motivation for counter-Mirror Principle orderings

The prefixal morphology in Siouan is largely inflectional, in the case of pronominals, or at the very least valency-increasing, in the case of instrumentals. Xu (2007) proposes an inferential-realization model of inflectional morphology within the framework of OT, which Aronoff & Xu (2010) later refer to as Realization OT.

Realization OT according to Xu (2007) assumes that the phonological information of inflection affixes is introduced via realization constraints (RCs), which associate abstract morphosyntactic or semantic feature values with phonological forms. Realization OT has several key advantages. Firstly, it is able to capture universal generalization in affix order, such as the observation by Greenberg (1963:112) that “the expression of number almost always comes between the noun base and the expression of case.”

These RCs bear strong resemblance to Anderson’s (1992) concept of Word Formation Rules (WFRs) and Stump’s (1992) rewrite rules. However, neither of these realizational approaches to accounting for the ordering of inflectional morphology nor Stump’s (2001) Paradigm Function Morphology (PFM) is capable of accounting for the motivation for affix ordering per Greenberg (1963) by themselves. That is to say, both programs of morphology can account for the surface ordering of affixes, but they do not have a way of accounting for the typology. For this reason, we turn to Realization OT.

Most relevant to our goal of addressing the questions in (4.1) is Realization OT’s ability to capture affix ordering. In that respect, PFM is certainly able to capture the ordering of affixes in Siouan languages and other templatic languages by arranging RRs into rule blocks to produce the desired output. In addition, Stump’s (2001) description of determining how one RR can win out over another due to the assumption that Pāṇini’s Principle is at work within each individual rule block is reminiscent of how one constraint can win out over another on an OT tableau. One crucial issue that PFM does not capture in its formation of rule blocks is the scopal relationship certain morphs have with respect to each other, as well as any universal generalizations for affix ordering that go hand-in-hand with scopal relationships.

In Realization OT, RCs are created by listing the set of features of an affix, then listing the realization of said affix, along with a description. For example, the third-person singular present indicative in English is typically realized by the suffix *-s*, and simple past by the suffix *-ed*. RCs for these suffixes would have the following format:

(4.46) English verbal inflectional RCs

- a. {3rd, sg, pres, ind}: *-s*: The third-person present indicative is realized by the suffix *-s*. Assign one violation

if this bundle of features is present in the input but not realized with *-s*.

- b. {pst}: *-ed*: The past tense is realized by the suffix *-ed*. Assign one violation if this feature is present in the input but not realized with *-ed*.

Each of the RCs above depict two inflectional suffixes in English, where each suffix is really a bundle of features that is phonologically realized as an affix. In order to represent the process by which inflection takes place in Realization OT, we can use the English verb ‘walk’ as an example.

(4.47) Use of RCs in English to select correct output

walk, 3sg, pres, ind	{3rd,sg,pres,ind}: -s	{pst}: -ed
a. walk	*!	
b. walks		
c. walked	*!	*!
d. swalk	*!	

Candidate (a) is ruled out due to the fact that there are features in the input that are not realized through an inflectional affix. Candidate (c) is ruled out for the same reason, as well as the fact that the affix that is realized shares no features with the input. Candidate (d) is ruled out because the RC is realized only as a suffix, not a prefix. As part of the RC, *-s* is a shorthand for the fact that this affix will incur a violation if not adjoined to the left edge of the word. Thus, only the optimal candidate, candidate (b), should be realized.

#### 4.5.2 Role of semantic scope in a constraint-based system

In addition to RCs, we need some way of constraining their ordering. It is certainly possible to rank RCs in a manner similar to that of phonological constraints so that affixes appear in a specific order, but doing so ignores the tendency in languages for the surface order of affixes to mirror the underlying semantic composition of what is scoping over what. To capture the generalizations noted in Greenberg (1963) and Bybee (1985), Aronoff & Xu (2010:389) define that method of constraining affixal ordering by defining a SCOPE constraint along the same lines as Spencer (2003:643) with a slight modification to explicitly state the conditions under which violations are assigned:

- (4.48) SCOPE( $f_1, f_2$ ): Given two scope-bearing features  $f_1$  and  $f_2$ , if  $f_1$  scopes over  $f_2$ , then  $I_2$ , an exponent of  $f_2$  cannot be farther away from the same stem than  $I_1$ , an exponent of  $f_1$ , i.e.,  $I_1 > I_2$ . Assign one violation if  $I_2 > I_1$ .

The SCOPE constraint is highly reminiscent of Hyman's (2003) family of MIRROR constraints, and it serves the same purpose: to maintain faithfulness between the surface ordering of affixes the underlying compositionality that should assist in the morphological reflection of the ordering of those operations. These SCOPE constraints fit right in with typological generalizations, as Bybee (1985) notes that negation morphology typically appears farther from the verb than tense morphology, which typically appears farther from the verb than aspect morphology.

We can further consider the observation that tense appears closer to the verb than mood, and that negation is similar to mood in that it often appears farther away from the verb than tense to scope over an entire proposition. Given those observations, we can convert these typological generalizations into SCOPE constraints.

(4.49) Typological generalizations as SCOPE constraints

- a. SCOPE(T, A): An aspectual exponent cannot be farther away from a verbal stem than a temporal exponent because tense scopes over aspect. Assign one violation if  $A > T$ .
- b. SCOPE(M, T&A): Exponents of tense and aspect cannot be farther away from a verbal stem than an exponent of mood because mood scopes over tense and aspect. Assign one violation if  $T \& A > M$ .
- c. SCOPE(Neg, T&A): Exponents of tense and aspect cannot be farther away from a verbal stem than an exponent of negation because negation scopes over tense and aspect. Assign one violation if  $T \& A > \text{Neg}$ .

Thus, armed with both SCOPE constraints and RCs, we can motivate the ordering of affixes through constraint hierarchies in an OT sense.

## 4.6 Templatic morphology and Realizational OT

In my adaptation of Aronoff & Xu's (2010) Realization OT to help motivate the affix order in Siouan, I shall incorporate my analysis to Mandan, to demonstrate its strengths and show where improvement and modification is needed in order to accommodate inflectional morphology in morphologically complex words (i.e., composites and compounds). The ordering of prefixes on Table 4.1 shows that Mandan has instrumentals, aspect, and voice marking close to the verb. These prefixes are derivational in nature and under Anderson's (1982, 1992) interpretation of the Lexicalist Hypothesis, they are relegated to the lexicon. As such, the issue of how they are ordered with respect to one another is one issue. The main issue, however, is that any inflectional morphology will precede these derivational prefixes along with a derivational preverb. These preverbs demarcate internal boundaries within lexically specified words in a manner similar to Anderson's (1992) description of composites in Georgian.

### 4.6.1 Patterns in Mandan prefix order

In previous discussions of the template in Mandan, it has been assumed that the template is immutable. However, enclitics do not have the same fixed ordering. In fact, as posed at the end of Chapter 3, I argue that enclitic order informs us about semantic scope and a change in enclitic order reveals the scopal relationships between that enclitic and its constituents.

In the examples below, we see two examples of Mandan sentences. The prospective aspectual enclitic =*naate* appears in both, but its ordering with respect to subject marking and negation is different. This aspectual enclitic is shown in bold, the subject enclitic is underlined, and the negative enclitic appears with a double underline.

#### (4.50) Variable positioning of enclitics

- a. *wáa'okikashkaxinashanaatekere'sh*  
waa-o-ki-kashka=xi=rash=rąatE=krE=o'sh  
NEG-PV.IRR-MID-be.same=NEG=ATT=PRSP=3PL=IND.M  
'they were **almost** sort of not the same' (Mixco 1997a:30)
- b. *wáarakų'karaanitinxanaate'sh*  
waa-ra-ku'=krE=rjt=rjx=rąatE=o'sh  
NEG-2A-give=3PL=2PL=NEG=PRSP=IND.M  
'you (pl.) **just about** did not give it to them' (Hollow 1970:468)

Let us look at some generalizations about prefix ordering in Mandan.

#### (4.51) Mandan inflectional prefix ordering

- The negation marker *waa-* is farther away from the verb stem than either the aspect markers or the future tense marker, and is the inflectional element farthest away from the verb.
- Among the inner pronominals, first person *wa-/ma-* or any of their allomorphs will always precede second person *ra-/ni-* or any of their allomorphs.
- Among the outer pronominals, the unspecified argument marker *wa-/waa-* will always precede the first person plural marker *nu-/ro-* or any of their allomorphs.
- The relativization marker *ko-* is the farthest prefix from the stem.
- Negation, relativization, and outer pronominals prefix onto the left edge of the word.
- Preverbs are the separation point between inner and outer prefixes; all outer prefixes precede preverbs while all inner prefixes follow preverbs.

Looking at the generalizations in (4.51), we see a few typological familiarities. Namely, Mandan follows Bybee’s (1985) observation that relativization does not appear closer to the verb than negation, tense, or aspect marking. Of the last three features mentioned, Mandan only inflects for negation in the prefix field. Aspect is marked through enclitics after the verb, and no dedicated tense marking is present in Mandan. Despite the lack of inflectional aspect or tense marking in the prefix field, we are still able to see that several typologically-expected orderings occur due to the compositional semantics of what scopes over what. We can therefore add to the SCOPE constraints already proposed in (4.49).

(4.52) Additional typological generalizations to which Mandan adheres

- a. SCOPE(Neg, T&A): Exponents of tense and aspect cannot be farther away from a verbal stem than an exponent of negation because negation scopes over tense and aspect.
- b. SCOPE(Rel, Neg&T&A): Exponents of negation, tense, and aspect cannot be farther away from a verbal stem than an exponent of relativization because relativization scopes over negation, tense, and aspect.

Mandan appears to follow the typological generalization that relativization marking in the form of the prefix *ko-* is farther away from the verb than negation marking in the form of the prefix *waa-*, as demonstrated in the example below.

(4.53) Relativization preceding negation in Mandan

*kowáakihinixkeres*  
 ko-waa-kih=rɪx=krE=s  
 REL-NEG-arrive.back.here=NEG=3PL=DEF

‘those are the ones who did not get back’ (Kennard 1936:15)

While the example in (4.53) conforms to the typological generalization that a candidate that places a negation prefix before a relativization prefix will be ruled out, the SCOPE constraints we have observed so far are completely blind to the ordering of pronominals. Namely, given that all the SCOPE constraints in (4.49) and (4.52) relate to non-argument morphology (i.e., no subject or object marking), we must come up with a satisfactory method to help motivate the ordering of these pronominals.

## 4.6.2 Realization constraints for Mandan prefixes

In order to see how well the rest of the Mandan prefixes adhere to any of the generalizations in Greenberg (1963) or Bybee (1985), let us examine the inflectional prefixes as RCs.

(4.54) Codification of inflectional prefix RCs in Mandan

a. Inner prefixes:

- i. {1st person, sg, agent}: *wa-*: The feature value set {1st person, sg, agent} is realized by the prefix *wa-*.
- ii. {1st person, sg, non-agent}: *mq-*: The feature value set {1st person, sg, non-agent} is realized by the prefix *ma-*.
- iii. {2nd person, agent}: *ra-*: The feature value set {2nd person, sg, agent} is realized by the prefix *ra-*.
- iv. {2nd person, non-agent}: *ni-*: The feature value set {2nd person, non-agent} is realized by the prefix *nj-*.

b. Outer prefixes:

- i. {1st person, pl, agent}: *nu-*: The feature value set {1st person, pl, agent} is realized by the prefix *nu-*.
- ii. {1st person, pl, non-agent}: *ro-*: The feature value set {1st person, pl, non-agent} is realized by the prefix *ro-*.
- iii. {3rd person, indef, non-agent}: *wa-*: The feature value set {3rd person, indef, non-agent} is realized by the prefix *wa-*.
- iv. {negative}: *waa-*: Negative is realized by the prefix *waa-*.
- v. {[+relativized]}: *ko-*: Relativization is realized by the prefix *ko-*.

The fact that prefixes can be broken down into these two types already informs us that not all prefixes are alike. As previously discussed, Mandan prefixes seem to be divided into those that prefix onto the verbal stem of the word and those that prefix onto the left edge of the overall word. Going off previous analogies, the inner prefixes function more like the English plural does in the word *passer-s-by*, while the outer prefixes are more akin to the adjectivizer *-able* in *pass-by-able*, which simply aligns itself to the right edge of the entire compound word.

### 4.6.3 Implications of internal word boundaries

To explain the difference in these prefixes, we must first consider whether the definitions for RCs per [Aronoff & Xu \(2010\)](#) sufficiently capture the ways in which affixation onto a word takes place. For simplex words, [Xu's \(2007\)](#) analysis does an admirable job of explaining how to account for the ordering of affixes. Compounds and composites, however, are a different matter. Recalling [Anderson's \(1992\)](#) definition of a composite, it is a word that has complex internal structure, but whose content is not purely made up on individual words inside of a greater word. To illustrate this difference, let us look at the examples of *passers-by* and *pass-by-able*.

(4.55) Andersonian word types

a. Simplex:

[ pass-es ]

b. Compound:

[ [ passer-s ] [ by ] ]

c. Composite:

[ [ pass ] [ by ] -able ] or [ [ [ pass ] [ by ] ] -able ]

We see a simplex word in (4.55a), where inflectional morphology is attracted to its right edge, since *-s/-es* is a suffix. Similarly, in the compound in (4.55b), we see inflectional morphology, but it is attracted to *passer* instead of the right edge of the word. Furthermore, we can also see derivational morphology in (4.55b) in the form of the agentive *-er*. The example in (4.55c) provides a sharp contrast to the behavior in both (4.55a) and (4.55b), where the derivational suffix *-able* appears on the right edge of the overall word. These data show that inflectional morphology in English uniformly targets the right edge of the head of a word: i.e., if a word is a compound, its head will receive inflectional morphology. A simplex word is vacuously its own head, and can therefore receive inflectional morphology. Furthermore, we can see a divide in what domains different derivational affixes target, as the agentive *-er* targets the head of the compound, while the *-able* suffix targets the rightmost edge of the overall word.

In a similar vein, the distribution of inflectional prefixes in Mandan reveals that there is a divide between what kind of domain each prefix targets. Inner pronominals only appear between a preverb and the verb, while outer pronominals always appear before the preverb. Therefore, we can say that preverbs must mark where the word-internal boundary is for a composite. Mandan provides this evidence of verbs with preverbs being composites through two particular phonological tests we can perform for word boundaries: pitch accent placement and nasal harmony blocking. Mandan is by default a language that prefers heavy iambic feet, measuring from the left edge of the word. Long vowels in the first syllable also vacuously satisfy the IAMB constraint per McCarthy (2008:227). Codas do not affect syllable weight with regard to stress placement. Further explanation of primary stress in Mandan appears in §2.5.4, but we can examine some examples of how primary stress works in simplex words in the following data.

(4.56) Primary stress assignment in Mandan simplex words

a. [ *mashí* ]

(ma.shí)

‘white man’

- b. [xtáqte]  
 (xtáa).<te>  
 ‘thunder’
- c. [kí’kaare’]  
 (kí’).<kaa.re’>  
 ‘to fly’

As the data above show, Mandan has default left-aligned iambic pitch accent assignment.<sup>8</sup> The single foot in (4.56a) is LĪ, parsing the entirety of the word, while (4.56b) and (4.56c) satisfy IAMB by footing the initial syllable, which contains a long vowel or heavy syllable, yielding a footing of Ĥ<L> and Ĥ<HH> that leaves subsequent syllable unfooted. In compounds, only the leftmost word will receive pitch accent, even if the result would be a deficient iambic foot. This behavior happens even if the following syllable or syllables are heavy. A heavy syllable would satisfy IAMB unto itself, and a LĪĤ foot would likewise be a well-formed iamb. As the data below in (4.57) show, however, it is preferable for Mandan to flout this regular iambic footing if that means crossing into another word to do so. The behavior of primary stress in Mandan compounds can be seen in the examples below.

(4.57) Primary stress assignment in Mandan compound words

- a. [[xkék][xtes]]  
 (xkék).<xtes>  
 ‘the Morning Star [lit. the big star]’
- b. [[pá][hí]]  
 (pá).<hí>  
 ‘hair [lit. head hair]’
- c. [[pó][waakiruxka]]  
 (pó).<waa.k<sup>1</sup>ru.xka>  
 ‘eel [lit. fish snake]’

Since Mandan only assigns one primary stress per word, the placement of the stressed syllable is a fair test to determine whether a word is treated as a single word or several words that are part of a larger phonological phrase. In the data in (4.57), we see atypical first-syllable stress on light syllables due to the presence of an internal word

<sup>8</sup>Secondary stress is not discussed in this dissertation as additional phonetic analysis is needed.

boundary. We can contrast this behavior to the typical primary stress assignment in (4.56), where stress is assigned per the processes described earlier in §2.5.4.2.

A similar test often works in English to differentiate compounds from noun phrases: e.g., the stress in *the White House* ‘the place where the American president lives’ and *the white house* ‘the home that is painted white.’ As such, the orthography belies the fact that *[[White][House]]* is really a single phonological word, much in the same way that the data in (4.57) do, as there is inconsistency in when certain compounds are written as a single orthographic word versus separate orthographic words that are prosodically treated as a single word.

When verbal constructions contain a preverb, the primary stress is always on the preverb in the same way the primary stress is always on the leftmost word within a Mandan compound. Since a foot cannot be formed across word boundaries in Mandan, preverbs take primary stress despite their status as deficient feet, as can be seen below.

- (4.58) a. [ í [ *minikihe*’*sh* ] ]  
           ‘I waited for you’  
       b. [ áa [ *manahuuro*’*sh* ] ]  
           ‘you came here with me’

As I discussed in §4.3.2.3, given the status of Mandan words with preverbs as composites and not full compounds, we have evidence of a left word boundary in the fact that inflectional affixes will ignore the presence of certain morphology like the in Icelandic, Georgian, and Russian examples in (4.32) show. However, unlike the German separable prefix verbs in (4.31), where we can prove their wordhood in that they are able to exist prosodically apart from their original stem, we cannot confirm that Mandan preverbs are words. Thus, we have evidence for a single left word boundary internal to words in Mandan that contain preverbs rather than a single left and a single right boundary: i.e., we reasonably can say that the structure of (4.58a) does not include a subordinate word [*í*].

Another piece of evidence of a boundary between the preverb and the verbal head of the composite is the leftward nasal harmony in Mandan, which is blocked at word boundaries. Nasality spreads leftward along each [+voice] segment until it hits one of the following blocking mechanisms: a word boundary, a [-voice] segment, or a mid-vowel, which cannot be nasalized in Mandan, due to a markedness constraint \* $\bar{E}$ , which assigns a violation for each nasalized mid-vowel. This process is discussed in greater detail in §2.5.3. The data in (4.58) is particularly telling in that both examples also show nasal spread being blocked by a word boundary. The data in (4.58) are repeated below with the nasal spread underlined.

- (4.59) Interaction of primary stress assignment and nasal harmony in Mandan

- a. [ *i* [ *minikihe'sh* ] ]  
 'I waited for you'
- b. [ *áa* [ *manahuuro'sh* ] ]  
 'you came here with me'

Featurally, there is nothing preventing the [+nasal] feature from spreading onto a preverb like *i-* or *aa-*, seeing as how it is [+voice] and not a mid-vowel. Thus, the reason why it does not participate in nasal harmony like the other inner prefixes do is because nasal spread cannot cross word boundaries.

#### 4.6.4 Revisiting a constraint-based account of affix order

This composite structure in Mandan clearly plays a role in blocking certain phonological processes. As such, this boundary does not simply exist because it helps satisfy some theoretical motivation for affix order, but because speakers treat it as a real word boundary. To prevent different phonological processes from crossing over this internal word boundary, we can look to Itô & Mester (1999:201). They propose a family of constraints called CRISP-EDGE, which serve as blocking mechanisms for the spread of features across the edge of prosodic boundaries. A formulation of this constraint appear below.

(4.60) CRISP-EDGE(*F*, *D*): Assign one violation for every instance feature or phonological representation *F* spreads over a boundary for domain *D*.

For Mandan, a CRISP-EDGE(Nasal, Word) constraint would be sufficient to prevent nasal features from spreading across word boundaries. This constraint permits nasal spread within the domain of a word boundary, but is violated if the regressive nasal harmony process in Mandan crosses over the internal boundary leftward onto a preverb. Likewise, there must be CRISP-EDGE(Head, Word) constraint preventing iambic footing across an internal word boundary to assign primary stress where "Head" refers to the prosodic head of the word: i.e., primary stress. This constraint accounts for the fact that Mandan places primary stress on deficient feet at the expense of IAMB, as does ALIGN-LEFT(Head, Word), which must be dominated by CRISP-EDGE(Head, Word) since primary stress is never footed across a word boundary. In (4.62), we can see the interaction between these CRISP-EDGE constraints and some of those previously discussed in Chapter 2 to deal with primary stress assignment and nasal harmony.

We can see how these constraints interact with each other in the tableau in (4.62) below with the following ranking of constraints:

(4.61) { ALIGN-LEFT(Head, Word), CRISP-EDGE(Nasal, Word), CRISP-EDGE(Head, Word) }  $\gg$  { \*R $\check{V}$ , IAMB, IDENT-V }

The ranking above takes into account that processes that are sensitive to word boundaries are inviolable, but the other three phonological processes are possible if all constraints above them in the hierarchy have been satisfied.

(4.62) Interaction between phonology and morphology in (4.59a)

[ i [ w-r̥i-kihE ] ] =o'sh	ALIGN-LEFT (Head, Word)	CRISP-EDGE (Nasal, Word)	CRISP-EDGE (Head, Word)	*R $\tilde{V}$	IAMB	ID-V
a.  [ (i). [ m <sup>h</sup> nī.ki.he ] ] ?f				*	*	
b. [ (i̇). [ m <sup>h</sup> nī.ki.he ] ] ?f		*!				*
c. [ (i. [ m <sup>h</sup> nī).ki.he ] ] ?f			*!	*		
d. [ (i. [ m <sup>h</sup> nī).ki.he ] ] ?f			*!		*	
e. [ (i̇. [ m <sup>h</sup> nī).ki.he ] ] ?f		!*	*!			*
f. [ i. [ (m <sup>h</sup> nī.̇ki).he ] ] ?f	*!			*		

As the tableau above in (4.62) shows, the only viable option is candidate A, it is the only one with no fatal violations. It is a strong requirement in Mandan that the phonological head of the word (i.e., the primary stress) be aligned with the left edge of the word. It is true that there is an internal word edge in *iminikihe'sh* 'I waited for you,' but there is still another left word edge in that same word, thus ruling out candidate F. The remaining candidates are all eliminated from consideration by virtue of the fact that they violate a CRISP-EDGE constraint, whether it is because footing takes place across the internal word boundary or because the spread of the [+nasal] feature leftword by the \*R $\tilde{V}$  constraint also takes place across the internal word boundary.

#### 4.6.4.1 Reconciling Xu's (2007) Realization OT with Anderson's (2005) theory of clitics

Having established the internal structure of the composites in Mandan, we can now examine where within this structure prefixes may attach. I have repeatedly argued that there is a fundamental difference between the way that the inner prefixes affix onto the verb versus the way that outer prefixes do. In his dissertation, Xu (2007:43) notes that formulating an ALIGN constraint so that the feature value set was a separate entry in the morphology would not affect his analysis. While largely true for his data, it does beg the question of why bother simply listing the featural values by themselves if they can be packed into ALIGN constraints that govern the ways in which those formatives affix themselves to a host. Namely, the precise way in which an affix attaches can be built right into the RC, without having to resort to multiple RCs and large, unwieldy tableaux to accommodate the redundant notation, given that an RC within an ALIGN constraint can do the work that an RC alone done. As such, I see RCs as a kind of shorthand, where inflectional material innately has a preferential point of affixation: i.e., a prefix is not simply a prefix, but

rather selects for a particular kind of domain to prefix onto that is determined by that particular formative and its place within the lexicon.

It seems clear that affixes are really some kind of ALIGN-type constraint, and I am certainly not the first person to follow this line of thinking. Prince & Smolensky (1993) originally introduce ALIGN constraints to account for infixation. Anderson (2005:118) describes a family of ALIGN-type constraints that Prince & Smolensky (1993:29) first dub  $\text{EDGEMOST}(e, L/R, \mathcal{D})$ , where  $e$  is some linguistic element such an affix or clitic, the L/R is the edge of the domain  $\mathcal{D}$  within which element  $e$  appears.

Employing this kind of constraint would be a powerful tool in determining the order of affixes. However, if the motivation for aligning an affix to a particular position within the word is determined purely by ALIGN constraints, the importance of SCOPE is diminished, because the ranking of EDGEMOST-type constraints would allow us to create a hierarchy where the only RCs that matter are those that produce the proscribed template. In fact, reliance solely on EDGEMOST constraints would make the ordering of affixes seem almost arbitrary without the need for faithfulness RCs like SCOPE. Xu (2007:6) does explain that an RC like {1st, sg, agent}: *wa-* can certainly be decomposed into two separate constraints, with one realizing the affix and the other placing it in its desired destination.

While EDGEMOST constraints of some sort are assumed to accompany each morph, they are only explicitly dealt with when needed, as Xu (2007) shows that RCs often pile up in large blocks that are sorted out by SCOPE rather than any kind of templatic preference for a particular position within the word. As such, it may just be that EDGEMOST constraints are often ranked lower than SCOPE constraints, allowing for affix order to be addressed by faithfulness to the underlying structure in the case of those languages for which that is the norm. However, when affix order fails to follow the underlying structure, EDGEMOST constraints must be used. Prefixes can be defined by which variety of a modified EDGEMOST constraint they belong to according to the formats below.

#### (4.63) Definitions of prefix RCs

- a. Inner prefix  $\leftrightarrow \text{EDGEMOST}(\text{Head}, L, Af_i, L)$ : The left edge of the head of a word coincides with the left edge of  $Af_i$ . Assign one violation if  $Af_i$  does not align its left edge to the left edge of the head of the word.
- b. Outer prefix  $\leftrightarrow \text{EDGEMOST}(\text{Word}, L, Af_i, L)$ : The left edge of a word coincides with the left edge of  $Af_i$ . Assign one violation if  $Af_i$  does not align its left edge to the left edge of the overall word.

Like Anderson (2005:135), I employ a shorthand of the above constraints given that aligning the left edge of an affix to the left edge of a word is really just a formal definition of a prefix. Namely, instead of valuing 'Left' twice in the specifications of an EDGEMOST constraint, we can simply have  $\text{LEFTMOST}(Af_i, \mathcal{D})$  and  $\text{RIGHTMOST}(Af_i, \mathcal{D})$  for prefixes and suffixes, respectively. The value  $Af_i$  represents the underlying form of each particular affix. The ordering

of prefixes can then be ordered with respect to each other through. Taking Xu's (2007) notion of RCs as a bundle of features with SCOPE acting as a morphological FAITHFULNESS constraint, and then incorporating Anderson's (2005) motivated use of EDGEMOST constraints to achieve surface affix order, we can combine these two elements to improve upon the definition of what a realization constraint means. Xu (2007) uses SCOPE as the motivating factor behind affix order, but the counter-Mirror Principle order of Mandan prefixes shows that SCOPE in and of itself is insufficient, and as such, we need to rely more on EDGEMOST constraints to account for such orderings.

I assume each affix has the appropriate EDGEMOST constraint stored along with it in the lexicon under a realization constraint. It is certainly possible that some people have different points of affixation for a particular formative than others, as evidenced earlier with the difference between some speakers saying *passable-by* instead of *pass-by-able*. This variation shows that for some people, the *-able* suffix functions like an inner prefix in Mandan and targets the head of a word, rather than the edge of a word. For the purposes of my analysis of prefix ordering in Mandan, it is necessary to assume that RCs specify not only the directionality of affixal attachment to determine whether something is a prefix or suffix, but that RCs must also select for a particular domain. RCs are a kind of shorthand that include the information akin to that in (4.63), where an affix has a specific EDGEMOST constraint as well.

#### 4.6.4.2 Revisiting Mandan prefix RCs

Since Xu & Aronoff (2011) assume only a single word edge, they do not stipulate where an affix should be aligned. For composites, specificity is needed as there are not simply two landing zones for affixes (i.e., prefixes at the left edge of a word and suffixes at the right), but several different word edges given the presence of word-internal boundaries (e.g., prefixes that target the left edge of the head of a word versus prefixes that target the left edge of the overall word).

To demonstrate how to use the inflectional morphological RCs that I describe above and how they apply to Mandan, we can look at the reformulation of prefix RCs from §4.6.2 below. Note that the bundle of features that Xu (2007) invokes as part of an RC still defines what the eventual prefix will be, but this bundle includes a LEFTMOST constraint that stipulates to what word edge the prefix will align.

(4.64) Revised codification of inflectional prefix RCs in Mandan

a. Inner prefixes:

i. {1st person, sg, agent}: LEFTMOST(wa-, Head):

The feature value set {1st person, sg, agent} is realized by the prefix *wa-*, which aligns to the leftmost edge of the head of a word.

- ii. {1st person, sg, non-agent}: LEFTMOST(wa-, Head):  
The feature value set {1st person, sg, non-agent} is realized by the prefix *ma-*, which aligns to the leftmost edge of the head of a word.
  - iii. {2nd person, agent}: LEFTMOST(ra-, Head):  
The feature value set {2nd person, sg, agent} is realized by the prefix *ra-*, which aligns to the leftmost edge of the head of a word.
  - iv. {2nd person, non-agent}: LEFTMOST(ri-, Head):  
The feature value set {2nd person, non-agent} is realized by the prefix *ni-*, which aligns to the leftmost edge of the head of a word.
- b. Outer prefixes:
- i. {1st person, pl, agent}: LEFTMOST(ru-, Word):  
The feature value set {1st person, pl, agent} is realized by the prefix *nu-*, which aligns to the leftmost edge of the overall word.
  - ii. {1st person, pl, non-agent}: LEFTMOST(ro-, Word):  
The feature value set {1st person, pl, non-agent} is realized by the prefix *ro-*, which aligns to the leftmost edge of the overall word.
  - iii. {3rd person, indef, non-agent}: LEFTMOST(wa-, Word):  
The feature value set {3rd person, indef, non-agent} is realized by the prefix *wa-*, which aligns to the leftmost edge of the overall word.
  - iv. {negative}: LEFTMOST(waa-, Word):  
Negative is realized by the prefix *waa-*, which aligns to the leftmost edge of the overall word.
  - v. {[+relativized]}: LEFTMOST(ko-, Word):  
Relativization is realized by the prefix *ko-*, which aligns to the leftmost edge of the overall word.

These RCs represent the default form of each of the prefixes described in §3.1.2. Furthermore, we can add the condition to all these RCs that one violation is incurred for each intervening formative between the prefix and its chosen edge. Therefore, the farther away from its target, the more violations are assigned. Failure to use a prefix when it is called for also incurs a violation, as does using a prefix that should not be present given the intended reading. In addition to the RCs above, there are numerous allomorphs for which we must account. Two common allomorphs for inner pronominals appear below.

(4.65) RCs for allomorphs

- a. {1st person, sg}/+{2nd person}: LEFTMOST(*w-*, Head):

The feature value set {1st person, sg} is realized by the prefix *w-* when second person features are present on the same verb, which aligns to the leftmost edge of the head of a word.

- b. {2st person, sg, agent}/:{1st person, sg}+ LEFTMOST(*ra-*, Head):

The feature value set {2st person, sg, agent} is realized by the prefix *na-* first person singular features are also present on the same verb, which aligns to the leftmost edge of the head of a word.

The prefix *w-* marks only first person singular, but not what role the argument plays. It always co-occurs with a second person prefix. If the second person argument is an agent and there is a first-person non-agent, then that prefix is realized as *na-* instead of *ra-*. These allomorphs must be ranked higher than their default realizations. We can see this process at work below in (4.66). Firstly, all the constraints above necessarily must dominate an unseen SCOPE(Agent, Patient) constraint due to the fact that this prefix order in Mandan consistently has first person marking precede second person marking.

Of all the candidates in this tableau, the only candidate that remains faithful to SCOPE(Agent, Patient) is candidate F, which involves the second person agent prefix *ra-* being farther away from the root than the first person singular non-agent prefix *ma-*. Given Mandan's templatic nature, and the fact that there are specific allomorphs required when a verb bears both first person singular and second person features, candidate F must be eliminated. Similarly, candidates A and B are disqualified due to the fact that they either use the wrong prefix for what role the first person singular argument is play (as in A) or that they are using the improper manifestation of the first person singular non-agent prefix (as in B).

(4.66) Tableau for *manahé'sh* 'you see me'<sup>9</sup>

---

<sup>9</sup>I do not factor in enclitics for this tableau, given the fact that their order is determined how wide their semantic scope is in the sense of Rice (2000).

	{1sg} / +{2}: LM(w-,H)	{2sg,agt} / +{1sg}: LM(rā-,H)	{1sg,agt}: LM(wa-,H)	{1sg,pat}: LM(wā-,H)	{2sg,agt}: LM(ra-,H)	{2sg,pat}: LM(rī-,H)
a. [hE] ‘see’ {1sg,pat}, {2sg,agt} <i>maráhe’sh</i>	*!	**	*	*		
b. [wā-ra-hE]=o’sh <i>manáhe’sh</i>	*!	**				
c. [w-ra-hE]=o’sh <i>warahé’sh</i>		*!*		*		
d.  [w-rā-hE]=o’sh <i>manahé’sh</i>				*	**	
e. [w-rī-hE]=o’sh <i>minihé’sh</i>		*!*		*	***	***
f. [ra-wā-hE]=o’sh <i>ramáhe’sh</i>	*!*	*		*		

Moving on to the interaction between these inner pronominals and preverbs, we can take these exact same RCs and use the same ranking to yield the expected output of *ómanahe’sh* ‘you will see me,’ which features the irrealis preverb *o-*. If we modify the tableau in (4.67) slightly to insert the preverb into the affixation process, there is no change at all in any of the candidates A through F.

Adding a candidate where we prefix these pronominals onto the leftmost edge of the overall word, however, still incurs fatal violations of the most highly-ranked constraint, removing it from consideration. While it is true that the first person singular prefix *w-* is present in candidate G, the RC is still violated because of the fact that it only meets one of the conditions of LEFTMOST(*w-*, Head). Namely, the prefix *w-* is not being aligned to the leftmost edge of the head of the word, /hE/ ‘see.’ For this reason, we still have candidate D winning out over all other candidates.

(4.67) Tableau for *ómanahe’sh* ‘you will see me’

	{1sg} /++{2}: LM(w-,H)	{2sg,agt} /++{1sg}: LM(r̄-,H)	{1sg,agt}: LM(wa-,H)	{1sg,pat}: LM(w̄-,H)	{2sg,agt}: LM(ra-,H)	{2sg,pat}: LM(r̄-,H)
[o-[hE]] ‘see.IRR’ {1sg,pat}, {2sg,agt}						
a. [o-[wa-ra-hE]]=o’sh <i>ómarahesh</i>	*!	**	*	*		
b. [o-[w̄a-ra-hE]]=o’sh <i>ómanahesh</i>	*!	**				
c. [o-[w-ra-hE]]=o’sh <i>ówarahesh</i>		*!*		*		
d. [o-[w-r̄a-hE]]=o’sh <i>ómanahesh</i>				*	**	
e. [o-[w-r̄i-hE]]=o’sh <i>óminihe’sh</i>		*!*		*	***	***
f. [o-[ra-w̄a-hE]]=o’sh <i>óramahesh</i>	*!*	*		*		
g. [w-ra-o-[hE]]=o’sh <i>mana’óhesh</i>	*!***	*		***	*	

In the inner pronominals, we can see that there is an order to RC ranking. Firstly, since first person singular must always precede second person prefixes, second person RCs are dominated by first person singular RCs. Secondly, to account for the fact that allomorphs are selected over their default counterparts, they must be ranked more highly. Therefore, we can see the following constraint hierarchy inner pronominal RCs.

(4.68) Ranking of inner pronominal RCs

{ 1st person singular allomorphs }  $\gg$  { 2nd person allomorphs }  $\gg$  { 1st person defaults }  $\gg$  { 2nd person defaults }

Moving on to the outer prefixes, we can employ the same strategies as used in (4.66) and (4.67) to use RCs to motivate surface prefix order. However, the one variable that is different for outer pronominal RCs is that instead of being LEFTMOST( $Af_i$ , Head), they are LEFTMOST( $Af_i$ , Word). This slight change in the LEFTMOST constraint signifies that they are unable to target the leftmost edge of the head of the word specifically. If it is the case that the verb lacks a preverb, then the left edge of the overall word will coincide with the left edge of the head of said word.

The order of the outer prefixes is that first person plurals are preceded by unspecified argument markers, which in turn are preceded by negative prefixes, which ultimately must be preceded by a relativization prefix. If we have multiple prefixes targeting different word edges in the presence of a preverb, then the outcome will be the trapped pronominals that [Helmbrecht & Lehmann \(2008\)](#) posited were a challenge for morphological theory. We can see this process at work in the data and its matching tableau below.

(4.69) Outer and inner prefixes on the same verb

*wáaraaniraahinixo'sh*  
 waa-r-aa-rj-rEEh=rjx=o'sh  
 NEG-1A.PL-PV.TR-2S-go.there=NEG=IND.M

'we did not take you with us'

In the in (4.69) data above, we see not only inner and outer pronominals, but also a negation prefix, which patterns with the outer pronominals. In order to get this prefix order, negation must precede first person plural marking. Furthermore, if first person plural marking and second person are ever in contact, first person plural will always precede second person marking. Therefore we can posit a RC hierarchy based on this information plus what we already know about inner pronominals.

(4.70) Hierarchy of prefixal RCs in Mandan

relativizer  $\gg$  negation  $\gg$  unspecified argument marking  $\gg$  { first person allomorphs }  $\gg$  { second person allomorphs }  $\gg$  { first person singular defaults }  $\gg$  { second person defaults }

All first person prefixes cluster together, since they do not compete with one another in Mandan; two first person prefixes cannot co-occur on the same verb. Saying something to the effect of 'we picked me' would require a more circumlocutory utterance. Furthermore, first person prefixes target different word boundaries: first person singular targets the head of the word, but first person plural targets the leftmost edge of the overall word. Allomorphs must dominate defaults in order to be realized, and negation dominates all person prefixes. This ranking can be seen in the tableau in (4.71) below. Note that enclitics have been omitted from the candidates for the sake of space.

In (4.71), the winning candidate is one where negation appears at the leftmost edge of the overall word. Furthermore, even though there is another word edge that is farther left, the second person stative *ni-* remains prefixed onto the head of the word due to the fact that *ni-* specifically targets the head of a word rather than the overall word.

(4.71) Tableau of the data in (4.69)

	{neg}: LM (waa-,Wd)	{1pl} /_V: LM (r-,Wd)	{2sg.pat} /{1pl.agt}_: LM (rɥ-,H)	{1pl.agt}: LM (rɥ-,Wd)	{1pl.pat}: LM (ro-,Wd)	{2sg.agt}: LM (ra-,H)	{2sg.pat}: LM (rɥ-,H)
a.  [waa-r-aa-[rɥ-rEEh]] <i>wáaraaniraah</i>				*			
b. [rɥ-waa-aa-[rɥ-rEEh]] <i>nuwáa'aniraah</i>	*!						
c. [waa-rɥ-rɥ-aa-[rEEh]] <i>máanuni'aaraah</i>			*!*	*			
d. [waa-aa-[rɥ-ra-rEEh]] <i>wáa'aanuraraah</i>			*!*	*		**	**
e. [aa-[waa-rɥ-rɥ-rEEh]] <i>áamaanuniraah</i>	*!*		***	*			
f. [waa-rɥ-aa-[rɥ-rEEh]] <i>wáanu'aanuraah</i>		*!	*	*			*
g. [rɥ-aa-[waa-rɥ-rEEh]] <i>ni'áamaanuraah</i>	*!*			*			*

Furthermore, most of the candidates are ruled out because of how highly-ranked *waa-* is with respect to other prefixes. Candidates C and D are ruled out because of the wrong second person prefix being used, while candidate F is ruled out because the wrong allomorph of *nu-* first person plural active is used. Candidate A is the best available candidate, as its only violation is that *nu-* is not realized as the first person plural marker, given the fact that the allomorph *r-* must be used instead.

Again, while all these RCs are aligning a prefix to a target edge, we can assume that there are SCOPE constraints at work. In the case of SCOPE(Relativization, Negation), that generalization holds for Mandan, and we could argue that there is a highly-ranked SCOPE(Relativization, Negation) constraint that would render a candidate unwinnable due to how marked it is in the language. While it would be quite useful to have a singular constraint drive the ordering of morphology alongside SCOPE constraints in the way that Hyman (2003) does with his TEMPLATE constraint, the fact of the matter is that Mandan prefixal morphology goes beyond simple prefix ordering; it has multiple targets

for prefixation, depending on the formative. Inner prefixes target the head of a word, whether that word is a simple word or a word with internal structure. Outer prefixes target the leftmost possible edge of the word. That is to say, outer prefixes are blind to the head of a word in composites because it is not their target.

#### 4.6.5 Conclusion

Utilizing a modified version of Xu's (2007) Realization OT, the ordering of prefixes in Mandan can be accounted for by employing RCs alongside SCOPE, plus additional motivated ordering due to LEFTMOST constraints per Anderson (2005). Inner prefixes and outer prefixes that do not adhere to the ordering that the Mirror Principle predicts are licensed by a more highly-ranked LEFTMOST constraint than the applicable SCOPE constraint. An OT-based model is better able to account for typological universals in affix ordering, such as those observed by Bybee (1985) or Greenberg (1963).

Janda (1983:80) holds that morphology is closer to phonology than it is to syntax. While this paper does not take a particular side on that issue, I do see how the machinery commonly used to account for phonological phenomena is better suited to explaining marked morphological structures, such as the placement of prefixes within Siouan languages. A Realization OT account could certainly be applied to other languages that seemingly run contra to the Mirror Principle, such as the Bantu languages that Hyman (2003) discusses. Although he combines all RCs into a singular TEMPLATE constraint, his observation nonetheless holds that affix ordering in templatic languages can run afoul of the Mirror Principle in that the surface ordering of morphology cannot be accounted for compositionally through the syntax. Harley (2010) suggests a series of steps involving syntactic head movement and post-syntactic Merger Under Adjacency, but such a post-syntactic operation could easily be assigned to the morphology proper, where particular morphology has a NONFINAL constraint that ranks more highly than a SCOPE constraint, as in the case of the Affix Lowering-like properties of the combined Agr/Asp and Adv head that she describes merging with the lower verb complex in Navajo.

It is possible to explain the Navajo example that Harley gives with a syntactic and subsequent post-syntactic motivation for affix ordering, but no such machinery permits a syntactic motivation for Bantu or Mandan affix order. As such, the most efficient way to account for the ordering of inflectional affixes, particularly in languages that feature Mirror Principle violations that cannot be explained by Merger Under Adjacency, is such languages motivate those affix ordering through the use of positioning constraints ranked higher than morphological faithfulness constraints such as Xu's (2007) SCOPE or Hyman's (2003) MIRROR.

In all the materials that exist that address supposed Mirror Principle violations in affix ordering, I have not yet encountered any that attempt to explain the motivation of affix ordering within morphologically complex words, such

as the composites involving preverbs in Mandan. Further work is needed to investigate whether the structure of other languages with complex templatic morphology, such as Athabaskan, particularly to see if those languages also have similar differences in inner and outer affixes. For example, the CARP ordering that Hyman (2003) describes in Bantu might involve passive morphology having a RIGHTEDGE constraint that outranks a SCOPE constraint, permitting its left edge to coincide with the right edge of a prosodic word, ignoring its placement with respect to the head of the word and the compositional ordering within the structure.

Coming out of this analysis is that the phonology and the morphology are both treating different elements of a composite as the head of the word. We have a similar issue in English in compounds like [[nóte][book]], where the morphological head of the compound is ‘book,’ but the prosodic head is ‘note,’ since it bears primary stress. An example of this isomorphism between the head of a composite and the head of a prosodic word in Mandan appears below. We can see this non-isomorphic relationship between head of a morphological word versus prosodic word in the example below.

(4.72) *íwahaaxiko’sh* ‘I do not know’ (Hollow 1973a:64)

- a. Morphological word: [ í [ wa-haaxik ]<sub>head</sub> ] =o’sh
- b. Prosodic word: ( ( í )<sub>head</sub> wa-haaxik=o’sh )

While the notion of what is a head may vary depending on what linguistic domain is being discussed, what is abundantly evident in Mandan is that several opaque phonological phenomena are really quite transparent once it is understood that speakers are recognizing a boundary within a morphological word. This boundary plays a role in blocking iambic footing for primary stress, as well as impeding the spread of what is normally a very robust long-distance nasal harmony. Not only are these internal word boundaries vital to understanding the motivation for these phonological processes, but also to uncovering the very motivation for inflectional prefix order in Mandan. The inner prefixes, also called trapped pronominals, are really prefixing onto the head of a composite word, while outer pronominals and other prefixes are aligning themselves to the leftmost edge of the word, irrespective of whether that edge happens to be the head of a simplex word or the left edge of a word with internal structure.

## 4.7 Templatic morphology across Siouan

The prefix template in Mandan has been the source of extensive discussion throughout this dissertation. Despite its complexity, Mandan is certainly not the Siouan language with the most robust word-building process. That distinction goes to Crow, which goes so far as to incorporate into the preverbal domain nominal objects—and even

whole relative clauses—that would otherwise be free morphosyntactic objects, as the Crow example from Graczyk (1991:254) below demonstrates.<sup>10</sup>

(4.73) Multi-clausal incorporation in Crow<sup>11</sup>

- a. *Akdiiammalapáshkuuassaaleewaachiinmook.*  
 ak-dii-Ammalapáshkuua-ss-aa-dée-baa-chiili-moo-k  
 REL-2S-Billings-GOAL-PREVERB.PORT-go-1A-look-INCL.PL-DEC  
 ‘We will look for someone who will take you to Billings.’
- b. [CP [CP *Akdii-* [CP *ammalapáshkuua* ] -*ssaalee-* ] *waachiinmook* ]  
 [CP [CP who will take you to [CP Billings ] ] we will look for someone ] (lit.)

The rest of the Siouan language family has likewise been described as having templatic morphology (Rankin et al. 2003). The literature is full of generalizations about the composition of the prefix template across Siouan (Rankin, Carter & Jones 1998), but most of these generalizations come from looking at a small subgrouping of closely related languages. In order to compare Mandan’s template with the rest of the Siouan language family, the remainder of this chapter is devoted to a survey of the template across Siouan. A language from each branch of the family appears below. Note that morphological glosses and transcriptions come from the original authors unless otherwise stated.

#### 4.7.1 Missouri Valley Siouan: Hidatsa

The Missouri Valley family of Siouan languages consists of two living members: Hidatsa and Crow. Both languages feature a more robust degree of object incorporation than other Siouan languages, as seen in the Crow example from earlier in (4.73). Similar nominal object incorporation can be seen in Hidatsa:<sup>12</sup>

(4.74) Incorporated direct objects in Hidatsa

- a. *Macée ídagidiheec.*  
 wacée íitaki-ti-hee-c  
 man rabbit-die-CAUS.D.SG-DECL

<sup>10</sup>This utterance is considered to be a single phonological word under the definition that Dixon & Aikhenvald (2003:13) give in that there is a single pitch accent in the entire word, despite the fact that three words, *Ammalapáshkuua* ‘Billings, MT,’ *dée* ‘go,’ *chiili* ‘look,’ all have their own underlying pitch. Crow permits a single pitch accent per word, and as such, the lack of three different pitch accents points to the fact that this is a single word, at least a single phonological word. With respect to their definition of a grammatical word (Dixon & Aikhenvald 2003:19), *Akdiiammalapáshkuuassaaleewaachiinmook* is also a grammatical word in Crow in the sense that it behaves as a single morphosyntactic unit in the sense that the relative clause is unable to appear elsewhere in a sentence.

<sup>11</sup>Even the word ‘Billings’ clause, meaning ‘where they cut lumber.’ Even though this element is being treated like a noun because of the fact it is fairly lexicalized to mean the city of Billings in contemporary Crow, it is still nonetheless an example of two layers of incorporation, where the relative clause ‘where they cut lumber’ is incorporated into a superior relative clause ‘who will take you there,’ which in turn is incorporated into the matrix clause ‘we will look for someone to do this.’

<sup>12</sup>Utterance-initial /w/ in Hidatsa becomes [m], as seen in *mía* ‘woman’ but appears as [w] in *Cagáagawia* ‘Bird Woman,’ better known in English as Sacagawea. Similarly, utterance-initial /t/ fortifies to [n].

‘A man kills a rabbit’ (Boyle 2007:236)

b. *īidagi wacéediheec.*

īitaki wacée-ti-hee-c

rabbit man-die-CAUS.D.SG-DECL

‘A rabbit kills a man’ (Boyle 2007:236)

In each of the examples in (4.74), the direct object is incorporated into the verb and becomes part of the same prosodic word, despite being a distinct morphological word: i.e., a syntactic atom. Further morphology can be found between the incorporated object and the verb, as seen in (4.75) from Park (2012:208).

(4.75) Incorporated instrumentals in Hidatsa

*Isbahxeehdiibádaadic.*

isbahxée-hdaa-ii-bádaadi-c

elbow-INST-PREV.INST-nudge-DECL

‘She nudged him with her elbow.’

Boyle (2007:365) points out that this nominal incorporation occurs within a particular slot within the Hidatsa preverbal template, as shown below.

Table 4.2: Prefix field in Hidatsa

8	7	6	5	4	3	2	1	0
FUT.N	INDEF	INCEPT	PREV.LOC	PRO.OBJ	PRO.SUBJ	SUUS	INSTR	STEM
PART	INCORP	COMPLE	PREV.INSTR			REPT		
REL.N						INCHO		
REL.S						VERT		

Incorporated nouns fill slot 7 in the Hidatsa prefixal template, and are typically the leftmost morphological items in the verb complex, second only to relativizing morphology and what Boyle (2007) calls the nonspecific future marker *aru-*, which Park (2012) simply calls the irrealis marker. The example in (4.75) shows that a PP *isbahxée-hdaa* ‘with [her] elbow’ incorporates onto the verb to the left of the preverb *ii-*, which means that slot 7 is really not just for incorporated nouns but incorporated nominals. Any pronominal marking or denotation of non-core arguments such as instrumental objects are trapped very close to the verb to the right of the preverbs, which appear to occupy slot 5.

Despite the ordering of prefixes that Boyle (2007) describes, examples of pronominal marking preceding incorporated nouns exist in the literature. In the data below, we can see that the pronominal marking is not part of the incorporated DP, but is actual inflectional morphology on the overall stem: i.e., it is verbal morphology and not nominal morphology.

(4.76) Pronominal markings on incorporated elements

- a. *Miiraadaxiibíc.*  
**wii**-raata-xiipí-c  
**1s**-heart-be.wrinkled-DECL  
'I am lazy' (Park 2012:204)
- b. *Miiráaxugareec.*  
**wii**-ráaxu-kareé-c  
**1s**-lung-be.rotten-DECL  
'I have tuberculosis' (Park 2012:204)
- c. *Miihuaragabadíc.*  
**wii**-huá-nakapatí-c  
**1s**-cough-contract-DECL  
'I caught a cold' (Park 2012:205)

Park (2012:207) lists several other instances of incorporated nouns whose verbs contain a preverb like in (4.75), but no non-third person forms are given, making it difficult to see if first- or second-person marking would take place at the left edge of the word, on the verb itself, or both. Typically, however, preverbs appear before pronominals, as seen in the examples from Park (2012:133).

(4.77) Preverbs in Hidatsa

- a. *Iidiác.*  
ii-díà-c  
PV.INS-be.late-DEC  
'He depends on him.'
- b. *Iwiiidiác.*  
ii-**wii**-díà-c  
PV.INS-**1s**-be.late-DEC  
'I depend on him.'
- c. *Iiridiác.*  
ii-**rii**-díà-c  
PV.INS-**2s**-be.late-DEC  
'You (sg.) depend on him.'

The positioning of the preverbs with respect to the pronominals is exactly what is expected. That is, the pronominals appear to be trapped by the preverb. However, Park (2012:133) shows that it is also the case that in some verbs in Hidatsa, the preverb and pronominal appear to have switched places.

(4.78) Pronominals before the incorporated material with instrumental preverb

- a. *Mii<sup>?</sup>iiríre<sup>?</sup>*      *wareec.*  
**wii-ii-ríre<sup>?</sup>**      waree-c  
**1s-PV.INS-speak.2A EVID-DEC**  
‘I hear you gossiped about me.’
- b. \**Imiiríre<sup>?</sup>*      *wareec.*  
ii-**wii-ríre<sup>?</sup>**      waree-c  
PV.INS-**1s**-speak.2A EVID-DEC  
‘I hear you gossiped about me.’

(4.79) Pronominals before the incorporated material with comitative preverb

- a. *Mii<sup>?</sup>áàbasa<sup>?</sup>c.*  
**wii-áàb-asi<sup>-?</sup>a-c**  
**1s-PV.COM-travel-PL-DEC**  
‘They followed me.’
- b. \**Áàbwiiasa<sup>?</sup>c.*  
áàb-**wii-asi<sup>-?</sup>a-c**  
PV.COM-**1s**-travel-PL-DEC  
‘They followed me.’

The data in (4.78a) and (4.79a) show that pronominals are able to appear before the preverb in some instances. These exceptions to the normal ordering of preverbs and pronominals appear to be lexically determined. As such, one likely explanation for this is that those cases where the pronominal precedes the preverb are due to the preverb being reanalyzed as being an integral part of the verb root instead of behaving like a separable prefix.

Hidatsa apparently features two kinds of preverbs: ones that are treated as separate from the verb like in (4.77), and ones that are treated as integral parts of the verb like in (4.78a) and (4.79a). The reason why some pronominals become trapped between the preverb and the verb and others do not is based on the lexicon of Hidatsa, rather than some other factor like position within a sentence or some kind of influences that motivate morphological metathesis.

## 4.7.2 Mississippi Valley Siouan

Mississippi Valley Siouan represents the branch of the Siouan language family with the most extant speakers and the highest amount of documented languages. It is also the branch with the largest amount of internal diversity. As such, it is divided below into its three clades, given that there is some diversity in how each clade deals with the issue of trapped pronominals.

#### 4.7.2.1 Chiwere-Hoocąk: Hoocąk

Hoocąk has the most documentation on the issue of trapped pronominals of any Siouan languages due to the work of [Helmbrecht \(2006, 2008\)](#) and [Helmbrecht & Lehmann \(2008\)](#). Hoocąk occupies its own branch of Mississippi Valley Siouan with its sister language Chiwere. Compared to the languages discussed thus far, Hoocąk has a similarly-sized prefix field. The data below are adapted from [Helmbrecht & Lehmann \(2008:284\)](#).

Table 4.3: Prefix field in Hoocąk

10	9	8	7	6	5	4	3	2	1	0
1.DU	3S.PAT	PREV.INST	PREV.IN PREV.SUP	INST	PRO.PAT	PRO.AG	REFL RECP SUUS BEN	PRO	INST	STEM

Much like Mandan, Hoocąk exhibits discontinuous person marking, particularly with the first person dual/plural marking being closer to the left edge of the word. Unlike Mandan and Hidatsa, however, the third person plural patient marker *wa-* does not precede the first person dual/plural marker. This *wa-* is historically related to the unspecified object marker in other Siouan languages.<sup>13</sup> Examples of the use of *wa-* in Hoocąk appear below.

#### (4.80) Trapped pronominals in Hoocąk

- a. *Woorága.*  
**wa-ho-ra-gá**  
**UNSP-PV.INES-2A-give**  
 ‘you give something’ ([Helmbrecht & Lehmann 2008:301](#))
- b. *Wiákaragųs.*  
**wa-hi-ha-káragųs**  
**UNSP-PV.INS-1A-use.potential**  
 ‘I’m using my full potential’ ([Helmbrecht & Lehmann 2008:301](#))

The data in (4.80) show that, like in Mandan and Hidatsa, Hoocąk places the unspecified argument marker *wa-* before a preverb. Furthermore, even in the presence of first- or second-person marking, the unspecified argument marker does not appear contiguously with other pronominals, such as *ha-* 1A and *ra-* 2A. Instead, as in the other languages described above, the unspecified argument marker appears before any preverbs. Additional instances of

<sup>13</sup>As stated earlier in this dissertation, in Siouanist literature, this unspecified object marker is sometimes glossed as the absolutive marker, which to the best of my knowledge stems from [Hollow’s \(1970\)](#) analysis of Mandan being an ergative-absolutive language. Some literature on Lakota and Dakota states that this formative marks the antipassive voice, but nonetheless is used to express the idea that an action has happened to something without placing emphasis on what that something is. I adhere to [Mixco’s \(1997a\)](#) description of *wa-* as denoting an unspecified object, glossed as UNSP.

trapped pronominals, along with the discontinuous first person plural appear in (4.81) from [Helmbrecht & Lehmann \(2008:293\)](#), with the pronominals shown in bold below.

(4.81) Interaction between pronominals and preverbs in Hoocək

- a. *hagipé*  
ha-gi-pé  
PV.INES-BEN-wait  
'to wait for someone'
- b. *Haagipé.*  
ha-**h**a-pé  
PV.INES-**1A**-BEN-wait  
'I wait for someone'
- c. *Haragipé.*  
ha-**ra**-gi-pé  
PV.INES-**2A**-BEN-wait  
'you (sg.) wait for someone'
- d. *Hīgípe.*  
**h**í-ha-gi-pé  
**1DU.INCL**-PV.INES-BEN-wait  
'we wait for someone'

In addition to having the first person dual/plural in a different spot in the verbal paradigm from the first person single or second person markers, Hoocək has a third prefixal slot to redundantly mark the agent of the verb for a subclass of verbs. Examples of both singly- and doubly-marked pronominals from [Helmbrecht & Lehmann \(2008:291\)](#) appear below.

(4.82) Hoocək /r/-initial verbs

- a. *horák*  
ho-rak  
PREV.SUP-tell  
'to tell something'
- b. *Hoták*  
ho-**h**-rak  
PREV.SUP-**1A**-tell  
'I tell something'
- c. *Hošarák*  
ho-**r**-rak  
PREV.SUP-**2A**-tell  
'you tell something'

(4.83) Hoocąk /r/-initial verbs with benefactive preverb *gi-*

- a. *hogirák*  
ho-gi-rak  
PV.SUP-BEN-tell  
'to tell someone something'
- b. *Waagítak*.  
ho-**ha**-gi-**h**-rak  
PV.SUP-**1A**-BEN-**1A**-tell  
'I tell someone something'
- c. *Horagíšarak*.  
ho-**ra**-gi-**r**-rak  
PV.SUP-**2A**-BEN-**2A**-tell  
'you (sg.) tell someone something'

Helmbrecht & Lehmann (2008:295) state that the conditions under which the double marking of agents is constrained by whether the root verb begins with a particular consonant. Some verbs that do meet the phonotactic requirement for double marking maintain only the standard single marking of the agent, but these verbs are lexically determined. As such, the issue of double marking of agents in Hoocąk is something that is unique to Hoocąk morpho-phonology and will not be heavily scrutinized here. However, this phenomenon is worth noting, in that Hoocąk is alone in developing this redundancy.

Double marking the agent in this way appears to have arisen as the instrumental prefixes that are found in the same paradigmatic slot in Mandan and Hidatsa split into different slots in Hoocąk, with the presence of the inner instrumentals in slot 1 triggering double agreement, but the outer instrumentals in slot 6 having no effect on agreement doubling.

#### 4.7.2.2 Dakotan: Lakota

Of all the recorded Siouan languages, the Dakotan languages have been the most well-studied. Starting with the work of Boas & Deloria (1941) and continuing until the modern day with the Lakota dictionary project (Ullrich 2011), the Lakota-Dakota language continuum represents the largest language in the Siouan family in terms of speakers in excess of five thousand (Parks & Rankin 2001).<sup>14</sup>

The data represented in this section comes from the Teton (also known as *Thítħűjwan* 'those who dwell on the plains') dialect group that is more commonly known as Lakota (Ullrich 2011:3). Some of the data is adapted from

---

<sup>14</sup>I have retransliterated the Lakota-Dakota data here to appear in line with the standardized orthography used by the Lakota Language Consortium in Ullrich's (2011) dictionary.

slightly older Lakota documents, and as such those data are not subject to the standardized spelling developed more recently (Ingham 2003). The morphological data will be clear nonetheless.

The ordering of prefixes in Lakota appearing below is adapted from Patterson (1990:15).

Table 4.4: Prefix field in Lakota

10	9	8	7	6	5	4	3	2	1	0
UNSP	1PL	PREV.LOC	INST	PRO.PAT	PRO.AGT	BEN	DAT	SUUS	INST	STEM
INCP		PREV.SUP						REFL		
		PREV.INST								

Like all the languages presented heretofore, Lakota quite productively exhibits trapped pronominals, which are shown below in bold in the data from Ingham (2003:19).

(4.84) Trapped pronominals in Lakota

- a. *Olé.*  
o-le  
PV.LOC-look.for  
'He looks for it'
- b. *Owále.*  
o-**wa**-le  
PV.LOC-**1A**-look.for  
'I look for it'
- c. *Oyále.*  
o-**ya**-le  
PV.LOC-**2A**-look.for  
'You (sg.) look for it.'
- d. *uṅkóle.*  
**uṅ**-o-le  
**1PL**-PV.LOC-look.for  
'We (dual.incl.) look for it'

The data in (4.84) show that Lakota follows Mandan and Hoočak in having discontinuous pronominal markers in (4.84d), with the first person plural appearing to the left of the preverb *o-*. Unlike the previously-described languages, Lakota has a class of verbs that feature preverbs where all the pronominals appear trapped. Examples of such verbs can be seen in below. The data in (4.85a) through (4.85d) come from Rood & Taylor (1996:465), while the colloquial form in (4.85e) comes from Ullrich (2011:299).<sup>15</sup>

<sup>15</sup>The example in (4.85e) is a colloquial way of saying 'he is thirsty.' Additional examples of third person plural patients on stative verbs that are used to describe third person singular subjects are not uncommon when looking at paradigms under particular lexical entries in Ullrich's (2011) dictionary.

(4.85) Affixation with an incorporated noun *í* ‘mouth’

- a. *ípuzē*.  
i-puzA  
mouth-be.dry  
‘he is thirsty’
- b. *ímapuzē*.  
i-**ma**-puzA  
mouth-**1s**-be.dry  
‘I am thirsty’
- c. *ínipuzē*.  
i-**ni**-puzA  
mouth-**2s**-be.dry  
‘you are thirsty’
- d. *íuṅpuzē*.  
i-**uṅ**-puzA  
mouth-**1PL**-be.dry  
‘we are thirsty’
- e. *íwičhapuzē*.  
i-**wičha**-puzA  
mouth-**3PL.s**-be.dry  
‘he is thirsty’ (collq.)

(4.86) Affixation with an incorporated verb *ǎ́’áŋ* ‘be sore’

- a. *ǎ́’úŋt’e*.  
ǎ́’áŋ-o-t’A  
be.sore-PV.LOC-die  
‘He is exhausted.’ (Patterson 1990:11)
- b. *ǎ́’úŋmat’e*.  
ǎ́’áŋ-o-**ma**-t’A  
be.sore-PV.LOC-**1s**-die  
‘I am exhausted.’ (Patterson 1990:11)
- c. *ǎ́’úŋuṅt’e*.  
ǎ́’áŋ-o-**uṅ**-t’A  
be.sore-PV.LOC-**1PL**-die  
‘We (dual.incl.) are exhausted.’ (Ullrich 2011:187)

Every single pronominal in (4.85) and (4.86) is trapped, even the first person plural. There are two kinds of verbs treated as separate conjugational classes in Lakota literature (Patterson 1990, Rood and Taylor 1996). However, the first person plural in (4.85) is actually “trapped” by an incorporated noun, which occupies the leftmost slot in the

Lakota prefixal paradigm. The verbal morphology is still affixing onto its predicted locations, but the presence of an incorporated noun gives the appearance that both the first person plural and the other pronominals are trapped between the verb and some other constituent at the left edge of the word. Conversely, the incorporated verb in (4.86) appears with an actual preverb *o-*, which then takes pronominals between the preverb and the verb. Compare (4.86c) with (4.87) below.

- (4.87) **uŋkót'e.**  
**uŋ**-o-t'A  
**1PL**-PV.LOC-die  
 'We (dual.incl.) passed out.' (Ullrich 2011: 449)

In (4.87), the same underlying morphology yields a different affix ordering than in (4.86). This different order is clear from the blending of the verb *h'aŋ* with the preverb *o-*, which yields a vowel shift on the verb and the deletion of the *o-* in the preverb to create *h'uŋ*. Had the ordering of affixes been different in (4.86c), then the preverb *o-* would have been overt, as it is in (4.87). Thus, we can be certain that it is the case that (4.86c) is an instance of even the first person plural pronominal being trapped by some kind of preverbal element.

#### 4.7.2.3 Dhegihan: Osage

Relatively little work has been published on the Dhegihan clade of the Mississippi Valley branch, compared with the large amount of work done on Lakota and Dakota. These languages were mutually intelligible until relatively recently, with the divergence into different languages only happening relatively recently within the past few centuries.

Some speakers of Osage in the middle of the twentieth century say that Omaha-Ponca was understandable with some difficulty, though Quapaw was wholly unintelligible. Osage and Kansa are often grouped together as dialects of a single language: Osage-Kansa, though there are some phonological and lexical differences that separate the two (Parks & Rankin 2001). Despite the fact that there are still speakers of Omaha-Ponca, Osage has a more complete grammar that has been published (Quintero 2004), which forms the backbone of the analysis presented here.

The ordering of prefixes below on Table 4.5 in Osage is adapted from Quintero (2004:8) looks very similar to that in Lakota and Hoocąk. The distribution of pronominals with respect to the preverbs can be seen in bold below.

Table 4.5: Prefix field in Osage

10	9	8	7	6	5	4	3	2	1	0
UNSP	INCORP	1PL	PREV.LOC	INST	PRO.PAT	PRO.AGT	SUUS	INCEP	INST	STEM
			PREV.SUP				DAT	VERT		
			PREV.INST				RECIP			

Like other languages discussed in this section, Osage has a clear divide between inner and outer pronominals. The distribution of these prefixes can be seen in the data below in (4.88) and (4.89).

(4.88) Inner and outer pronominals in Osage

- a. *ođáake.*  
o-đáake  
PV.LOC-tell  
'he tells' (Quintero 2004:109)
- b. *obráake.*  
o-**Wa**-đáake  
PV.LOC-**1A**-tell  
'I tell' (Quintero 2004:109)
- c. *oštáake.*  
o-**Ya**-đáake  
PV.LOC-**2A**-tell  
'you tell' (Quintero 2004:109)
- d. *qkóđaakape.*  
**ak**-o-đáake-api-đe  
**1A.PL**-PREV.LOC-tell-PL-DECL  
'we tell' (Quintero 2004:109)

(4.89) Inner and outer pronominals without a preverb in Osage

- Mázeska huuhtáka wađák<sup>2</sup>upe.*  
mázeska huuhtáka **wa**-**Ya**-k<sup>2</sup>u-api-đe  
money much **UNSP-2A**-give-PL-DECL  
'You gave them lots of money.' (Quintero 1997:194)

Little discussion is given to the treatment of pronominals with respect to preverbs in Osage (Quintero 1997, Quintero 2004), but it appears that the ordering of pronominal prefixes is identical to that in the other Mississippi Valley languages discussed here, as well as in Mandan. That is, first person plural pronominals will always precede preverbs like in (4.88d), but other pronominals will appear trapped, as shown in (4.88b) and (4.88c). (4.89) likewise demonstrates that the unspecified argument marker *wa-* precedes other pronominals, as is the case in the other languages discussed here.

### 4.7.3 Ohio Valley Siouan: Biloxi

The members of the Ohio Valley Siouan clade are sparsely accounted for (Oliverio & Rankin 2003). The Beaver Wars and subsequent conflicts between the Iroquois and Algonquian-speaking peoples of the Great Lakes region caused

many of the Siouan peoples who inhabited the East Coast and the Ohio River Valley to flee westward to the Great Plains or southward towards the Gulf of Mexico. [Hanna \(1911\)](#) notes that the Ofo people had lived between the Muskingum and Scioto rivers in what is now central Ohio during the middle of the 1600s. By 1684, their villages were destroyed by the Iroquois and their people were either taken captive or forced to flee south in search of safer havens. Over time, the Ofo moved southward to join up with the Biloxi, a larger Siouan tribe, into which they were absorbed ([Swanton 1952](#)). The Biloxi were already dwelling on the Gulf coast around modern-day Biloxi, Mississippi by 1669, though had moved west into Louisiana by 1763, and some had moved into the Neches River delta region of Texas in 1805 ([Dorsey 1893](#)).

As more and more settlers moved into the region during the nineteenth century, Biloxi numbers dwindled. The Biloxi language went extinct sometime in the 1930s, though [Morris Swadesh](#) and [Mary Haas](#) were able to conduct some fieldwork with the last remaining native speaker, who was already in her 80s at the time ([Dalby 2003](#)). The largest corpus of Biloxi is a collection of narratives put together by [Dorsey & Swanton \(1912\)](#), and it is this corpus that forms the basis of most modern attempts to analyze or reinvigorate the Biloxi language.

While [Einaudi \(1976\)](#) does not provide an explicit ordering of preverbs in Biloxi, searching through her grammar reveals the following order.

Table 4.6: Prefix field in Biloxi

6	5	4	3	2	1	0
NEG	PRO.AGT	PRO.PAT	PREV.SUPER	SUUS	INST	STEM
			PREV.INST	REFL		
			PREV.LOC	RECIP		
				DAT		

As [Table 4.6](#) above shows, Biloxi has a much smaller prefix field than any other Siouan language discussed heretofore. In addition to its small size, Biloxi differs significantly from the other languages in that the preverbs do not seem to trap pronominals. [Einaudi \(1976\)](#) does not have any examples of preverbs with pronominals, given the scarcity of non-third person verbs in the folk narratives found in [Dorsey & Swanton \(1912\)](#). Furthermore, Biloxi, like the Missouri Valley languages, lack a dedicated first person plural marker. First person plural is marked using the first person prefix along with a plural suffix, though this suffix may be omitted if the context is clear.

Examples of pronominals and preverbs in Biloxi from [Dorsey and Swanton \(1912\)](#), abbreviated as DS, appear below:<sup>16</sup>

<sup>16</sup>I adopt a modified version of the orthography used by [Kaufman \(2011\)](#) for Biloxi. [Torres \(2010\)](#) adopts a version of the [Dorsey & Swanton \(1912\)](#) orthography that lacks many of the diacritics they used, but she otherwise keeps the orthographic shape of their data intact. Vowel length does not appear in [Dorsey and Swanton](#), but [Kaufman](#) states that Biloxi certain does have phonemic vowel length. This distinction is only noted in [Haas \(1968\)](#) from her fieldnotes.

(4.90) Pronominals in Biloxi

- a. *d̥hi*  
d̥hi  
see  
'he saw it' (Dorsey & Swanton 1912:92)
- b. *q̥d̥hi*  
q̥-d̥hi  
1A-see  
'I see it' (Dorsey & Swanton 1912:126)
- c. *q̥yid̥hi*  
q̥-i-d̥hi  
1A-2s-see  
'I see you' (Dorsey & Swanton 1912:184)
- d. *iy̥q̥d̥hi*  
i-q̥-d̥hi  
2A-1s-see  
'you see me' (Dorsey & Swanton 1912:184)
- e. *q̥yid̥htudaha*  
q̥-i-d̥hi-tu-daha  
1A-2s-see-PL.AGT-PL.PAT  
'we saw you (pl.)' (Dorsey & Swanton 1912:185)
- f. *y̥q̥d̥htudaha*  
i-q̥-d̥hi-tu-daha  
2A-1s-see-PL.AGT-PL.PAT  
'you (pl.) saw us' (Dorsey & Swanton 1912:185)

(4.91) Biloxi constructions with three arguments

- a. *Ḁkaki*  
q̥-a-ki  
1A-UNSP-carry.on.back  
'I carried something on my back' (Einaudi 1976:78)
- b. *Ay̥idako.*  
ay̥-i-dako  
tree-PV.INST-use.a.whip  
'he whipped him against the tree' (Einaudi 1976:111)<sup>17</sup>

---

<sup>17</sup>In Mandan, the instrumental preverb and the directional preverb *i-* are homophonous. This example would seem to indicate that Biloxi also has a directional preverb, given the fact that Dorsey & Swanton (1912) gloss (i'd̥ko') *idako* as 'he whipped him against,' rather than 'he whipped him with.' The verb *dako* already means 'to use a whip,' to the addition of this preverb is indicating a relationship between the action of whipping and the place of whipping, namely the tree.

- c. *yakxidi?*  
 i-a-kxi-di  
 2S-**PV.SUPER**-be.angry-EMPH  
 ‘are you angry?’ (Dorsey & Swanton 1912:209)
- d. *Ayokxipa*  
 a-i-**o**-kxipa  
 1A-2s-**PV.LOC**-meet  
 ‘I met you’ (Dorsey & Swanton 1912:210)

The data in (4.90) demonstrates how pronominals appear where one would expect them to in verbs that do not take preverbs. The lack of a first person plural marker mirrors the situation seen in Hidatsa previously, but unlike Hidatsa and any other language discussed up to this point, Biloxi treats the unspecified argument marker as any other pronominal, placing it in the same slot as any other non-agent argument, as seen in (4.91a). Few examples of preverbs with first or second person arguments appear in the Dorsey & Swanton (1912) corpus, but those that do show that pronominals always precede preverbs. Thus, there are no trapped pronominals in Biloxi. The preverbs, in fact, appear to be integral parts of the verb, likely having grammaticalized onto the verb during some earlier stage of development in an ancestor language.

#### 4.7.4 Catawban: Catawba

The data above deals with the issue of trapped pronominals and their relationship with preverbs in Siouan. More morphologically and lexically innovative than the rest of the Siouan language family is the Catawban language family, with two attested members: Woccon and the eponymous Catawba. Woccon is not well-documented, having ceased to be spoken in the early 1700s after being absorbed by the neighboring Tuscarora tribe between 1711 and 1713 (Rudes 2000). Only Catawba managed to survive into the twentieth century, though its final speaker, Red Thunder Cloud, is famous for being able to pass as a Catawba from the Carolinas despite being a man of non-native descent from Long Island. While his aboriginal background is not authentic, he was actually a speaker of Catawba through learning it (Goddard 2000).

Rudes (2007) lists the verbal prefixes in Catawba as follows:

Table 4.7: Prefix field in Catawba

4	3	2	1	0
OBJECT PRONOMINAL	LOCATIVE	INSTRUMENTAL	SUBJECT PRONOMINAL	STEM

While Biloxi had a much smaller prefix field than other Siouan languages, Catawba appears to have an almost impoverished one by comparison. Rudes (2007) explains that while slots 2, 3, and 4 are listed as prefix slots for

convenience, they actually are better analyzed as being proclitics, due to the fact that the presence of these formatives trigger word-initial consonant mutation in a certain class of verbs. Furthermore, only subject pronominals appear to factor into stress assignment. Thus, the prefix field in Catawba is better explained as having a single prefix with up to three possible proclitics.

The examples below all come from [Rudes \(2007\)](#), demonstrating subject pronominals, instrumentals, locatives, and object pronominals, respectively.

(4.92) Verbal paradigm in Catawba

- a. *paksúuree* ‘he tells a lie’
- b. *ɗapaksúuree* ‘I tell a lie’
- c. *yapaksúuree* ‘you (sg.) tell a lie’
- d. *hapaksúuree* ‘we tell a lie’
- e. *wipaksúuree* ‘you (pl.) tell a lie’
- f. *ipaksúuree* ‘They tell a lie’

The data above in (4.92) highlights one difference between verbal paradigms in Siouan and Catawban. Unlike Siouan languages, Catawba has distinct pronominals for all plural subjects, not just first person plural. Third person singular remains unmarked, as in Siouan.

(4.93) Interaction between proclitics and verbal stems

- a. *du*            *ɗáree*  
ru=            rɔ̄-ree  
INS.HAND= eat-DECL  
‘he eats by hand’
- b. *du*            *čáree*  
ru=            ɗ-rɔ̄-ree  
INS.HAND= 1A-eat-DECL  
‘I eat by hand’
- c. *du*            *yáree*  
ru=            y-rɔ̄-ree  
INS.HAND= 2A.SG-eat-DECL  
‘you (sg.) eat by hand’
- d. *du*            *wáree*  
ru=            w-rɔ̄-ree  
INS.HAND= 2A.PL-eat-DECL  
‘you (pl.) eat by hand’

As the examples in (4.93) illustrate, instrumentals cause consonant mutations that would otherwise only occur at word boundaries. The two instrumentals in Catawba, *raa*= ‘action by foot’ and *ru*= ‘action by hand’ appear to be related to the Catawba verbs *raa* ‘go’ and *ru* ‘get, obtain.’<sup>18</sup> It is very possible that instrumentals in Siouan languages originated in such a manner by incorporating another verb to indicate the manner in which the action took place.

(4.94) Adverbial proclitics in Catawba

- a. *ka*        *nq̄tiree*.  
 ka=        n-waṭ-ree  
 UPRIGHT= 1s-set-DECL  
 ‘I am getting up’
- b. *ka*        *yq̄tiree*.  
 ka=        y-waṭ-ree  
 UPRIGHT= 2s.sg-set-DECL  
 ‘you are getting up’
- c. *tak*        *dáaree*.  
 tak=        raa-ree  
 IN.FRONT= set-DECL  
 ‘he goes ahead’
- d. *hap* *dáaree*  
 hap= raa-ree  
 UP= set-DECL  
 ‘he goes ahead’

The data above in (4.94a) and (4.94b) demonstrate how locatives trigger consonant mutation in that class of verbs. In addition, (4.94c) and (4.94d) show the word-initial fortition that takes place, where word-initial /r/ becomes [d]. Object pronominals have an identical effect on the initial consonant of the verb, triggering consonant mutation or fortition.

(4.95) Subject proclitics in Catawba

- a. *Yi*        *káaniree*  
 yi=        kaan-ree  
 2S.PRO= see-DECL  
 ‘he sees you (sg.)’

---

<sup>18</sup>Explicit details regarding systematic consonant mutations are not found in Rudes’s (2007) unpublished Catawba manuscripts. Prior to his passing, he had planned on producing a grammar, but had not yet written a section on Catawba phonology. As such, his texts are full of references to consonant mutations and the kinds of circumstances under which it is triggered, but there is no overt account of how or why such mutation may be occurring. As far as I can tell, Rudes is defining consonant mutation as a phenomenon whereby the subject pronominal and initial consonant of a verb root are realized as a single consonant that bears the place of articulation of the subject pronoun. For example, the verb *rii* ‘to be located’ when inflected for first person, becomes *čiree*: *d- 1A, rii* ‘be located;’ and *ree* DECL. The /d/ of the pronominal and the /r/ of the initial consonant yield the mutation [č], which preserves the coronal place of articulation of the subject marker. Further research is needed in this area.

- b. *Nu káaniree*  
 nu= kaan-ree  
 1S.PL.PRO= see-DECL  
 ‘he sees us’

While Catawba appears to have a very different way of dealing with morphology that appears preceding the verb, it is easy to see how the system of proclitics may have eventually developed into the more robust prefix field seen in the distantly-related Siouan languages.

#### 4.7.4.1 Summary of preverbal template in Siouan

The overall goal of presenting such a large amount of data is to see what patterns emerge. An analysis of a representative of each branch of the Siouan language family tells us the following:

- All Siouan languages have preverbs.
- Most Siouan languages have trapped pronominals.
- All Siouan languages have instrumentals.
- Most Siouan languages have dedicated first person plural marking that do not pattern with other pronominals.
- The placement of pronominals in all languages vary, with some languages having the agent/subject pronominal closer to the verb, while others have the patient/object closest to the verb.
- Most Siouan languages place the unspecified argument pronominal farthest away from the verb, and is in the same slot that incorporated objects or verbs can appear.

There seems to be a level of inconsistency among Siouan and Catawban languages regarding the ordering of prefixal morphology, which raises the question of what has motivated this difference in prefix order in the first place. One explanation as to how these prefixes came from the same set of Proto-Siouan formatives and yet show up in slightly different orders is that as languages changed over time, they underwent changes to their phonologies and lexicons. Part of these changes inevitably involved differing interpretations on the parts of speech communities over the status of these preverbal elements. In languages like Biloxi, which has lost preverbs as a discrete morphological element, this change could have been brought about by a reanalysis of preverbs actually being treated as standard derivational prefixes as opposed to creating a composite structure. Similarly, in languages that have object marking farther away from the verb than subject marking, a highly-ranked SCOPE(Subject, Object) constraint would motivate a re-ordering of RCs so that prefixation acted more in accordance with the underlying semantico-syntactic structure.

## Chapter 5

# Conclusion

This chapter serves to summarize the main points of this dissertation. While each chapter has had a focus on a particular area of inquiry, each of these chapters work to further the questions posed in (1.1), (1.2), and (1.3). In Chapter 1, I provide ethnographic information about the Mandan people and their gradual travel up the Northern Plains over the course of the past millennium. In addition to an abridged history of the Mandan people and their ancestors since 900CE, I note that Mandan presents a particular challenge to morphological theory. Namely, its templatic morphology is described in linguistic literature as being unmotivated: i.e., affixation appears in a proscribed pattern that is unconstrained by some other language domain such as syntax or phonology. I argue that templatic morphology could not be unmotivated, as we could attribute the motivation for the ordering of affixes to the morphology alone.

Chapter 2 involves an investigation into a large number of phonological processes at work in Mandan, many of which have not been previously described by previous researchers. In Siouan linguistics, a majority of the literature focuses on a description of the morphology found in a language, and phonetics and phonology tend to play a minimal role in the study of Siouan languages. Of particular note is the description of stress in this chapter, which most previous researchers have stated was a subject for further study, but which had not been addressed in a systematic way until now. The data in this chapter discounts the notion that Mandan has any underlying stress or pitch accent on a lexical item, though some words give the appearance of such due to their status as compounds containing one or more elements that are not longer found apart from said compounds in modern Mandan. This chapter also concludes that affixation is not phonologically driven, contrary to previous analysis of “infixation” in other Siouan languages (McCarthy & Prince 1993b).

The longest chapter, Chapter 3, provides a description of the verbal morphology found in the corpus, including several items not identified in earlier grammatical sketches. Mandan has a large degree of pronominal allomorphy,

and certain processes that had previously been assumed to be suppletion have truly been predictable allomorphs: e.g., the treatment of the first person plural prefixes before vowel-initial stems. While largely descriptive, the data presented here also make a case against prefix order being determined by semantic scope per [Rice \(2000\)](#).

Chapters 2 and 3 both serve to eliminate phonology and syntax from consideration over the driving force behind affix order in Mandan. Chapter 4 highlights this point and proffers a third option: the morphology itself. Using a synthesis of [Xu's \(2007\)](#) Realization OT and aspects of [Anderson's \(2005\)](#) theory of clitics, realization constraints are able to dominate SCOPE constraints to align to a word edge in a specific order. The key point here is the notion that Mandan verbs with preverbs have a composite structure, and that different morphology is drawn to different edges within that structure.

The remainder of this chapter is dedicated to discussing the contributions to the study of Mandan, to Siouan linguistics, and linguistics in general that this dissertation makes, as well as briefly examining the viability of the hypothesis that all templatic languages have affix order that is motivated by the morphology itself. I conclude with areas for future research and what questions still exist related to Mandan or templatic morphology in general.

## 5.1 Contributions

Over the course of this dissertation, I have engaged in the most detailed investigation into the workings of the Mandan language to date. This work would not be possible without the hard work done by previous researchers like [Kennard \(1936\)](#), [Hollow \(1970\)](#) and [Trechter \(2012b\)](#). Their foresight in transcribing hundreds of pages of narratives and their care in either archiving or sharing these transcriptions and recordings have made this process possible. Their work will help aid future studies of the Mandan language who can build upon what has been discussed here.

In treating these narratives as a corpus, there is now room to grow by converting them into a usable and publicly-available database, where community members, learners, and scholars can find key words or search specific morphology and constructions to study. One issue with dealing with the corpus is the level of training needed to predictably reconstruct the surface form of [Hollow's \(1970, 1973a, 1973b\)](#) work, since he denied that there were long vowels in Mandan and typically wrote Mandan in what is basically underlying notation. This format is not immediately useful to heritage learners, and as such, this dissertation is the first major attempt to begin making these narratives more user-friendly by making the orthography more in line with the actual phonetic realization rather than trying to make the underlying morphology the focus. A natural consequence of this work is that going through the narratives and breaking down the corpus into interlinear glosses will also help learners and researchers better understand the process of wordbuilding in Mandan, as well as clausal structure.

This dissertation adds to the body of work done by other like Boyle (2007), Cumberland (2005), Graczyk (2007), Park (2012), and Quintero (2004), all of whom assembled grammars on the respective languages that they studied. A large problem in Siouan linguistics is that researchers will often present at conferences, but publications are relatively rare. As such, the enormous amounts of data that Siouanists have at their disposal is relegated to brief handouts available only to those who were at a talk. Linguistic theory is requires data in order to provide evidence of a claim or point out that a claim cannot hold. I consider the dissemination of several hundred pieces of Mandan data an important act, as I hope other researchers are able to identify similiar phenomena in other languages and use the analysis herein to enrich our typological understanding of underlying nasality, morphologically-triggered ablaut, allocutive agreement, or any of the various topics covered in the descriptive portions of this work.

## 5.2 Status of templatic morphology

Mandan certainly has templatic morphology in the sense that its affixes follow a strict order that does not appear motivated by the phonology, semantics, or syntax. The discussion of the status of templatic morphology in Mandan has implications beyond just that of Mandan and other Siouan languages. The section below revisits the notion of what templatic morphology means, as well as the implications of the data and discussion in this dissertation.

### 5.2.1 Templatic morphology is motivated

A large portion of this dissertation has been devoted to the grammar of Mandan. However, the grammar acted as a backdrop for the investigation into the nature of templatic morphology and the motivation for affix order in Mandan. The three questions guiding this line of inquiry are reproduced below.

#### (5.1) Three research questions

- a. **Question 1:** According to Manova & Aronoff (2010:110), affix ordering could be either motivated (i.e., governed by rules) or unmotivated (i.e., inexplicable). They deem “templatic” to be a subtype of unmotivated affix order, but is affix ordering in languages with templatic morphology truly unmotivated, or can there be at least some motivating factors with respect to affix order?
- b. **Question 2:** Rice (2000:1) questions the notion of a template as a word-formation device in Athabaskan languages and that argues affix ordering is constrained by semantic scope. Since Athabaskan languages are often held up as exemplars of templatic morphology (i.e., unmotivated affix ordering), does this necessitate that all languages therefore have motivated affix ordering?

- c. **Question 3:** [Anderson \(1982:609\)](#) states that derivation takes place in the lexicon, after which inflectional affixation can occur, with inflected forms thereafter being unable to undergo additional derivation. Given that inflectional and derivational affixes are frequently interspersed in templates, does this distribution of affixes indicate that inflection and derivation are cyclical morphological processes, or can we account for this interweaving of affix types some other way?

Let us evaluate how the contents of this dissertation have answered each of these questions. For (5.1a), “templatic” does not truly mean unmotivated. The argument in Chapter 4 is that templatic languages motivate affix order through the morphology alone. Morphology certainly interfaces with other linguistic domains, but it is not the case that morphology is merely the medium through which another domain manifests its influence. The morphology has the ability on its own to order affixes to either remain faithful to or flout SCOPE, which Chapter 4 shows repeatedly through the use of RCs. As such, the response to [Manova & Aronoff’s \(2010\)](#) description of templatic morphology is that it is truly motivated.

I argue that templatic morphology involve affix ordering that is motivated. While [Rice \(2000\)](#) states that affix order is a consequence of the underlying semantics, we cannot say the same about Mandan, at least not completely. It is the case that enclitics do reflect the underlying semantic scope of their functional domain in that we have seen that variable enclitic order grants slightly different readings. This fact is consistent with [Rice’s \(2000\)](#) view on affix ordering. However, we cannot ascribe the semantics full control over affix ordering, as the prefix field largely runs counter to our predictions under [Baker’s \(1985\)](#) Mirror Principle. I hold that affix order in Mandan is motivated by morphology. As such, we can extrapolate that fact to say that all templatic languages have motivated morphology. Under [Manova & Aronoff’s \(2010\)](#) typology of affixation systems, templatic morphology is the only one they consider to be unmotivated. We can therefore say that, since templatic morphology is motivated after all, there are no languages with unmotivated affix orders, which addresses the question in (5.1b).

Both the questions in (5.1a) and (5.1b) are connected, but the question in (5.1c) is quite altogether different. The Lexicalist Hypthothesis per [Anderson \(1982\)](#) holds that derivation takes place in the lexicon, and that inflection takes place at a later stage. The interspersion of inflectional and derivational morphology in the prefix field in Mandan call this hypothesis into question. However, using [Anderson’s \(1992\)](#) notion of composites, we can say that it is not the case that the affixes are all appearing at the same stage, but that words with preverbs undergo inflection already having a more complex internal structure.

(5.2) Structure of Mandan composite words

[ Af<sub>i</sub> Preverb [ Af<sub>j</sub> Verb ]<sub>head</sub> ]

It is not the case that the derivational material is being generated in between inflectional prefixes. Instead, that derivational material was already there before inflection began, as we see above in (5.2). While the structure of a composite gives the appearance of linear affix order, it is simply the case of the nested structure of the composite. The head of a word is contained within a greater word, and that greater word has morphological material in it that is not itself a word. These morphological materials lacking the full status of wordhood are preverbs. Other languages with composites, such as Russian and Icelandic as described in [Anderson \(1992:302\)](#), feature inflectional material trapped between the head of a word and some postverbal element. Therefore, we can say that the reflexive morphology in both Russian and Iceland consist of postverbs instead of preverbs.

By applying this analysis to Mandan, we can see that composite words are more commonly found than previously thought. Furthermore, we can eliminate any conflict between the presence of derivational morphology in the middle of an inflection field by realizing that that derivation has been in that position within the word before inflection ever took place. We can maintain the integrity of the Lexicalist Hypothesis without having to make any exceptions for templatic languages, because templatic languages are following the same perimeters as all other languages in this sense.

Having answered the three research questions above, this work has other implications for the relationship between affixation and cliticization. In [Anderson's \(2005\)](#) book, he focuses on the treatment of clitics using the EDGE-MOST constraints discussed in Chapter 4. This same constraint can be formatted to accommodate both affixes and clitics. Indeed, just as inner prefixes and outer prefixes in Mandan are targeting different edges within a word, clitics target different edges within a phrase. We can draw parallels between the two morphological items in that they share very similar distributions. We have prefixes that must exist at the leftmost edge of the overall word, ignoring the head, such as the outer prefixes in Mandan. This behavior mirrors that of first-position clitics, which align themselves to the leftmost edge of the utterance. It may also be the case that true infixes are like second-position clitics in that they must appear near the left edge of their domain, but never at the leftmost edge.

First- and second-position clitics mirror the outer prefixes in Mandan in that they align to the left edge of their overall domain (i.e., the word). We can contrast this with clitics that must align to the head of a phrase. Similar to Romance proclitics that align to the left edge of T (i.e., the head of the phrase), inner prefixes in Mandan align to the left edge of the head of the word. In the same way that prefixes differ from suffixes in that they target a different word edge, affixes and clitics differ only in the domain in which they target. Both morphological items target either an overall edge or a head.

Over time, it is not difficult to see how one might become another, as a clitic can become an affix simply by changing the domain  $\mathcal{D}$  of a  $\text{CRISPEDGE}(e, L/R, \mathcal{D})$  realization constraint from the head of a phrase to the head of a

word. Similarly, languages that reanalyze an affix as being associated with the edge of a word versus the head of a word can do so likewise by changing what  $\mathcal{D}$  it affixes to: e.g., some English speakers can say *pass-able-by* instead of *pass-by-able*. By employing a constraint-based account of affix order, we are better able to understand both the synchronic and diachronic motivations for affix order.

## 5.2.2 Templates in other languages

While Mandan has been the focus of this dissertation, the implications of this research are that all templatic languages have motivated affix order. Furthermore, it stands to reason that the counter-Mirror Principle ordering observed elsewhere might also be caused by the presence of preverbs or postverbs. These demarkations between inflectional morphology and derivational morphology suggest an internal word boundary, meaning that templatic morphology may just be synonymous with a language having a composite and affixes that target different edges of the word.

### 5.2.2.1 Composites in Caddo

A brief investigation of templates in other languages show that this hypothesis holds promise. [Chafe \(1976\)](#) has proposed that Caddoan languages and Siouan languages are distantly related. While this conclusion is not widely accepted, it is true that there are some similarities between the language families. One such similarity is the robust templatic morphology that each Caddoan language possesses. Looking just at Caddo itself, we can see some familiar patterns. Like Mandan, there is morphology in Caddo that some have varyingly called both a prefix and an infix. The animate plural marker *wa-* can appear as a prefix, but seems to “infix” itself with certain verbs ([Kasak 2015b](#)). We can see examples of this behavior below.

#### (5.3) Animate plural marker *wa-* in Caddo

- a. *háh?áwnánní-yah*  
 hak#?awi-nán-yi='yah  
 IND#ABS.SG-by.foot-go.along  
 'he is trotting along' ([Melnar 2004:114](#), [Chafe j010](#))
- b. *háh?áwnánní-wá-yah*  
 hak#hani-nán-yi=**wa**'yah  
 IND#ABS.PL-by.foot=**PL**=go.along  
 'they are trotting along' ([Melnar 2004:20](#), [Chafe j011](#))
- c. *kukáw?áhki?a?*  
 ku-kahwa=?ahaki-?a?  
 1PAT-become.conscious.of-FUT  
 'I will find out, wake up' ([Melnar 2004:130](#), [Chafe b647](#))

- d. *kúc'iyakahwáw?áhah*  
 kúc'i#sa-kahwa=**wa**=?ahák(i)  
 NEG.PRIOR#IRR-become.conscious.of.**PL**  
 'they haven't yet awakened, been informed' (Melnar 2004:93, Chafe b659)

Melnar (2004) transcribes certain verbs as having separable elements like 'go along' /yi='yah/ or 'be conscious of' /kahwa=?ahaki/. The animate plural *wa-* appears to insert itself between the two syllables in /yi='yah/, but after the first two syllables in /kahwa=?ahaki/.<sup>1</sup> Looking at the data in Caddo, it seems a more apt explanation is that this plural marker is prefixing onto the head of a composite. While the elements *yi-* or *kahwa-* do not seem to have any meaning of their own, it appears that they are simply lexically selected preverbs of uncertain origin, given that these preverbal elements appear with numerous verbs. While the glossing of the verb above comes directly from Melnar, I shall reanalyze the element *yi-*, *kahwa-*, and others like it as preverbs and gloss them accordingly. As such, the data above can be rewritten with the structures below.

(5.4) Animate plural marker *wa-* in Caddo (revised)

- a. *háh?áwnánní-yah*  
 hak#[?awi-nán-yi-['yah]]  
 IND#ABS.SG-by.foot-go.along  
 'he is trotting along' (Melnar 2004:114, Chafe j010)
- b. *háh?áwnánní-wá-yah*  
 hak#[hani-nán-yi-[wa-'yah]]  
 IND#ABS.PL-by.foot=**PL**=go.along  
 'they are trotting along' (Melnar 2004:20, Chafe j011)
- c. *kukáw?áhki?a?*  
 [ku-kahwa=[?ahaki-?a?]]  
 1PAT-become.conscious.of-FUT  
 'I will find out, wake up' (Melnar 2004:130, Chafe b647)
- d. *kúc'iyakahwáw?áhah*  
 kúc'i#[sa-kahwa=[wa=?ahák(i)]]  
 NEG.PRIOR#IRR-become.conscious.of.**PL**  
 'they haven't yet awakened, been informed' (Melnar 2004:93, Chafe b659)

This trapped pronominal seems to mirror the situation in Mandan. This structural re-interpretation of the composition of the Caddo words above show that *wa-* must be a head-seeking prefix like the inner prefixes in Mandan. It is not a true prefix, as it does not uniformly align itself after the initial element of a root. The only prefix that

<sup>1</sup>Rood (p.c.) analyzes its cognate *-wa-* in Wichita as a true infix, as he describes it as occurring before the last consonant of the root with some minor exceptions.

functions this way in Caddo is *wa-*, but there are numerous other inflectional prefixes. These prefixes all appear at the left edge of the word, though they will never precede a proclitic, which will always be word-initial [Melnar \(2004:10\)](#). We can see these outer inflectional prefixes below.

(5.5) Outer prefixes in Caddo

- a. *k'apáhci? hákkuhkáwáyúhsa?*  
 k'apáhci? hák#[**ku**-haka-[**wa**-yúk-sa?]]  
 chicken IND#**1PAT**-INDV-**PL**-vanish-IMPV  
 'my chickens are vanishing on me' ([Melnar 2004:43](#), [Chafe 1976 h628](#))
- b. *cihkámmáwínčah*  
 [**ci**-haka-ni-[**wa**-wín-čah]]  
**1AGT**-INDV-PORT-**PL**-go.down-INTENT  
 'I'm going to take [live] things down' ([Melnar 2004:137](#), [Chafe 1976 d619](#))
- c. *ʔáwyawatáhʔnah*  
 [ʔawi-yah-[wa-tak-'iʔn-ah]]  
 OBLIQUE-by-PL-stand-CAUS-PERF  
 'they leaned it' ([Melnar 2004:166](#), [Chafe 1976 f128](#))
- d. *kúʔníbítwá'wa?*  
 kúʔni#[**ba**-t-**wa**-ʔaʔ  
 NEG.CONT[#**1DAT**.**IRR**-APP-[**PL**-is]]  
 'we [excl.] don't have it anymore' ([Melnar 2004:112](#), [Chafe 1976 f354](#))

In the examples above in (5.5), we can see that a series of preverbal derivational morphology appears between the animal plural *wa-* and the different inflectional prefixes at the left periphery. Unlike Mandan, Caddo makes use of portmanteaux when marking a first person argument acting upon a second person argument or vice versa. This use of portmanteaux prevents Caddo from having to rank discrete pronominal prefixes in a template.

As the data above show, the behavior of inflectional prefixes in Caddo bear a striking resemblance to those in Mandan, despite the lack of an accepted genetic connection between the two language groups. Using a composite analysis of templatic morphology, we can look to find where the internal word boundaries are in a template. From there, we can determine what prefixes are drawn to the head of the composite, such as *wa-*, versus others that must align to the left edge of the word: i.e., all other inflectional prefixes in Caddo. The proclitics exist outside the domain of the word for the purposes of affix ordering.

### 5.2.2.2 Composites in Navajo

The approach taken with the Caddo data above can certainly be used with other templatic languages of the Americas. Given that [Harley \(2010\)](#) explains that prefix order in Navajo is motivated by syntactic structure and post-syntactic

operations, we can take an alternative view and say that the same analysis that accounts for the distribution of inflectional morphology in Mandan (and Siouan in general) and in Caddo can work for Navajo as well. The Navajo data from Chapter 4 is reproduced below.

(5.6) Trapped pronominals in Navajo (revisted)

*ch'ishidiníldqzh*

**ch'i**-sh-d-n'-ł-dqzh

DERIV-INFL-DERIV-INFL-DERIV-ROOT

PV.out.horizontally-1SG.OBJ-INS.LIMB-PERF.3SG.SUBJ-TR-move.jerkily

'he jerked me outdoors' (Hale 2001:678)

We can clearly see that we have inflectional morphology intersperse between derivational morphology in the example above. One issue, however, is that there is a derivational marker at the left edge of the word, *chi* 'outdoors horizontal motion.' This adverbial is what Athabaskanists refer to as a disjunct, and it represents one of the three parts of an Athabaskan verb template. McDonnough (2000:161) points out that disjuncts have 'clitic-like properties.' This structure is strikingly similar to the observed pattern of proclitics versus prefixes in Caddo. If we were to assume that this inclination to call the disjunct a clitic was a founded one, then we can re-analyze the data above as being a composite in like with the ones seen in Mandan and Caddo. Inflectional prefixes are shown in bold below.

(5.7) Composites in Navajo

*ch'ishidiníldqzh*

ch'i#[**sh**-d-[**n'**ł-dqzh]]

PV.out.horizontally-**1SG.OBJ**-INS.LIMB-PERF.**3SG.SUBJ**-TR-move.jerkily

'he jerked me outdoors' (Hale 2001:678)

Relegating the disjunct to the proclitic field outside of the word, we can draw word boundaries around the head of the word *dqzh* 'move jerkily' and then around the rest of the morphological material present. The subject prefix aligns to the left edge of the head of the word, while the object prefix aligns to the left edge of the overall word. Just like in Caddo and Mandan, we are not moving in and out between inflection and derivation, but we have a composite structure complete with existing derivational material before the word even undergoes inflection.

### 5.2.2.3 Composites in Arapaho

One of the piece of evidence for word-internal boundaries in Mandan is the blocking effect that it has for various phonological processes. While similar blocking effects have not been described to date in Siouan, other languages

report blocking effects that do not seem phonologically motivated. In the Arapaho, [Cowell & Moss \(2008:20\)](#) describe a process of vowel harmony where /e/ becomes [o] when the following syllable contains [o]/[oo] and has one of the following onsets: /k w x h '/. This regressive [+back, +round] harmony can be seen below.

(5.8) Arapaho e~o harmony in Arapaho

*co'okusee-*  
*ce'-oku-see-*  
 ITR-sit-crawl

'crawl back' ([Cowell p.c.](#))

The aspectual prefix *ce'* is followed by a syllable containing an [o]. Back-vowel harmony is able to pass through the glottal stop and spread onto the [e] in *ce'*, yielding [co']. This is predictable and normal behavior. However, there are situations where this harmony are blocked for no phonologically-motived reason.

(5.9) Blocking of e~o harmony in Arapaho

*cee'oowuseet*  
*ce'-hoowusee-t*  
 ITR-walk.downhill-3s

'he is walking downhill again' ([Cowell p.c.](#))

The construction above should permit vowel harmony to turn the /e/ into an [o] on the prefix, but that is not what we see. [Cowell \(p.c.\)](#) states that this difference is because of the *ce'* in (5.9) is really a preverb, and is not part of the verb in the same way that the *ce'* in (5.8) is. From the analysis of word-internal structure I have proposed for Mandan, this behavior should not be surprising if (5.8) features a simplex word, but (5.9) features a composite. The structure of these two Arapaho words is shown below.

(5.10) Simplex and composite words in Arapaho

*ce'-oku-see-*  
*ce'- [ hoowusee-t ]*

Just like regressive nasal harmony in Mandan, regressive vowel harmony in Arapaho is blocked by a word boundary. Clearly, Arapaho considers internal boundaries to be just as large an impediment for vowel harmony as any other word boundary. Therefore, there must be some kind of CRISP-EDGE([+back/+round, Word) constraint preventing the *ce'* in (5.9) from participating in vowel harmony.

#### 5.2.2.4 Summary

Many of the languages of North America have templatic morphology or have templatic-like tendencies. We cannot simply attribute the presence of a template to it being an areal feature, because templatic morphology exists all around the world. We do not call Russian or Icelandic templatic languages, yet they have composite words that allow one or more inflectional suffixes to appear between the verb root and a derivational suffix. Similarly, with Georgian and its aspectual preverbs, we see trapped pronominals between the preverb and its verb. The literature has largely avoided calling these languages templatic and saved that term for languages with more articulated suffix or prefix fields.

Nomenclature notwithstanding, the templatic morphology we see in four very different language families (i.e., Siouan for Mandan, Caddoan for Caddo, Athabaskan for Navajo, and Algonquian for Arapaho) patterns in a very similar way. Inflectional morphology is able to align itself to a particular word edge, and that word edge can be the head of the word or the greater morphological word. The motivation for affix order largely comes from the fact that derivation has already produced the affix order we see when inflection begins, and we then simply have to see what order affixes go in when multiple inflection affixes appear at the same edges. These languages all have been cited as having very complex verbal morphology, but in the end, they all have the same pattern: [  $Af_1$  Preverb [  $Af_j$  Verb ] ].

### 5.3 Avenues for future research

Mandan has been the subject of several grammars and a dictionary over the past century. There have been nearly a thousand transcribed pages of Mandan narratives done between a half-dozen researchers in that same amount of time. Despite all this material, Mandan has not been studied as much as other Siouan languages. In particular, not much formal work has been done on intonation patterns, interclausal syntax, and phonetic features of vowels and their non-modal manifestations (e.g., creaky voice in the presence of a coda glottal stop). This dissertation is just one step in the direction of shedding more light on this understudied language. With the lack of L1 speakers at this point, there are limits to topics of inquiry. However, there are many hours of recorded data to analyze, plus over 100 hours of recordings done by [Bowers \(1971\)](#) that need to be digitally remastered and transcribed.

Aside from the documentation aspect of describing the Mandan language, this dissertation largely focused on the issue of what role does morphology play in building a word. The question of how common are composites is one that should be investigated further. I have posited that there are possible words in English that are actually composites. The more we investigate the nature of a word's internal structure, the more we may add to the typology of what is even considered a word and how many kinds of words there are. The analysis done in this dissertation relies on

Mandan verbs having a composite structure to help justify why prefixes appear where they do in the template. In reality, there is no template. There is only a composite word, and a set of prefixes that align to the head and a set that align to the overall word. Templatic morphology is still a convenient term to use, but there is no primitive related to what slot an affix fills. As we look at more languages with templatic structures, we should ask if those templates can also fall under the basic description I have proposed here. Can we distill all templates into this same categorization, or are there templates out there that nullify this Composite Template hypothesis? That is a question that will require an investigation into many other languages with templatic morphology to confirm. It is my hope that other researchers take up this question and explore this topic in other languages and language families.

# Bibliography

- Allen, Paul. 1814. *History of the expedition under the command of Captains Lewis and Clark to the sources of the Missouri, thence across the Rocky Mountains and down the River Columbia to the Pacific Ocean performed during the years 1804-5-6 by order of the government of the United States*. Vol. 1. Philadelphia, PA: Bradford & Inskeep.
- Alsina, Alex. 1999. Where is the Mirror Principle? *The Linguistic Review* 16(1). 1–42.
- Ameka, Felix. 1992. Interjections: The universal yet neglected part of speech. *Journal of Pragmatics* 18(2-3). 101–118.
- Anderson, Stephen R. 1977. On the formal description of inflection. *Proceedings of Chicago Linguistic Society* 13. 15–44.
- Anderson, Stephen R. 1982. Where's morphology? *Linguistic Inquiry* 13(4). 571–612.
- Anderson, Stephen R. 1992. *A-morphous morphology*. Cambridge, UK: University of Cambridge Press.
- Anderson, Stephen R. 2005. *Aspects on the theory of clitics*. Oxford, UK: Oxford University Press.
- Anderson, Stephen R. 2008. English reduced auxiliaries really are simple clitics. *Lingue e Linguaggio* 2. 169–186.
- Anderson, Stephen R. & Arnold M. Zwicky. 2003. *Clitics*. 2nd. Vol. I. Oxford, UK: Oxford University Press. 328–328.
- Aronoff, Mark. 1994. *Morphology by itself: Stems and inflectional classes*. Cambridge, MA: MIT Press.
- Aronoff, Mark & Zheng Xu. 2010. A Realization Optimality-Theoretic approach to affix order. *Morphology* 20(2). 381–411.
- Axtell, James. 1981. *The Indian peoples of eastern America: A documentary history of the sexes*. New York, NY: Oxford University Press.
- Baird, Brandon O. 2010. Phonetic and phonological realizations of 'broken glottal' vowels in K'ichee'. In Kirill Shklovsky, Pedro Mateo Pedro & Jessica Coon (eds.), *Proceedings of Formal Approaches to Mayan Linguistics (FAMLi) 1*, 39–49. Cambridge, MA: MIT Working Papers in Linguistics.
- Baker, Mark C. 1985. The Mirror Principle and morphosyntactic explanation. *Linguistic Inquiry* 16(3). 373–415.
- Baker, Mark C. 2008. *The syntax of agreement and concord*. Cambridge, UK: Cambridge University Press.

- Beckman, Mary & Janet Pierrehumbert. 1986. Intonational structure in Japanese and English. *Phonology Handbook* 3. 255–309.
- Bennett, Ryan. 2016. Mayan phonology. *Language and Linguistics Compass* 10(10). 469–514.
- Benson, Edwin. 1999. *Mandan coloring book: An English & Mandan word builder - Book 5: Foods*. Twin Buttes, ND: Twin Buttes School District.
- Benson, Edwin. 2000. *Nu eta - "We the People": a Mandan language booklet for classroom use with simple vocabulary for anyone to learn a few everyday words in the Mandan language*. Twin Buttes, ND: Twin Buttes School District.
- Benson, Edwin, Cory Spotted Bear & Sarah Trechter. 2009. *Transcription of Otter Sage's "Origin of the Mandan people" from 1988*. Ms. Twin Buttes, ND.
- Benua, Laura. 1995. Identity effects in morphological truncation. In Jill N. Beckman, Laura Walsh Dickey & Suzanne Urbanczyk (eds.), *Papers in Optimality Theory* (University of Massachusetts Occasional Papers 18), 77–136. Amherst, MA: Graduate Linguistics Student Association of the University of Massachusetts, Amherst.
- Billings, Loren A. 2002. Phrasal clitics. *Journal of Slavic Linguistics* 10(1-2). 53–104.
- Boas, Franz & Ella Deloria. 1941. *Dakota grammar*. Washington, DC: U.S. Government Printing Office.
- Bobaljik, Jonathan. 1994. What does Adjacency do? In Heidi Harley & Colin Phillips (eds.), *Mit Working Papers in Linguistics 22: The Morphology-Syntax Connection*, 1–32.
- Boersma, Paul & David Weenik. 2016. *Praat: Doing phonetics by computer*. [Computer program]. Version 6.0.19, retrieved 13 June 2016 from <http://www.praat.org/>.
- Bonaparte, Louis-Lucien. 1862. *Langue basque et langues finnoises*. London, UK: Strangeways & Walden.
- Booij, Geert. 1995. *The phonology of Dutch*. Oxford, UK: Carendon.
- Bowers, Alfred W. 1950. *Mandan social and ceremonial organization*. Chicago, IL: University of Chicago Press.
- Bowers, Alfred W. 1971. *Mandan-Hidatsa ethnohistory and linguistics*. (Collection of 155 hours of Mandan and Hidatsa narratives from Otter Sage and Annie Eagle archived at the American Philosophical Society in Philadelphia, PA).
- Boyle, John P. 2007. *Hidatsa morpho-syntax and clause structure*. Chicago, IL: University of Chicago dissertation.
- Boyle, John P. 2011. Switch-reference in Hidatsa: The evolution of a grammatical system. *International Journal of American Linguistics* 77(3). 413–428.
- Boyle, John P. 2012. *Internally and externally headed relative clauses in Mandan and Hocqk*. Paper presented at the 32nd Siouan and Caddoan Languages Conference. University of Kansas: Lawrence, KS.
- Boyle, John P., Ryan Kasak, Sarah Lundquist, Armik Mirzayan, Jonnia Torres & Brittany Williams. 2016. *A preliminary study on accentuation in Hidatsa*. Paper presented at the annual meeting of Society for the Studies of Indigenous Languages of the Americas at the Linguistic Society of America annual meeting. Washington, DC.

- Bybee, Joan. 1985. *Morphology: A study in the relationship between form and meaning*. Philadelphia, PA: John Benjamins.
- Caffarel, Alice, James Robert Martin & Christian M. I. M. Matthiessen. 2004. *Language typology: Functional perspective*. Philadelphia, PA: John Benjamins Publishing.
- Calloway, Colin G. 2008. *First peoples: A documentary history of American history*. 3rd edn. Boston, MA: Bedford/St. Martin's.
- Carter, Richard T. 1991a. Maximilian's Ruptare vocabulary: Philological evidence and Mandan phonology. In Frances Ingemann (ed.), *The Proceedings of the 1990 Mid-America Linguistics Conference and Conference of Siouan-Caddoan Linguistics*, 479–489. Lawrence, KS: University of Kansas.
- Carter, Richard T. 1991b. Old Man Coyote and the Wild Potato: A Mandan trickster tale. In H. Christopher Wolfart (ed.), *Linguistic studies presented to John L. Finlay*, 27–43. Winnipeg, MB: University of Manitoba.
- Carter, Richard T. 1983. Root-final consonant clusters in mandan. In Mary Marino (ed.), *Napao: A Saskatchewan Anthropology Journal*, vol. 13, 1–4.
- Casali, Roderic F. 1997. Vowel elision in hiatus contexts: Which vowel goes? *Language* 73(3). 493–533.
- Casali, Roderic F. 2011. Hiatus resolution. In Marc van Oostendorp, Colin J. Ewen, Elizabeth Hume & Keren Rice (eds.), *The Blackwell companion to Phonology*, vol. 3, 1434–1460. Oxford, UK: Blackwell Publishers.
- Catlin, George. 1844. *Letters and notes on the manners, customs, and condition of the North American Indians*. 3rd edn. Vol. 2. New York, NY: Wiley & Putnam.
- Cattaneo, Andrea. 2009. *It is all about clitics: The case of a Northern Italian dialect like Bellinzonese*. New York, NY: New York University dissertation.
- Chafe, Wallace L. 1976. *The Caddoan, Iroquoian, and Siouan Languages*. The Hague, Netherlands: Mouton.
- Chitoran, Ioana, Louis Goldstein & Dani Byrd. 2002. Gestural overlap and recoverability: Articulatory evidence from Georgian. In Carlos Gussenhoven & Natasha Warner (eds.), *Laboratory Phonology 7*, 419–447. New York, NY: Mouton de Gruyter.
- Cho, Taehong & Peter Ladefoged. 1999. Variation and universals of VOT: Evidence from 18 languages. *Journal of Phonetics* 27(2). 207–229.
- Chomsky, Noam. 1970. Remarks on nominalizations. In Roderick A. Jacobs & Peter S. Rosenbaum (eds.), *Readings in English transformational grammar*, 184–221. Waltham, MA: Ginn.
- Chomsky, Noam. 2000. Minimalist inquiries. In Roger Martin, David Michaels, Juan Uriagereka & Samuel Jay Keyser (eds.), *Step by step*, 89–155. Cambridge, MA: MIT Press.

- Chomsky, Noam. 2001. Derivation by phase. In Michael Kenstowicz (ed.), *Ken Hale: A life in language*, 1–52. Cambridge, MA: MIT Press.
- Cinque, Guglielmo. 1999. *Adverbs and functional heads: A cross-linguistics perspective*. Oxford, UK: Oxford University Press.
- Ciucivara, Oana. 2009. *A syntactic analysis of pronominal clitic clusters in Romance: The view from Romanian*. New York, NY: New York University dissertation.
- Coberly, Mary. 1979. A text analysis and brief grammatical sketch based on ‘Trickster Challenges the Buffalo’: A Mandan text collected by Edward Kennard. *Colorado Research in Linguistics* 8. 19–94.
- Cowell, Andrew. 2007. Arapaho imperatives: Indirectness, politeness and communal “face”. *Journal of Linguistic Anthropology* 17(1). 44–60.
- Cowell, Andrew & Alonzo Moss Sr. 2008. *The Arapaho language*. Boulder, CO: University Press of Colorado.
- Craig, Collete & Ken Hale. 1988. Relational preverbs in some languages of the Americas: Typological and historical perspectives. *Language* 64(2). 312–344.
- Cumberland, Linda A. 2005. *A grammar of Assiniboine: A Siouan language of the Northern Plains*. Bloomington, IN: Indiana University dissertation.
- Cumberland, Linda A. & Robert L. Rankin. 2012. *Kaá<sup>n</sup>ze íe wayáje: an annotated dictionary of kaw (kanza)*. Kaw City, OK: Kanza Language Project of the Kaw Nation.
- Dalby, Andrew. 2003. *Language in danger: The loss of linguistic diversity and the threat to our future*. New York, NY: Columbia University Press.
- Densmore, Frances. 1923. *Mandan and Hidatsa music* (Smithsonian Institution, Bureau of American Ethnology, Bulletin 80). Washington, DC: United States Government Printing Office.
- Dixon, Robert M.W. & Alexandra Y. Aikhenvald. 2003. Word: A typological framework. In Robert M.W. Dixon & Alexandra Y. Aikhenvald (eds.), *Word: A crosslinguistic typology*, 1–37. Cambridge, UK: Cambridge University Press.
- Dorsey, James Owen. 1885. On the comparative phonology of four Siouan languages. In *Annual report of the Board of Regents of the Smithsonian Institution showing the operations, expenditures, and condition of the Institution for the year 1883*, 919–930. Washington, DC: Government Printing Office.
- Dorsey, James Owen. 1893. The Biloxi Indians of Louisiana. *Proceedings of the American Association for the Advancement of Science* 42. 267–287.
- Dorsey, James Owen & John R. Swanton. 1912. *A dictionary of the Biloxi and Ofo languages* (Smithsonian Institution, Bureau of American Ethnology, Bulletin 47). Washington, DC: United States Government Printing Office.

- Downing, Laura J. 2006. *Canonical forms in prosodic morphology*. Oxford, UK: Oxford University Press.
- Drummond, Alexei J. & Andrew Rambaut. 2007. BEAST: Bayesian evolutionary analysis by sampling trees. *BMC Evolutionary Biology* 7. 214.
- Dryer, Matthew R. 2009. A comparison of preverbs in Kutenai and Algonquian. In David Pentland (ed.), *Papers of the Twenty-ninth Algonquian Conference*, 63–94. Winnipeg, MB: University of Manitoba.
- Einaudi, Paula Ferris. 1976. *A grammar of Biloxi*. New York, NY: Garland Publishing.
- Embick, David & Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry* 32(4). 555–595.
- Fenn, Elizabeth A. 2015. *Encounters at the heart of the world: A history of the Mandan people*. New York, NY: Hill & Wang.
- Gick, Bryan. 1999. A gesture-based account of intrusive consonants in English. *Phonology* 16(1). 29–54.
- Goddard, Ives. 2000. *The identity of Red Thunder Cloud*. Society for the Study of Indigenous Languages of the Americas Newsletter, April.
- Good, Jeff. 2016. *The linguistic typology of templates*. Cambridge, UK: Cambridge University Press.
- Graczyk, Randolph. 1987. Switch reference in Crow: An emergent category. In Paul Kroeber & Robert Moore (eds.), *Native American languages and grammatical typology*, 119–135. Bloomington, IN: Indiana Linguistics Club.
- Graczyk, Randolph. 1991. *Incorporation and cliticization in Crow morpho-syntax*. Chicago, IL: University of Chicago dissertation.
- Graczyk, Randolph. 1997. *Switch-reference in Biloxi*. Paper presented at the annual meeting of the Society for the Studies of Indigenous Languages of the Americas in conjunction with the Linguistic Society of America. Chicago, IL.
- Graczyk, Randolph. 2007. *A grammar of Crow*. Lincoln, NE: University of Nebraska Press.
- Greenberg, Joseph H. 1963. *Some universals of grammar with particular reference to the order of meaningful elements*. Cambridge, MA: MIT Press.
- Greer, Jill D. 2016. Baxoje-Chiwere grammar sketch. In Catherine Rudin & Bryan J. Gordon (eds.), *Advances in the study of Siouan languages and linguistics* (Studies in Diversity Linguistics 11), 183–228. Berlin, Germany: Language Science Press.
- Grimm, Thaddeus C. 2012. *The Siouan languages*. Newton, KS: Mennonite Press, Inc.
- Haas, Mary. 1968. The last words of Biloxi. *International Journal of American Linguistics* 34(2). 77–84.
- Haiman, John & Pamela Munro. 1983. Introduction. In John Haiman & Pamela Munro (eds.), *Switch-reference and Universal Grammar*, ix–xv. Philadelphia, PA: John Benjamins.

- Hale, Kenneth. 2001. The Navajo verb stem position and the bipartite structure of the Navajo conjunct sector. *Linguistic Inquiry* 32(4). 678–693.
- Hale, Kenneth & Josie White Eagle. 1980. A preliminary metrical account of Winnebago accent. *International Journal of American Linguistics* 46(2). 117–132.
- Hall, Nancy. 2006. Cross-linguistic patterns of vowel intrusion. *Phonology* 23(3). 387–429.
- Halle, Morris & Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In Kenneth Hale & S. Jay Keyser (eds.), *The view from Building 20*. Cambridge, MA: MIT Press.
- Hanna, Charles Augustus. 1911. *The wilderness trail: Or, the ventures and adventures of the Pennsylvania traders on the Allegheny path*. Vol. 1. New York, NY: G.P. Putnam & Sons.
- Harley, Heidi. 2010. Affixation and the Mirror Principle. In Raffaella Folli & Christiane Ullbricht (eds.), *Interfaces in linguistics*, 166–186. Oxford, UK: Oxford University Press.
- Harper, Allan G. 1948. *Land problems on the Fort Berthold Indian Reservation arising from the Garrison Project*. Report. Missouri River Basin Investigations Staff. Region No. 2 Bureau of Indian Affairs. April 20, 1948. Revised, May 7, 1948.
- Harris, Alice C. 2017. *Multiple exponence*. Oxford, UK: Oxford University Press.
- Headly, Robert K., Jr. 1971. *The origin and distribution of the Siouan speaking tribes*. Washington, DC: Catholic University of America M.A. thesis.
- Helmbrecht, Johannes. 2006. *Applicatives in Siouan languages: A study in comparative grammar*. Paper presented at the 3rd Workshop on Comparative Siouan Grammar. Rocky Mountain College: Billings, MT.
- Helmbrecht, Johannes. 2008. Decay and loss of applicatives in Siouan languages: A grammaticalization perspective. In Elisabeth Verhoeven, Stavros Skopeteas, Yong-Min Shin, Yoko Nishina & Johannes Helmbrecht (eds.), *Studies in grammaticalization*, 135–156. New York, NY: Mouton de Gruyter.
- Helmbrecht, Johannes & Christian Lehmann (eds.). 2006. *Hocqk-English/English-Hocqk Learner's Dictionary*. Erfurt, Germany: Arbeitspapiere des Seminars für Sprachwissenschaft der Universität Erfurt.
- Helmbrecht, Johannes & Christian Lehmann. 2008. Hocank's challenge to morphological theory. In K. David Harrison, David Rood & Arianne Dwyer (eds.), *Lessons from documented endangered languages*, 271–316. Philadelphia, PA: John Benjamins.
- Hollow, Robert C. 1970. *A Mandan dictionary*. Berkeley, CA: University of California, Berkeley dissertation.
- Hollow, Robert C. 1973a. Mandan texts. Box 3: Robert C. Hollow materials. (A set of 22 texts recorded, transcribed, and translated by Robert C. Hollow held at the North Dakota State Historical Society.)

- Hollow, Robert C. 1973b. Mandan texts. Box 5: Robert C. Hollow materials. (A set of Edward Kennard's (1933-1934) 22 texts re-elicited, transcribed, and translated by Robert C. Hollow held at the North Dakota State Historical Society.)
- Hollow, Robert C., A. Wesley Jones & David J. Ripley. 1976. *Mandan's teacher's guide: Elementary level*. Bismark, ND: Mary College Indian Languages Program.
- Hyman, Larry M. 2003. Suffix ordering in Bantu: A morphocentric approach. In Geert Booij & Jaap van Marle (eds.), *Yearbook of Morphology 2003*, 245–281. Dordrecht, Netherlands: Springer Netherlands.
- Ingham, Bruce. 2003. *Lakota*. Munich, Germany: LINCOM Europa.
- Itô, Junko & R. Armin Mester. 1999. Realignment. In René Kager, Harry van der Hulst & Wim Zonneveld (eds.), *The prosody-morphology interface*, 188–217. Cambridge, UK: Cambridge University Press.
- Janda, Richard D. 1983. “morphemes” aren't something that grows on trees: Morphology as more the phonology than the syntax of words. In John Richardson, Mitchell Marks & Amy Chukerman (eds.), *Papers from the Parasession on the Interplay of Phonology, Morphology, and Syntax*, 79–95. Chicago, IL: Chicago Linguistic Society.
- Johnson, Craig M. 2007. *A chronology of Middle Missouri Plains village sites* (Smithsonian Contributions to Anthropology, Number 47). Washington, DC: Smithsonian Institution Scholarly Press.
- Jones, A. Wesley. 1983a. On Proto-Siouan ablaut and nasalization: a note to follow David S. Rood's paper. In Mary Marino (ed.), *Napao: A Saskatchewan Anthropology Journal*, vol. 13, 29–30.
- Jones, A. Wesley. 1983b. Some archaisms and innovations in Hidatsa. In Mary Marino (ed.), *Napao: A Saskatchewan Anthropology Journal*, vol. 8, 8–10.
- Jones, A. Wesley. 1991. The case of root extensions in Proto-Siouan. In Frances Ingemann (ed.), *The Proceedings of the 1990 Mid-America Linguistics Conference of Siouan and Caddoan Languages*, 505–517. Lawrence, KS: University of Kansas.
- Julian, Charles. 2010. *A history of the Iroquoian languages*. Winnipeg, MB: University of Manitoba dissertation.
- Kang, Ongmi. 1999. *A correspondence analysis on hiatus resolution in Korean*. Ms. Chosun University.
- Kasak, Ryan M. 2012. *Treatment of vertitivity in Siouan languages*. Paper presented at the 32nd Siouan and Caddoan Languages Conference. University of Kansas: Lawrence, KS.
- Kasak, Ryan M. 2013a. *A reconstruction of verbs of motion in Proto-Siouan*. Paper presented at the annual meeting of Society for the Studies of Indigenous Languages of the Americas at the Linguistic Society of America annual meeting. Boston, MA.
- Kasak, Ryan M. 2013b. *Applicatives and valency in Mandan*. Paper presented at the 33rd Siouan and Caddoan Languages Conference. Sitting Bull College: Fort Yates, ND.

- Kasak, Ryan M. 2014a. *Núu’etaa íroonista! – Speak Mandan! Level 1*. Bloomington, IN: Language Conservancy Press.
- Kasak, Ryan M. 2014b. *Siouan preverbs, pronominals, and morphological theory*. Qualifying paper presented to the Yale University Linguistics Department. New Haven, CT.
- Kasak, Ryan M. 2014c. *The clitic field in Mandan*. Paper presented at annual winter meeting of the Society for the Study of Indigenous Languages of the Americas in conjunction with the Linguistic Society of America. Minneapolis, MN.
- Kasak, Ryan M. 2015a. A computational approach to Siouan phylogenetics. Ms. Yale University.
- Kasak, Ryan M. 2015b. *Caddo inflectional morphology*. Paper presented at the 35th Siouan and Caddoan Languages Conference. Tunica-Biloxi Tribe: Marksville, LA.
- Kasak, Ryan M. 2016. A distant genetic relationship between Siouan-Catawban and Yuchi. In Catherine Rudin & Bryan J. Gordon (eds.), *Advances in the study of Siouan languages and linguistics* (Studies in Diversity Linguistics 11), 5–39. Berlin, Germany: Language Science Press.
- Kaufman, David V. 2011. *Biloxi-English dictionary with English-Biloxi index*. Lawrence, KS: Kansas University ScholarWorks.
- Kawahara, Shigeto. 2002. *Feature recycling: Hiatus resolution by way of glide formation in Japanese*. Talk presented at International Christian University: Tokyo, Japan.
- Kayne, Richard S. 1991. Romance clitics, verb movement, and PRO. *Linguistic Inquiry* 22(4). 647–686.
- Kayne, Richard S. 1994. *The antisymmetry of syntax*. Cambridge, MA: MIT Press.
- Kennard, Edward. 1934. Mandan folkloristic texts. (Collection of 28 narratives elicited and transcribed by Edward Kennard held at the American Philosophical Society.)
- Kennard, Edward. 1936. Mandan grammar. *International Journal of American Linguistics* 9(1). 1–43.
- Kipp, James. 1852. Mandan vocabulary. Ms. Saint Louis, MO.
- Koontz, John E. 1985. Siouan subgrouping. Ms. University of Colorado, Boulder.
- Kurz, Rudolf Friederich. 1937. *Journal of Rudolph Friederich Kurz: An account of his experiences among fur traders and American Indians on the Mississippi and the Upper Missouri Rivers during the years 1846 to 1852*. Washinton, DC: Government Printing Office.
- Larson, Rory M. 2005. *Acculturation terms in Omaha*. Lincoln, NE: University of Nebraska M.A. thesis.
- Larson, Rory M. 2016. Regular sound shifts in the history of siouan. In Catherine Rudin & Bryan J. Gordon (eds.), *Advances in the study of Siouan languages and linguistics* (Studies in Diversity Linguistics 11), 63–82. Berlin, Germany: Language Science Press.

- Lehmer, Donald J. 1971. *Introduction to Middle Missouri archeology* (National Park Service, Anthropological Papers 1). Washington, DC: Department of the Interior.
- Leman, Wayne. 2013. *A reference grammar of the Cheyenne language*. 4th edn. Raleigh, NC: Lulu Press.
- Linn, Mary Sarah. 2000. *A grammar of Euchee (Yuchi)*. Lawrence, KS: University of Kansas dissertation.
- Lipkind, William. 1945. *Winnebago grammar*. New York, NY: King's Crown Press.
- Little Owl, Ronald Samuel & Christian Engell Rhod. 1992. *Núeta-Mandan*. (Unpublished textbook to accompany Mandan course at Fort Berthold Community College.) Ms. New Town, ND.
- Lombardi, Linda. 2001. Why place and voice are different: Constraint-specific alternations in Optimality Theory. In Linda Lombardi (ed.), *Segmental phonology in Optimality Theory*, 13–45.
- Lovett, William Andrew. 1975. *Last Mandan Indian, 108, is buried*. News release. Department of the Interior, Bureau of Indian Affairs. Prepared Jan. 14, 1975.
- Lowie, Robert H. 1913. Societies of the Crow, Hidatsa and Mandan Indians. *Anthropological Papers of the American Museum of Natural History* 11(3). 145–358.
- Lowie, Robert H. 1942. The Crow language: grammatical sketch and analyzed text. In *University of California Publications in American Archaeology and Ethnology*, vol. 39(1), 1–142.
- Lundquist, Sarah. 2015. *Phonology and function of reduplication in Hoocak*. Paper presented at the 35nd Siouan and Caddoan Languages Conference. Tunica-Biloxi Tribe: Marksville, LA.
- Maddieson, Ian. 2013a. Absence of Common Consonants. In Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures Online*. Leipzig, Germany: Max Planck Institute for Evolutionary Anthropology. <http://wals.info/chapter/18>.
- Maddieson, Ian. 2013b. Consonant inventories. In Matthew S. Dryer & Martin Haspelmath (eds.), *The world atlas of language structures online*. Leipzig, Germany: Max Planck Institute for Evolutionary Anthropology. <https://wals.info/chapter/1>.
- Manova, Stela & Mark Aronoff. 2010. Modeling affix order. *Morphology* 20(1). 109–131.
- Mapp, Paul W. 2013. *The elusive West and the contest for empire*. Chapel Hill, NC: University of North Carolina Press.
- Matthews, Peter H. 1991. *Morphology*. Cambridge, UK: Cambridge University Press.
- Matthews, Washington. 1877. Ethnography and philology of the Hidatsa Indians. In *United States Geological and Geographical Survey Miscellaneous Publications* 7, iii–238. Washington, DC: Government Printing Office.
- Maximilian, Prinz zu Wied-Neuwied. 1839. *Reise in das innere Nord-America in den Jahren 1832 bis 1834*. Koblenz, Prussia: J. Hölscher.
- McCarthy, John J. 1981. A prosodic theory of nonconcatenative morphology. *Linguistic Inquiry* 12(3). 373–418.

- McCarthy, John J. 1986. OCP effects: Gemination and antigemination. *Linguistic Inquiry* 17(2). 207–263.
- McCarthy, John J. 2008. *Doing Optimality Theory: Applying theory to data*. Malden, MA: Blackwell Publishing.
- McCarthy, John J. & Alan Prince. 1986. *Prosodic Morphology*. Ms. University of Massachusetts & Brandeis University.
- McCarthy, John J. & Alan Prince. 1990. Prosodic morphology and templatic morphology. In Mushira Eid & John J. McCarthy (eds.), *Perspectives on Arabic linguistics II: Papers from the Second Annual Symposium on Arabic Linguistics*. Philadelphia, PA: John Benjamins.
- McCarthy, John J. & Alan Prince. 1993a. Generalized alignment. In Geert Booij & Jaap van Marle (eds.), *Yearbook in morphology 1993*, 79–153.
- McCarthy, John J. & Alan Prince. 1993b. Prosodic Morphology I: Constraint interaction and satisfaction. *Linguistics Department Faculty Publication Series*. Paper 14.
- McDonnough, Joyce. 2000. Athabaskan redux: Against the position class as a morphological category. In Wolfgang U. Dressler, Oskar E. Pfeiffer, Markus A. Pöchtrager & John R. Rennison (eds.), *Morphological analysis in comparison*, 155–178.
- Melnar, Lynette. 2004. *Caddo verbal morphology*. Lincoln, NE: University of Nebraska Press.
- Meyer, Roy W. 1977. *The village Indians of the Upper Missouri: The Mandans, Hidatsa, and Arikaras*. Lincoln, NE: University of Nebraska Press.
- Miner, Kenneth L. 1979. Dorsey's Law in Winnebago-Chiwere and Winnebago accent. *International Journal of American Linguistics* 45(1). 25–33.
- Miner, Kenneth L. 1981. Metrics, or Winnebago made harder. *International Journal of American Linguistics* 47(4). 340–342.
- Mirzayan, Armik. 2010. *Lakota intonation and prosody*. Boulder, CO: University of Colorado, Boulder dissertation.
- Mithun, Marianne. 1986. Evidential diachrony in Northern Iroquoian. In Wallace Chafe & Johanna Nichols (eds.), *Evidentiality: The linguistic coding of epistemology*. Norwood, NJ: Ablex Publishing Corporation.
- Mithun, Marianne. 1991. The development of bound pronominal paradigms. In Winfred P. Lehmann & Helen-Jo J. Hewitt (eds.), *Language Typology 1988: Typological models in reconstruction*, 85–104. Amsterdam, Netherlands: John Benjamins.
- Mithun, Marianne. 2014. Morphology: What's in a word? In Carol Genetti (ed.), *How languages work*, 71–99. Cambridge, UK: Cambridge University Press.
- Mixco, Mauricio. 1997a. *Mandan*. Munich, Germany: LINCOM Europa.
- Mixco, Mauricio. 1997b. Mandan switch reference: A preliminary view. *Anthropological Linguistics* 39. 220–298.
- Moore, John H. 1999. *The Cheyenne*. Malden, MA: Blackwell Publishing.

- Moravcsik, Edith A. 1977. *On rules of infixing*. Bloomington, IN: Indiana University Linguistics Club.
- Müller, Stefan. 2003. Solving the bracketing paradox: An analysis of the morphology of German particle verbs. *Journal of Linguistics* 39(2). 275–325.
- Nespor, Marina & Irene Vogel. 1986. *Prosodic phonology*. Dordrecht, Netherlands: Foris.
- Oliverio, Giulia R. M. 1997. *Tutelo instrumental prefixes: Implications for Siouan*. Paper presented at the 17th annual Siouan and Caddoan Languages Conference. Wayne State College: Wayne, NE.
- Oliverio, Giulia & Robert L Rankin. 2003. On the sub-grouping of the Virginia Siouan languages. In *Algonquian and Iroquoian Linguistics Memoir 16: Essays on Algonquian, Catawban and Siouan linguistics in memory of Frank T. Siebert, Jr.* 275–296. Winnipeg, MB: Algonquian & Iroquoian Linguistics.
- Park, Indrek. 2012. *A grammar of Hidatsa*. Bloomington, IN: Indiana University dissertation.
- Parks, Douglas R. 1976. *A grammar of Pawnee*. New York, NY: Garland Publishing.
- Parks, Douglas R., Janet Beltran & Ella P. Waters. 1979. *Introduction to the Arikara language*. Bismarck, ND: Mary College.
- Parks, Douglas R. & Raymond J. Demallie. 2002. *AISRI Interactive Database Search*. Online database of Yanktonais Dakota, Arikara, Assiniboine, Skiri Pawnee, and South Band Pawnee compiled by Douglas Parks and Raymond Demallie at the American Indian Studies Research Institute at Indiana University, Bloomington. Accessed 1-23-2016. Available online at: <http://zia.aisri.indiana.edu/dictsearch/>.
- Parks, Douglas R., A. Wesley Jones & Robert C. Hollow (eds.). 1978. *Earth lodge tales from the Upper Missouri: Traditional stories of the Arikara, Hidatsa, and Mandan*. Bismarck, ND: Mary College.
- Parks, Douglas R. & Robert L. Rankin. 2001. Siouan languages. In Raymond J. DeMallie (ed.), *Handbook of North American Indians, Vol. 13 (Plains)*, 94–114. Washington, DC: Smithsonian Institution.
- Patterson, Trudi A. 1990. *Theoretical aspects of Dakota morphology and phonology*. Urbana-Champaign, IL: University of Illinois at Urbana-Champaign dissertation.
- Perlmutter, David. 1988. The Split Morphology Hypothesis: Evidence from Yiddish. In Michael Hammond & Michael Noonan (eds.), *Theoretical morphology*, 79–99. San Diego, CA: Academic Press.
- Picard, Marc. 1994. *Principles and methods in historical phonology: From Proto-Algonkian to Arapaho*. Montreal, QC: McGill-Queen's University Press.
- Pierrehumbert, Janet & David Talkin. 1992. Lenition of /h/ and glottal stop. In Gerard J. Docherty & D. Robert Ladd (eds.), *Papers in Laboratory Phonology II: Gesture, segment, prosody*, 90–127. Cambridge, UK: Cambridge University Press.

- Prince, Alan. 1990. Quantitative consequences of rhythmic organization. In Michael Ziolkowski, Manuela Noske & Karen Deaton (eds.), *Parasession on the syllable in phonetics and phonology*, 355–398. Chicago, IL: Chicago Linguistic Society.
- Prince, Alan & Paul Smolensky. 1993. *Optimality Theory: Constraint interaction in Generative Grammar*. Ms. Rutgers University, New Brunswick, and University of Colorado, Boulder.
- Quintero, Carolyn. 2004. *Osage grammar*. Lincoln, NE: University of Nebraska Press.
- Quintero, Carolyn F. 1997. *Osage phonology and verbal morphology*. Amherst, MA: University of Massachusetts Amherst dissertation.
- Rankin, Robert L. 1995. On *Quapaw (and Siouan) “ablaut”*. Paper presented at the 15th Annual Siouan and Caddoan Languages Conference. University of New Mexico: Albuquerque, NM.
- Rankin, Robert L. 1996. Deeper genetic relationships in North America: Some tempered pessimism. In David Librik & Roxane Beeler (eds.), *Berkeley linguistics society: special session on historical issues in Native American languages: proceedings of the 22nd annual meeting*, 117–128.
- Rankin, Robert L. 1998. *Siouan-Catawban-Yuchi genetic relationship: With a note on Caddoan*. Paper presented at the 18th Annual Siouan-Caddoan Linguistics Conference. Indiana University: Bloomington, IN.
- Rankin, Robert L. 2005. *Quapaw*. In Heather K. Hardy & Janine Scancarelli (eds.), *Native languages of the Southeastern United States*, 454–540. Lincoln, NE: University of Nebraska Press.
- Rankin, Robert L. 2010. *The place of Mandan in the Siouan language family*. Paper presented at the 30th annual Siouan and Caddoan Languages Conference. Northeastern Illinois University: Chicago, IL.
- Rankin, Robert L., John Boyle, Randolph Graczyk & John Koontz. 2003. A synchronic and diachronic perspective on ‘word’ in Siouan. In Robert M. W. Dixon & Alexandra Y. Aikhenvald (eds.), *Word: A cross-linguistic typology*, 180–204. Cambridge, UK: Cambridge University Press.
- Rankin, Robert L., Richard T. Carter & A. Wesley Jones. 1998. Proto-Siouan phonology and grammar. In Xingzhong Li, Luis Lopez & Tom Stroik (eds.), *Papers from the 1997 Mid-America Linguistics Conference*, 366–375. Columbia, MO: University of Missouri-Columbia.
- Rankin, Robert L., Richard T. Carter, A. Wesley Jones, John E. Koontz, David S. Rood & Iren Hartmann (eds.). 2015. *Comparative Siouan dictionary*. Available online at <http://csd.clld.org/>. Leipzig, Germany: Max Planck Institute for Evolutionary Anthropology.
- Rice, Keren. 2000. *Morpheme order and semantic scope: Word formation in the Athapascan verb*. Cambridge, UK: Cambridge University Press.
- Riggs, Stephen Return. 1893. *Dakota grammar, texts, and ethnography*. Washington, DC: Government Printing Office.

- Rood, David S. 1979. Siouan. In Lyle Campbell & Marianne Mithun (eds.), *The languages of Native America*, 236–298. Austin, TX: University of Texas Press.
- Rood, David S. 1983. A preliminary consideration of Proto-Siouan abalut. In Mary Marino (ed.), *Napao: A Saskatchewan Anthropology Journal*, vol. 13, 24–28.
- Rood, David S. & Allan R. Taylor. 1996. Sketch of Lakota, a Siouan language. In Ives Goddard (ed.), *Handbook of North American Indians*, vol. 17. Washington, D.C.: Smithsonian Institute.
- Rudes, Blaire A. 2000. Resurrecting costal Catawban: The reconstituted phonology and morphology of the Woccon language. *Southern Journal of Linguistics* 23(2). 228–244.
- Rudes, Blaire A. 2007. *Catawba verb morphology*. Ms. Charlotte, NC: University of North Carolina at Charlotte.
- Sampson, Rodney. 1999. *Nasal vowel evolution in Romance*. New York, NY: Oxford University Press.
- Sapir, Edward. 1929. Central and North American languages. In *Encyclopædia Britannica*, vol. 5, 138–141.
- Schoolcraft, Henry Rowe. 1853. *Historical and statistical information respecting the history, condition, and prospects of the Indian tribes of the United States; collected and prepared under the direction of the Bureau of Indian Affairs per act of Congress of March 3rd, 1847*. Vol. 3. Philadelphia, PA: Lippincott, Grambo & Company.
- Selkirk, Elizabeth O. 1986. On derived domains in sentence phonology. *Phonology Yearbook* 3. 371–405.
- Selkirk, Elizabeth O. 2011. The syntax-phonology interface. In John Goldsmith, Jason Riggle & Alan C. Yu (eds.), *The handbook of phonological theory*, 2nd edn., 435–484.
- Shaw, Patricia. 1980. *Theoretical issues in Dakota phonology and morphology*. New York, NY: Garland Publishing.
- Silverman, Daniel. 1995. *Phasing and recoverability*. Los Angeles, CA: University of California, Los Angeles dissertation.
- Simpson, Jane & Meg Withgott. 1986. Pronominal clitic clusters and templates. In Hagin Borer (ed.), *Syntax and semantics 19: The syntax of pronominal clitics*, 149–174. New York, NY: Academic Press.
- Smolensky, Paul. 1993. *Harmony, markedness and phonological activity*. Paper presented at the Rutgers Optimality Workshop. Rutgers University: New Brunswick, NJ.
- Spencer, Andrew. 2003. Putting some order into morphology: Reflections on Rice (2000) and Stump (2001). *Journal of Linguistics* 39. 621–646.
- Stearn, Esther W. & Allen E. Stearn. 1945. *The effect of smallpox on the destiny of the Amerindian*. Boston, MA: B. Humphries.
- Steele, Susan. 1995. Towards a theory of morphological information. *Language* 71(2). 260–309.
- Stump, Gregory T. 1992. Position classes and morphological theory. In Geert Booij & Jaap van Marle (eds.), *Yearbook in Morphology 1992*. London, UK: Springer.

- Stump, Gregory T. 1998. Inflection. In Andrew Spencer & Arnold Zwicky (eds.), *A handbook of morphology*, 13–43. Oxford, UK: Blackwell Publishers.
- Stump, Gregory T. 2001. *Inflectional morphology: A theory of paradigm structure*. Cambridge, UK: Cambridge University Press.
- Swanton, John R. 1952. *The Indian tribes of North America*. Washington, DC: Government Printing Office.
- Taylor, Allan R. 1976. On verbs of motion in Siouan languages. *International Journal of American Linguistics* 42(4). 287–296.
- Terzi, Arhonto. 1999. Clitic combinations, their hosts, and their ordering. *Natural Language & Linguistic Theory* 17(1). 85–121.
- Torres, Jonnia. 2013a. *An acoustic analysis of Mandan voiceless stops*. Chicago, IL: Northeastern Illinois University Master's thesis.
- Torres, Jonnia. 2013b. *Corpus-based linguistic investigation of stop consonants for Siouan languages: A Lakota case study*. Ms. University of Colorado, Boulder.
- Torres, Silvana Karin. 2010. *Switch-reference in Biloxi: The architecture of a complex morpho-discourse phenomenon*. Chicago, IL: Northeastern Illinois University Master's thesis.
- Travis, Lisa. 2000. The L-syntax/S-syntax boundary: Evidence from Austronesian. In Ileana Paul, Vivianne Phillips & Lisa Travis (eds.), *Formal issues in Austronesian linguistics*, 167–194. Dordrecht, Netherlands: Springer.
- Trechter, Sarah. 2012a. In the Words of Our Ancestors: The Mandan Language and Oral Traditions Preservation Project. (Transcriptions that accompany two DVDs of Edwin Benson relaying traditional Mandan narratives.)
- Trechter, Sarah. 2012b. *Mandan texts*. (A set of 16 narratives collected by Sarah Trechter in Twin Buttes, ND with Edwin Benson and Cory Spotted Bear between 2007 and 2010.)
- Uffmann, Christian. 2007. Intrusive [r] and optimal epenthetic consonants. *Language Sciences* 29(2-3). 451–476.
- Ullrich, Jan (ed.). 2011. *New Lakota dictionary*. 2nd edn. Bloomington, IN: Lakota Language Consortium.
- Ullrich, Jan & Ben Black Bear. 2016. *Lakota grammar handbook*. Bloomington, IN: Lakota Language Consortium.
- Voegelin, Charles F. 1941. Historical results of Crow-Hidatsa comparisons, according to three methods. *Proceedings of the Indiana Academy of Science* 50. 39–42.
- Wallace, Karen Kay. 1993. *Verb incorporation and agreement in Crow*. Los Angeles, CA: University of California, Los Angeles dissertation.
- Wheeler, Max W., Alan Yates & Nicolau Dols. 1999. *Catalan: A comprehensive grammar*. New York, NY: Routledge.
- Whitman, William. 1947. Grammar of Ioway-Oto. *International Journal of American Linguistics* 13(4). 233–248.

- Will, George F. & Herbert J. Spinden. 1906. The Mandans: A study of their culture, archaeology and language. *Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University* 3(4). 79–219.
- Wolfart, H. Christoph & Janet F. Carroll. 1981. *Meet Cree: A guide to the language*. 2nd edn. Lincoln, NE: University of Nebraska Press.
- Wolff, Hans. 1950a. Comparative Siouan I. *International Journal of American Linguistics* 16(2). 61–66.
- Wolff, Hans. 1950b. Comparative Siouan II. *International Journal of American Linguistics* 16(3). 113–121.
- Wolff, Hans. 1950c. Comparative Siouan III. *International Journal of American Linguistics* 16(4). 168–178.
- Wolff, Hans. 1951. Comparative Siouan IV. *International Journal of American Linguistics* 17(4). 197–204.
- Wright, Richard. 1996. *Consonant clusters and cue preservation in Tsou*. Los Angeles, CA: University of California, Los Angeles dissertation.
- Xu, Zheng. 2007. *Inflectional morphology in Optimality Theory*. Stony Brook, NY: Stony Brook University Dissertation.
- Xu, Zheng & Mark Aronoff. 2011. A Realization Optimality Theory approach to blocking and extending morphology exponence. *Journal of Linguistics* 47(3). 673–707.
- Yu, Alan C. L. 2007. *A natural history of infixation*. Oxford, UK: Oxford University Press.
- Zeller, Jochen. 2003. Moved preverbs in German: Displaced or misplaced? In Geert Booij & Jaap van Marle (eds.), *Yearbook in morphology 2003*, 179–212. Dordrecht, Netherlands: Springer.
- Zimmerman, Larry J. & Richard Whitten. 1980. Mass grave at Crow Creek in South Dakota reveals how Indians massacred Indians in 14th century attack. *Smithsonian* 11(6). 100–109.
- Zwicky, Arnold M. 1977. *On clitics*. Ms. Indiana University Linguistics Club.
- Zwicky, Arnold M. 1985. Clitics and particles. *Language* 61(2). 283–305.