UNIVERSITY OF CALGARY

Phonological Aspects of Blackfoot Prominence

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF ARTS

DEPARTMENT OF LINGUISTICS

CALGARY, ALBERTA

AUGUST, 2004

Library and
Archives Canada

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395 Wellington Street
Ottawa ON K1A 0N4
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Archives Canada

Direction du
Patrimoine de l'édition

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence
ISBN: 0-612-97671-8
Our file Notre référence
ISBN: 0-612-97671-8

Abstract

Blackfoot is typically identified as a pitch accent (PA) language (Frantz 1991, Frantz and Russell 1995, Kaneko 1999, Van Der Mark 2001, 2003), despite consistently contravening characteristic PA principles, including gross violations of culminativity, and unpredictable edge-effects. Acoustic research confirms the key correlate of Blackfoot prominence is pitch, and the present phonological analysis concludes that Blackfoot lacks significant metrical features, eliminating the possibility of a metrical stress system. This thesis argues in favour of Blackfoot as a tonal system. Several obvious tonal processes such as glottalization, accent spread, and tone dissimilation are observed in Blackfoot, along with development of low tone. Moreover, Blackfoot is geographically located in the vicinity of a number of languages that have unexpectedly developed tone. Reanalyzing Blackfoot as a tone language allows for a much more cohesive and fluid description of the language's prominence system.

Acknowledgments

I am grateful to Mrs. Rachel Ermineskin, a native speaker of Siksiká Blackfoot, for sharing her language expertise with me. I would also like to thank all those who took the time to provide me with helpful feedback and discussions. The support, positive advice, and thoughtful input were integral in completing this lengthy undertaking. Special thanks goes to my committee who provided different perspectives and valuable input. Particular thanks go to my supervisor, Dr. Darin Howe for his enthusiasm, encouragement, and reflective discussions. Research for this thesis was supported in part by SSHRCC grant #410-2003-1903, "The prosodic hierarchy in First Nations language of Western Canada," principle investigator, Darin Howe.

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1st	first person
2nd	second person
3rd	third person
4th	fourth person
anim	animate
AGR	agreement position
AGR1	agreement position 1 (person agreement)
AGR2	agreement position 2 (person agreement)
AGR3	agreement position 3 (number agreement)
ben	beneficiary
dir	direct theme
dur	durative
epen	epenthetic vowel
F_0	fundamental frequency
fut	future
imp	imperative
in	inanimate
inv	inverse theme
MWd	morphological word
neg	negative
nonaffirm	non-affirmative
pl	plural
poss	possessive
PWd	prosodic/phonological word
sg	singular
tr.an. final	transitive animate final
unspec obj	unspecified object

Throughout the world indigenous populations have had to reckon with the forces of "progress" and "national" unification. The results have been both destructive and inventive. Many traditions, languages, cosmologies, and values are lost, some literally murdered; but much has simultaneously been invented and revived in complex oppositional contexts. If the victims of progress and empire are weak, they are seldom passive.

James Clifford, The Predicament of Culture

Chapter 1

Introduction

This thesis provides a comprehensive, albeit necessarily incomplete, description of the linguistic elements governing assignment of prominence in Blackfoot. Such a description requires attention to a number of factors including morphology, phonetics, and phonology. The goal of this thesis is not to provide a complete description of Blackfoot prominence assignment, but to establish the state of Blackfoot prominence research, while identifying patterns in the language, leading to a claim regarding Blackfoot's prominence type.

In short, this thesis argues for Blackfoot as a tonal system. Although all previous literature on the language states that Blackfoot is a pitch accent system, only recent research has endeavoured to substantiate this claim. All claims prior to this were based on impressionistic data only, with no phonological or phonetic motivation. Experimental research (Van Der Mark 2003) indicates that a major phonetic correlate of Blackfoot prominence is pitch, and not correlates associated with stress systems, eliminating the possibility of Blackfoot as a stress language. However, this research merely confronts the dichotomy of a stress language and a pitch accent language, completely omitting the possibility of the third type of prominence system: tone. Van Der Mark concludes that Blackfoot is a pitch accent language based on the phonetic importance of pitch to Blackfoot prominence. However, pitch is also the phonetic correlate of tone languages.

Furthermore, phonologically, Blackfoot does not indicate features of an accentual language for it is in constant violation of accentual imperatives. Indeed, a convergence

of factors suggests that Blackfoot is a tonal system: phonetically, pitch[1] acts as the acoustic correlate; phonologically, Blackfoot exhibits accentual violations and irregular edge-effects – including severe breaches of culminativity, with cases of up to four accents per word. Other factors pointing to Blackfoot's tonal nature are the nearly complete lack of accentual minimal pairs, the introduction of a lexically-specified tone to an element of the word never appearing with accent, and finally and most importantly, the realization of tonal characteristics in Blackfoot phonology via glottalization, accent spread, and tone dissimilation. The tonal system of Blackfoot is impoverished, but this does not detract from its status as a tonal language, since many other known tone languages, such as Navajo, are also impoverished. While likely that Blackfoot was an accentual language at some point in its history, evidenced phonologically by accentual relics, it cannot continue to be called such today.

The research in this thesis attempts to provide an objective and thorough investigation of the factors involved in Blackfoot's prominence system, since past research is reviewed, but not relied upon for Blackfoot data. Although this method provides a better starting point for Blackfoot research, it does identify numerous inconsistencies and gaps in the language's short academic history. Unfortunately problems unveiled through the investigation expose more questions than this present research manages to solve. These questions and critiques compel further experimental and theoretical research, which will confirm Blackfoot's status as a tonal language.

In order to ascertain the nature of Blackfoot's prominence system, this thesis begins in Chapter 2 by situating Blackfoot socially and linguistically, followed by a clarification

[1] Note the term 'pitch' is used instead of 'fundamental frequency (F_0)' throughout this thesis, particularly in reference to images of 'pitch contours'. Although F_0 correctly refers to the instrumental measurement found in the waveform images, the widely used term 'pitch' is adopted, however incorrect this may be.

and critique of past research achievements in the fields of prominence (Chapter 3) is topic is developed in detail. Some surprising findings emerge in this chapter, notably a misalignment of the Morphological Word and Prosodic Word; this misalignment interacts somewhat with prominence. Although morphology does not completely resolve issues of prominence in Blackfoot, it does provide insight into its apparent irregularities, and suggests a path for future research on the morphology of Blackfoot. The theoretical ramifications of the morphological examination highlight several issues in prosodic phonology, including the required balance in the phonetics-phonology interface, and the status of the word in Blackfoot. Chapter 6 develops the arguments for Blackfoot as a tonal system and provides a number of arguments for this analysis over the standard PA proposal. The final chapter (Chapter 7) reviews the major findings of this research, while identifying shortfalls within this analysis, and future research worth developing.

Chapter 2

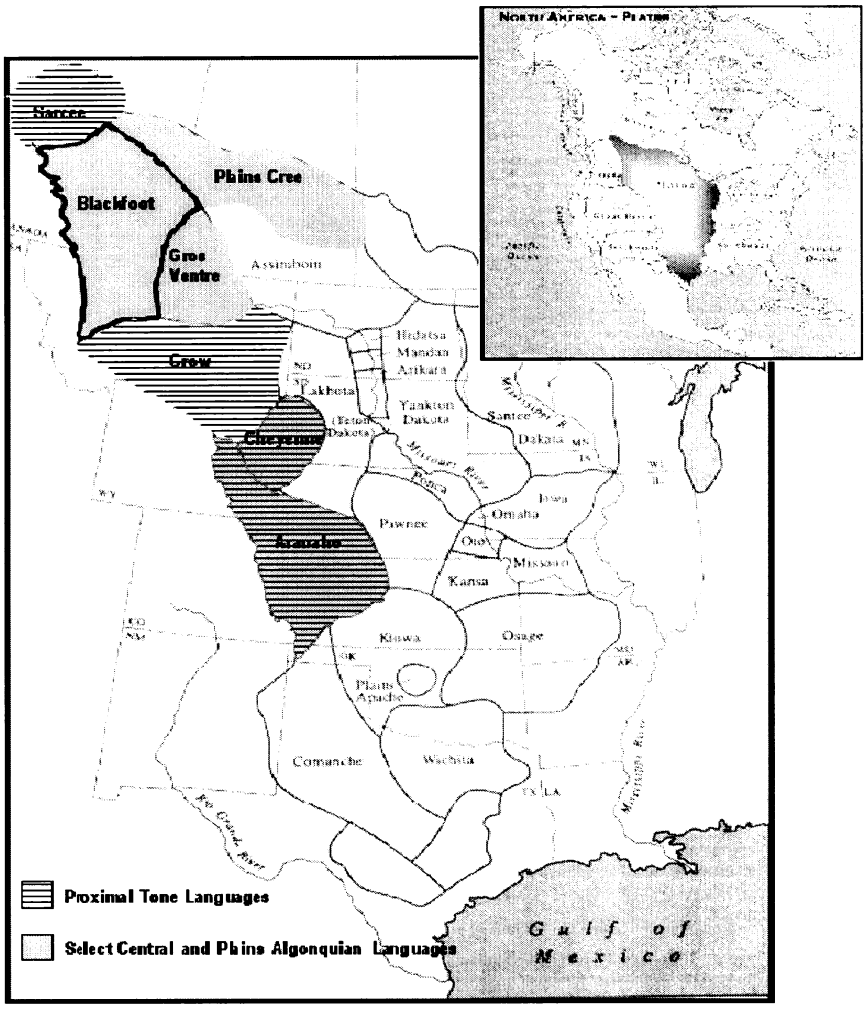
Overview of the Blackfoot Language

This chapter provides a brief summary of the linguistic and social status of the Blackfoot language. Section 2.1 historically situates Blackfoot among the languages of Native North America, §2.2 surveys socio-cultural aspects of the language, while §2.3 outlines Blackfoot phonology and linguistic structure. Finally, §2.4 explains the fieldwork methodology used in the present research.

2.1 Historical Outline

Blackfoot is an Algonquian language spoken in southern Alberta and northern Montana. It is a member of the Plains branch of Algonquian, which, along with Eastern and Central branches, form the Algonquian portion of the Algic family. Algic, which besides Algonquian also includes Ritwan, covers the largest area of all North American language families (Mithun 1999:328). The map below in (1) is adapted from Mithun (1999:606, 609) and represents selected languages from the Central and Plains branch of Algonquian (in grey) along with other languages indigenous to the North American Plains. Also shown in stripes are the tonal languages that surround Blackfoot.

(1)



The only known genetic subgroup in Algonquian is the Eastern branch (Goddard 1967, 1979); all other branches represent areal (*i.e.*, geographic) relationships. Presented below in (2) is the classification of the Algic family, from Mithun (1999:327). Subgroups are listed in small capitals, and languages are presented in normal type. Note that neither language name alternates, nor dialects are given. Moreover, only languages of the Central and Plains Algonquian subgrouping are presented; a raised cross, †, denotes languages no longer spoken.

(2) **ALGIC FAMILY**

ALGONQUIAN
- EASTERN ALGONQUIAN
- CENTRAL AND PLAINS ALGONQUIAN
  - Shawnee
  - Fox
  - Miami-Illinois†
  - Potawatommi
  - Ojibwe
  - Cree
  - Menominee
  - Cheyenne
  - Arapaho-Atsina
  - Blackfoot

RITWAN

The Plains languages, including Blackfoot, Cheyenne and Arapaho, demonstrate significant phonological differences from other Algonquian languages. Despite the phonological divergence found in the Plains branch of Algonquian, Blackfoot is the most divergent language of that branch; differences can be seen in its lexicon as well as its phonology. Based on Blackfoot's exceptionally divergent nature, it has been proposed as the first language to split from the original Algonquian stock (Proulx 1989, Goddard 1994). Goddard (*ibid.*) argues for a west-to-east chronological cline for Algonquian, meaning that languages of shallowest time depth lie in the east, and languages with the greatest time depth are found in the west. Implications of Goddard's view, then, are that western languages represent innovations, whereas eastern languages represent retentions. For a detailed overview see Campbell (1997).

2.2 SOCIO-CULTURAL SURVEY

There are four dialects of Blackfoot, three of which are spoken in Canada; only one dialect is spoken in the United States. Siksiká (Blackfoot) is spoken nearest to Calgary,

Aapátohsipiikani (Peigan) is spoken in the region between Cardston and Lethbridge, Káínaa (Blood) is found near Fort McLeod, and Aamsskáápipikani (Blackfeet/South Peigan) is spoken in Northwest Montana. Approximately 100 speakers reside in Montana, with a balance of between 5,000-8,000 living in Canada. However, according to the most recent Canadian census (2001), 3,020 people identify Blackfoot as their mother tongue, a -27.1% change from the previous 1996 census[2].

Few children are learning Blackfoot as a first language, although Blackfoot language programmes are being developed and implemented in schools. Currently, Blackfoot language programmes are offered in selected schools in Alberta, at elementary, junior high and high school levels[3]. Full-immersion programmes are also being developed, a notable example being The Piegan Institute's *Nizipuhwahsi*, or Real Speak School[4], on the Blackfeet Reservation in northwestern Montana, offering kindergarten to grade 8.

2.2.1 Blackfoot Orthography

Frantz (1978) developed a Roman-based writing system for Blackfoot, specific to Blackfoot phonology. This writing system replaces the Blackfoot syllabary, adapted from the Ojibwe system by English missionary, Tims (1889). Most consonants are written as in English or IPA, however, /x/ and /ç/ are both written *h*, while /ʔ/ is written with an apostrophe, '. The vowels, /i/, /a/, and /u/ or /o/ are written *i, a, o*, respectively. The status of diphthongs in Blackfoot phonology and orthography is discussed in §2.3.1. Prominence is marked with an acute accent over the vowel, and

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[2] It is worth noting that this dramatic difference is likely reflective of change in census methodology, not speaker population. However, the threatened status of the language remains a concern.
[3] For further information, see www.learning.gov.ab.ca/nativeed/nativepolicy/pdfs/AppendixA.pdf; http://www.vigile.net/01-3/immersion.html.
[4] For further information, see http://www.pieganinstitute.org.

long segments are written with two letters, as illustrated in (3)[5], below. Note that orthographic *oo* in Blackfoot is a long /o/, and not /u/, as in English.

(3) ʔ ookakííkin /o:kakí:kin/ 'spine'

2.3 Blackfoot Phonology

In order to establish the necessary groundwork required to discuss the phonology of Blackfoot pitch accent (PA), a brief introduction to the phonological system is provided. For further discussion on Blackfoot phonology, see Taylor (1969), and Frantz (1991).

2.3.1 Blackfoot Phonemic Inventory

Blackfoot has a very limited inventory of phonemes, represented in Table 1. Length is distinguished in the stop and nasal series, and on the segment [s]. Five places of articulation are contrasted in Siksiká's consonants, including labials, alveolars, palatals, velars, and laryngeals. Blackfoot lacks liquids completely, and voicing is not contrastive in Blackfoot. Consonants are also distinguished along five manners of articulation: plosive, fricative, affricate, nasal, and glide.

	Labial	Alveolar	Palatal	Velar	Glottal
Plosive	p p:	t t:		k k:	ʔ
Fricative		s s:		x	
Affricate	(ps?)	ts (ts:?)		ks (ks:?)	
Nasal	m m:	n n:			
Glide	w		j		

Table 1: Phonemic inventory of Blackfoot consonants

It has been proposed that, like [ts], [ks] is an affricate (Frantz 1991:31, Kaneko 1999:12, Van Der Mark 2003:8). This proposal is attractive from the point of view of syllable structure (see §2.3.6), but this argument runs the risk of circularity. Proposing

[5] Unless otherwise noted, all examples are from Frantz and Russell (1995). Examples marked with an ear, ʔ, were elicited from a native speaker of Siksiká Blackfoot.

that [ks] is an affricate is in fact theoretically problematic because, by definition, affricates are a combination of a plosive and a fricative at the same place of articulation (Gussenhoven and Jacobs 1998:16). The segment [ks] in Blackfoot violates the definition of an affricate because [k], a velar plosive, and [s], an alveolar fricative, are not phonologically homorganic[6]. Despite these outstanding problems in phonological theory, [ks] fits in comfortably as an affricate in Blackfoot phonology and will continue to be viewed as such throughout this thesis. For further discussion of [ks] as an affricate, see Frantz (1991), or Kaneko (1999).

Kaneko (1999) includes three affricates in her inventory of Blackfoot, [p^s], [k^s], [t^s]. Taylor (1969:27), on the other hand, discards the possibility of adding affricates to the inventory altogether, not based on the breach of definition of affricates mentioned above, but for other reasons. Despite stating that adding [ts] and [ks] as affricates to the inventory "affords an economy in the phonotactics... with a resultant simplification of consonant sequences," he claims that "the occurrence of geminate /s/ between stops makes a complicated syllable canon inevitable," and resigns himself to maintaining /t/, /k/, and /s/ as separate phonemes.

Length is significant for most vowels, as illustrated in Table 2. Confusingly, Blackfoot literature refers to both true and orthographically represented diphthongs. Orthographic diphthongs include *ai*, and *ao*, realized as long monothongs, /ɛ:/ or /e:/, and /ɔ:/, respectively. Blackfoot's only true diphthong is /ɔj/, represented

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[6] Crucially, the affricate [ks] is not produced by the same articulator. German affricate [pf] illustrates that although the place of articulation for the segments composing the affricate is not necessarily identical, the articulator for both items is identical. In the case of [pf], the articulator is labial.

orthographically as *oy* or *oi*. For further discussion of the Blackfoot vocalic system, see Kinsella (1972).

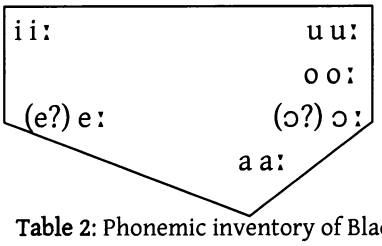


Table 2: Phonemic inventory of Blackfoot vowels

2.3.2 THE BLACKFOOT WORD

Blackfoot is polysynthetic, meaning most information is encoded morphologically onto the stem. Morphologically encoded elements may include: adjuncts, such as the negative marker, question markers, intensification; agreement markers, such as person and number markers; tense; and aspect. The following example includes verbal morphemes, aspect (*á*, durative), and person and number marking (*-yi* '3rd plural'), while nominal morphemes include possessive (*n-*, '1st possessive'), and nominal number (*-iksi*, 'plural'). More details of Blackfoot morphology will ensue in Chapter 5.

(4) Áyo'kaayi nóko'siksi (Fox & Frantz 1979:152)
á – yo'kaa – yi n – óko's – iksi
dur – sleep – 3rd pl 1st poss – kid – pl
'My kids are sleeping'

2.3.3 THE GLOTTAL FRICATIVE AND ITS ALLOPHONES IN BLACKFOOT

Orthographic *h* is realized as phonemic /x/ in Blackfoot. However, glottal fricative surfaces as one of several allophones in Siksiká Blackfoot. When *h* is found in the orthographic sequence, *VhC*, the vowel devoices (or deletes completely) and the glottal stop spirantizes to palatal fricative, [ç] or labialized velar fricative, [x^w]. If the vowel, V, is *i*, then the sequence *ihC* becomes [i̥çC], as exemplified by (5a). If the vowel is *o*, then

the sequence *ohC* becomes [o̥x$^{(w)}$C], as illustrated in (5b). When the vowel is *a*, the sequence *ahC* is predictably realized as [ḁxC]. This phonological process affects PA assignment in Blackfoot, an issue discussed in §5.5.

(5)	a. *ihC* → [i̥çC]	b. *ohC* → [o̥x^{w}C]	c. *ahC* → [ḁxC]
	iká'pihtsis	nítohpimmoka	áwahka
	[iká p(i̥)çtsis]	[nít(o̥)x^{w}pim : oka]	[áw(ḁ)xka]
	'rotten'	'she associated me with...'	'play'

2.3.4 Prominence

The prominence system of Blackfoot is the core focus of this thesis; this section is therefore simply intended as an introduction to prominence in the Blackfoot language. Since the majority of Blackfoot literature considers Blackfoot prominence to be pitch accent (PA), at this introductory stage consistency with past research will be maintained and Blackfoot prominence will be temporarily termed 'pitch accent', or 'accent'. Furthermore, only assignment restrictions and fundamental features of Blackfoot prominence (or PA) are discussed at this point. Further details of accent behaviour and assignment are explored in detail in subsequent chapters.

Accent is mainly lexical in Blackfoot, although it may be discourse driven to some degree. Discourse driven accent is restricted to particular contexts, such as in the case of imperatives. About 10% of imperatives carry an accent that could be construed as discourse driven, *i.e.* prominence found on the final vowel of the verb stem, akin to an exclamatory remark. Since prominence is not typically found in this position on other indicative conjugations, it suggests that discourse may be the cause for the location of accent on imperatives. Compare (6a), the base form of the verb, and (6b), the first person singular conjugation, to (6c), the imperative form.

(6) a. inihki 'sing'
b. nitáaksinihki 'I will sing'
c. inihkít 'sing!$_{sg}$'

A relation between accent and discourse has been claimed to exist. Frantz (1991:65) explains that though he does not understand PA assignment on demonstratives, discourse does appear to play a role. He claims that PA "on the first syllable may emphasize the proximity features which distinguish" the demonstrative stems. So, for example, when using the demonstrative stem *om* 'proximity to neither speaker nor addressee', in order to emphasize the lack of proximity, the stem would become *óm*. Frantz (*ibid.*) cites Taylor's (1978) argument for this same position in an unpublished paper, and early research by Uhlenbeck (1938:9) also notes this correlation. Leaving this less concrete explanation aside, let us examine actual cases of accent restriction in Blackfoot.

To date in the Blackfoot literature, there are no noted restrictions on where PA can fall, implying that any accent-bearing unit with the appropriate phonotactics can bear an accent. In fact, Taylor (1969:25) states that any syllable can be stressed. Contrary to this claim, research presented here reveals contexts where accent cannot occur. The first case concerns what can be called, 'deficient syllables'; the second case is morphologically driven. These restrictions will both be taken up in detail in Chapter 5.

In short, recall from §2.3.3 above, spirantization of glottal fricative /x/ causes the preceding vowel, *i*, *o*, or *a*, to become voiceless (or delete), and /x/ to become a palatal, labialized velar, or velar fricative depending on the preceding vowel. I adopt the term 'deficient' for these syllables because the nucleus becomes voiceless, and in many cases, deletes entirely. In these cases, the syllable is no longer capable of carrying accent

since the accent-bearing unit, the vowel, is either voiceless or deleted. Prominence is never found on these syllables.

The second instance of accent assignment restriction is concerned with the type of element bearing prominence. Stems and pre-stem elements may be lexically specified for prominence. However, elements at the right-most edge of the word do not bear prominence, expect for in one unusual and specific instance. This peculiar case will be reviewed in detail in Chapter 5; at this point it suffices to note that prominence avoids falling on items at the right edge of the word.

2.3.5 VOWEL DEVOICING

Devoicing of word-final vowels is an exceedingly common process found throughout Blackfoot. Van Der Mark (2003) notes that although auditorily it appears that many words have word-final voiced vowels, spectrographic analyses indicated that they are in fact devoiced. Frantz (1991:6) notes that the only occasion where a final vowel is not devoiced, is when the vowel is underlyingly long. This is represented in (7).

(7) a. /V/ → V̥ / __#
b. /V:/ → V / __#

Vowel devoicing is so frequent that it can lead to either deletion of the final vowel, (8a), or devoicing of final vowel plus the preceding sonorant consonant, (8b). In fact, deletion of both final vowel and the preceding sonorant are also attested, (8c).

(8)

a. ᑭ áítamat'matapat'piiwa	b. ᑭ ó'kaattsoohsiwa	c. ᑭ ni'táa'siwa
[ɛtamátʔmatapátʔpí:wḁ]	[óʔka:t:suxsiwḁ]	[niʔtáasi]
'it (an event) is about to begin'	'he/she overworked him/herself'	'it is/was one mile'

Furthermore, there is such a strong propensity to devoice vowels word-finally that a non-final consonant may also devoice when following an antepenultimate vowel, as illustrated in (9) below.

(9) nóópikkinnik (Van Der Mark 2003:9)
/nóópikkinn̥i̥k̥/
'my nostril'

This devoicing rule is claimed to apply to the spirantization process described in §2.3.3, as well. Only when the vowel is short in the sequence *ihC*, *ohC*, and *ahC* does vowel devoicing or deletion occur, otherwise, this process shortens an underlying long vowel. These processes are represented in (10)-(12).

(10) a. *ihC* → i̥çC → çC b. *iihC* → içC

(11) a. *ohC* → o̥xʷC → xʷC b. *oohC* → oxʷC

(12) a. *ahC* → ḁxC → xC b. *aahC* → axC

2.3.6 Syllable Structure

Although Frantz (1991:34) states Blackfoot PA is "sensitive to" syllable structure – a statement with which Kaneko (1999) concurs – the present investigation does not support this claim. Since it will be shown that syllable structure is not correlated with Blackfoot prominence assignment – deficient syllables aside – only a brief overview of syllable structure is required at this time.

Overall, Blackfoot syllable structure is not very restrictive, as illustrated for instance, by its very large consonant clusters. Blackfoot allows both onsets and codas,

and possibly consonantal nuclei. Glottal stops and velar fricatives are moraic. Evidence for these claims is provided at a later stage (§6.1.1), when they become relevant.

Taylor (1969:54) claims, rather doubtfully, Blackfoot syllable structure may potentially appear as in (13), with up to 5 pre-nuclear positions, 2 nuclear positions and 3 post-nuclear positions.

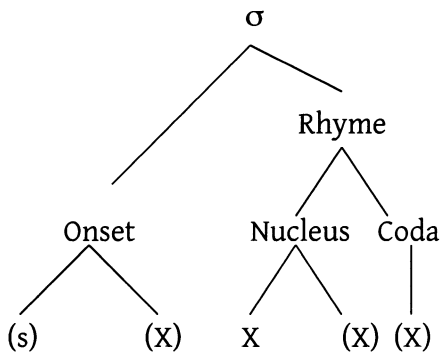
(13) (C) (C) (C) (C) (C) V (V) (C) (C) (C)

Taylor (*ibid.*) claims that only one word can be found in Blackfoot, occupying each of the proposed positions: *ksstsíísts*, 'snail shells; spiral shells'. This form is confirmed in Frantz and Russell's dictionary. However, if [ks], and [ts] are considered affricates, as suggested above, Taylor's proposal for syllable structure is too radical, and unnecessarily complex. Recall that Taylor's reasoning for not permitting [ks], [ts], and for that matter, [ps] as unique entries in the inventory is that Blackfoot syllables are already complicated, allowing such sequences as /ss/, /st/, and /sk/. The simplification in syllable structure when [ks], and [ts] are recognized as affricates is stunning. The single-syllable word, 'snail shells' would appear as CCCVVCC under an analysis positing [ks] and [ts] as affricates; where [ks] is permitted to distinguish length, *i.e.* /ks**ː**/, this once-complex syllable would become simply, CCVVCC.

Arguments presented in favour of affricates [ks], and [ts] in tandem with Taylor's recognition of sequences such as /ss/, /st/, /sk/ set the stage for Jackson's (2003) proposal for Blackfoot syllable structure as represented in (14). This proposal neatly accounts for the outstanding sequences, /ss/, /st/, /sk/, while maintaining the

economy Taylor chose to dispense with. Syllable structure will henceforth be excluded from the discussion and left for future investigation.

(14)



2.4 Fieldwork Methodology

Data used in this research was obtained from elicitation sessions between September 2002 and June 2004, and from Frantz and Russell's (1995) *Blackfoot Dictionary*. Items used from Frantz and Russell's dictionary were verified by a native speaker, and if an item was different from that found in the dictionary, the elicited form was used.

Speech samples were transcribed from recordings during elicitation sessions, which took place either at the University of Calgary, or at the consultant's residence. Recordings were made with a wide range microphone (Sony ECM-S907) at a sampling rate of 44.1 KHz, either directly into a laptop (Toshiba Satellite 2410) using SoundForge 6.0 (by Sonic Foundry) or into a minidisk recorder (Sony MZ-N707). The samples were analysed using Praat on a Mac PowerBook G4. Forms were elicited from word lists I compiled according to the research target, or by asking for native speaker intuitions about specific forms and constructions.

The primary language consultant used for this research is Rachel Ermineskin, a 70-year old female, from Calgary, Alberta. Her first language is the Siksiká dialect of Blackfoot, and she learned English upon entering residential school as a child.

Although banned from using Siksiká throughout her school years, she has maintained her native language through frequent use with other speakers in her community, and is one of the few native speakers able to read the newly developed orthography for Blackfoot.

Chapter 3

Prosodic Systems

This chapter will explore both traditional and contemporary analyses of prosodic systems in order to situate the implications for calling Blackfoot a pitch accent (or tone) language. A review of phonetic and phonological guidelines proposed to determine a language's prosodic type will be discussed, as will their inadequacies. It will be shown that these guidelines are vague, and tend to be contradictory when analysed together. As a result, the discussion is complicated and inconsistent; however, an attempt is made to highlight insightful and helpful elements in past research, which deserve to be maintained in any future theories.

A review of properties of tone, stress, and PA systems, along with a sample of representative languages is provided in §3.1. Problematic cases are discussed in §3.2. Finally §3.3 summarizes and highlights crucial issues that the reader will need to keep in mind throughout subsequent chapters on Blackfoot prominence.

The table below is intended to acclimatize readers to basic features of prototypical prosodic systems. This table is based on standard prosodic literature, (Hyman 1977a, Hyman 1977b, Beckman 1986, van der Hulst and Smith 1988, Yip 2002, etc.). I urge readers to compare this table to Table 4 (page 39) upon completion of this chapter, while considering intricacies of typologizing prosodic systems[7].

[7] See Remijsen (2001, 2002) for further details.

	TONE	STRESS	PA
Acoustic correlate(s)	Pitch	Change in pitch & vocal fold tension - Also possibly intensity, duration, length, vowel quality	Pitch
Prominence-bearing unit	Morpheme: - Mora, vowel, syllable	Word or phrase: - Minimally the word; maximally the phrase	Word or phrase: - Minimally the word; maximally the phrase
Distribution	Free: - Multiple adjacent tones acceptable	Culminative: - Only one primary prominence per accentual unit	Culminative: - Only one primary prominence per accentual unit
Rules affecting prosody	Assimilatory, dissimilatory	Accent reduction rules	Accent reduction & assimilation
Function	Distinctive: - Paradigmatic	Organizational: - Syntagmatic	Organizational: - Syntagmatic

Table 3: Properties of Prosodic Systems: An Initial Tentative Overview

3.1 Prosodic System Typology

Typically three types of prosodic systems are distinguished to describe prosodic systems across the world's languages: stress systems, tonal systems, and pitch accent (PA) systems. Of course this trichotomy is an over-simplification ceaselessly vexing linguists. The root of the problem lies in the lack of standards to measure what stress, tone, and PA in fact are. Even phonetic analyses can prove to be inconsistent and problematic. This is most succinctly expressed by Odden (1988:225):

> The question of whether a description of the prosodic system of some undescribed language should be framed in terms of "stress", "accent" or "tone" (and the justification for a particular choice in a language with a descriptive tradition) has plagued the workaday linguist for years: unlike notions like "bilabial", there are few clear principles in guiding the trichotomization of languages into these three types. There are

> certainly no acoustic or physiological properties of languages into two or three types.

As Odden clearly states, sharp lines cannot be drawn between classes of prosodic systems. Since phonetics is able to guide to some degree, Odden's fundamental argument that acoustic properties cannot be used to divide languages into prosodic types is not wholly correct. The statement is essentially accurate, nonetheless. No guidelines have been developed that are capable of satisfactorily categorizing languages – even where the prosodic system appears uncomplicated and clear-cut. Moreover, phonetics alone is not capable of determining prosodic type, since phonology is also required in the classification of prosodic systems. Therefore, a case where phonetics predicts one type of prosodic system and phonology predicts another is problematical, rendering phonetic and phonological criteria contradictory, since neither type of criteria would be capable of selecting the appropriate prosodic type.

Some may argue Odden's comments are overstated, since there are a large number of cases where the prosodic type is particularly clear. Throughout this research, it has become abundantly clear that even the simplest cases exhibit complications not readily dealt with under traditional prosodic theories. To begin with, an uncomplicated examination of the three types of systems is necessary, followed by an exploration of more complicated cases.

3.1.1 Tone Systems

It has been estimated that half of the world's languages are tonal (Hyman 2001:1367). These systems are found in high concentration throughout Southeast Asia, Sub-Saharan Africa, and Mexico (Yip 2002; Hyman 2001); however, tone systems can also be

found in North and South America, Europe, and Oceania. Mandarin Chinese [China], and Yoruba [Nigeria] are among the tonal languages with very large communities of speakers, estimated at 885,000,000 and 20,000,000 speakers, respectively (Yip 2002:1).

Tone languages use contrasting pitch in much the same way that vowels contrast. In other words, when all other phonemic information is identical, changing pitch in a word or syllable changes the core meaning of that word. Commonly, tone is not assigned by a rule, but encoded in the lexicon; this type of tone is called lexical tone (Alderete 1999). Although tone is not rule-governed for the majority of lexical tone systems, it is possible to find subsystems in lexical tone languages where tone is predictable, such as with Cantonese [China] hypocoristics where a high tone is found at the end of the word. Morphemic tone, the other type of tone system found predominantly in African tone languages, is described below in (18). Compare the following two examples of lexical tone in Cantonese, from Yip (2002:2):

(15) *[yau] in Cantonese*

a.	high level	'worry'	d.	low level	'again'
b.	high rising	'paint (noun)'	e.	very low level	'oil'
c.	mid level	'thin'	f.	low rising	'have'

Example (15) illustrates that the meaning of the syllable *[yau]* changes according to its pitch, indicating that Cantonese is a tonal language. A high pitch on *[yau]*, (15a), for instance, the word means 'worry', whereas changing the pitch to a level low tone, (15d), changes the meaning of *[yau]* to 'again'. This can be likened to the distinctive, or contrastive nature of the segments [i] and [a] or [p] and [b], in English.

(16)

a.	pit	c.	bit
b.	pat	d.	bat

When the vowel changes between [i] and [a] in the string *pVt*, where *V* is any vowel,

there is a change in meaning, as illustrated in (16a) and (16b). The meaning changes again when the consonant [p] is substituted [b] in the string *Cit* and *Cat*, where *C* is any consonant, as seen in (16c) and (16d). Depending on which segment is used in the string, meaning changes accordingly, just as meaning changes according to different tonal values in lexical tone languages. These examples illustrate that tone is distinctive. Tonal features enter into a paradigmatic relationship, just as the segments [p], [b], [i], and [a] do in English. Hyman (2001:1377) accurately expresses this notion: "each tone or vowel height is a discrete unit in terms of phonological function."

The minimal tone-bearing unit (TBU) for tonal systems is the mora. Toneless syllables are permitted in tonal languages, often in the form of grammatical morphemes. These morphemes typically receive pitch from their surroundings.

Register tones or contour tones may be found in tonal languages. Register tones are level throughout the TBU, while contour tones modulate in pitch, with a rise and/or fall occurring within the same TBU. Examples of contour tones are found in (15b) and (15f) above, where pitch rises throughout the TBU on which they occur. Standard Mandarin Chinese is commonly used to illustrate contour tones, since it has three contour tones (adapted from Gandour 1978:45; Hyman 2001:1368; Duanmu 2000:220).

(17)	a. high level	má	'mother'
	b. high rising	mǎ	'hemp'
	c. mid falling-rising	mà	'horse'
	d. high falling	mâ	'scold'
	e. toneless	ma	'question marker'

These examples illustrate one register tone, three contour tones, and one toneless morpheme (17e). The register tone is a high level tone, exemplified by 'mother' in (17a). The contour tones are exemplified by the high rising tone in 'hemp', (17b), in

(17c), 'horse', a mid falling-rising tone, and in (17d), 'scold', a high falling tone. The pitch of the tones, their contour nature along with relative movement found within these tones (excluding the toneless TBU) is clearly illustrated in the acoustic analysis found below. In this acoustic representation of pitch (the lines on the lower portion of the diagram), high level tone is clearly level, especially when viewed in comparison to the three remaining contour tones. The high rising tone starts at a mid range and moves to the same level as the high level tone, while the mid falling-rising tone starts at mid range, falls to a very low pitch and climbs again to just below its starting point. Finally, the high falling tone starts at a high pitch – higher in fact than the high level tone – and falls dramatically to very low pitch. This analysis was generated using sound clips from UCLA Archives' *Index of Sounds*, sound clips. For further details of tone languages and their characteristics, refer to Hyman (2001), or Yip (2002).

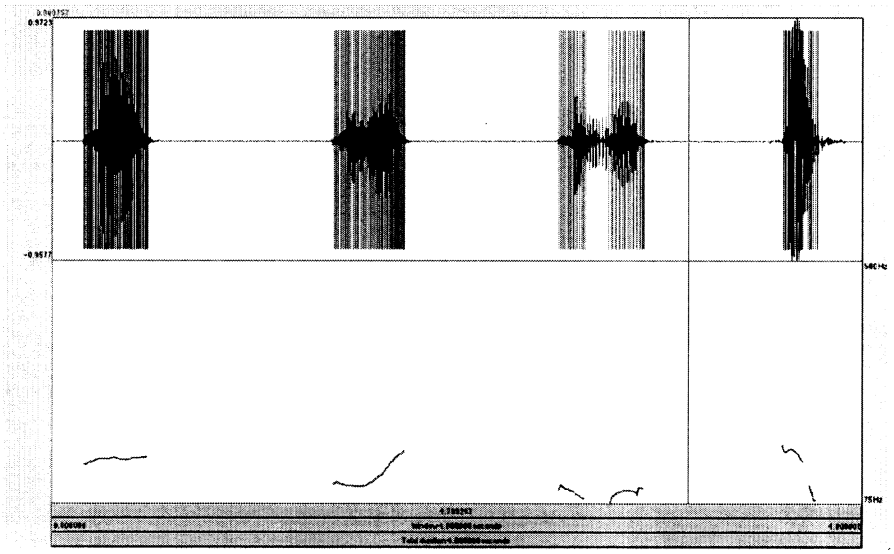


Figure 1: Acoustic Analysis of Standard Chinese Tones

The other type of tone system mentioned above, the tonal melody system, is predominantly found in African languages. In this system tone is morphemic, and is

very different from segmental-like tone described in the Cantonese example (15) above. In these languages, tone is not a property of vowels, but of entire words, where the underlying tonal specification is applied to the word, regardless of its length. Mende [Sierra Leone] (Goldsmith 1976), (18), illustrates morphemic, or melodic tone; underlying melodies in this language are mapped onto the word, from left to right.

(18)a. H	kɔ́	'war'	pɛ́lɛ́	'house'	káwámá	'waistline'
b. L	k͡pà	'debt'	bɛ̀lɛ̀	'trousers'	k͡pàkàlì	'tripod chair'
c. HL	ᵐbû	'owl'	ᵑgílà	'dog'	félàmà	'junction'
d. LH	ᵐbă	'rice'	faⁿdé	'cotton'	ⁿdàvúlá	'sling'
e. LHL	ᵐɓa̋	'companion'	njàhâ	'woman'	nìkílì	'groundnut'

In Mende, only five underlying tonal melodies are available in the tonal system: H(igh), L(ow), HL, LH, and LHL. Regardless of the number of syllables in a word in Mende, the underlying tonal pattern is mapped onto the word. Example (18a) illustrates, the underlying tonal melody is H, so whether the word is monosyllabic, *kɔ́* 'war', or trisyllabic, *káwámá*, 'waistline', every TBU will carry H tone. In cases where the underlying tone is HL, (18c), a contour tone will form in cases where the word only has one tone-bearing unit (TBU), *ᵐbû* 'owl'. However, where the word is disyllabic, tones will split over the two TBUs, *ᵑgílà* 'dog'. Finally, where the word is trisyllabic, the second portion of the tone, L in this case, will spread over two TBU's, *félàmà* 'junction'. When the underlying tone has three tones, such as LHL, as in (18e), it is not until the trisyllabic word that there are no longer any contours in the word, *nìkílì* 'groundnut'.

This type of tone is clearly very different from the lexical tone example (15) above. Tone is completely unpredictable in lexical tone languages, whereas tone in melodic tone languages is predictable. Once the underlying tonal melody is known in melodic

tone languages, the rest of the tonal pattern in the word becomes clear. Tone assignment in Mende is reminiscent of PA systems, as will be discussed in §3.1.4.

Tone languages can be contrasted with stress languages like English. Example (19) illustrates the difference between tone, discussed above, and intonation. Intonation also uses pitch, but in this case, there is no change in meaning to the word in question.

(19) a. Charlie ate a hamburger for lunch.
b. A hamburger? I thought Charlie was vegetarian.

The English example in (19) illustrates that the word *hamburger* can be pronounced with two different intonations, or pitches, and still has the same meaning. The first sentence is a declarative statement, where pitch falls at the end of the phrase. Thus *hamburger* carries falling pitch on the last syllable. The second phrase is interrogative, where pitch rises at the end of the phrase. In (19b) *hamburger* acquires a rising pitch on the last syllable. Despite these different pitches, English is not a tone language because change in pitch does not correlate to change in meaning of the word *hamburger*; this meaning distinction is a key property of tone languages.

3.1.2 Stress Systems

Among the world's languages, stress systems include English, Dutch [Netherlands], and Russian [Russia] (van der Hulst and Smith 1988). Odden's quote in the introduction to this chapter accurately describes the current state of prosodic research; no clear definition or guideline for 'stress' is satisfactory, forcing any theory of stress to be, as Hayes (1995:5) explains, "in an indirect relation with the facts that support it." It is claimed that stress systems can be identified using acoustic properties such as length, loudness, pitch, and vowel quality (Hyman 1977b, Gandour 1978, Beckman 1986, among

others). However, studies have shown that loudness plays a very small role on stress perception; pitch contours play the strongest role, while duration falls somewhere between the two (see Fry 1955, 1958; Mol and Uhlenbeck 1956; Bolinger 1958). Beckman (1986) argues for a combination of amplitude and duration, "total amplitude", as the most dominant phonetic correlate of English stress.

More recently, based on acoustic research of American English and Dutch, Sluijter (1995) argues that duration and spectral balance are the strongest correlates of word level stress and sentence level accent. Spectral balance is an acoustic measurement of vowel intensity across harmonics. Sluijter (1995) argues that vocal fold tension, which results in differences in spectral balance, is one of the strongest acoustic correlates of stress. Like earlier experiments have shown (*cf.* Fry 1955, 1958; Mol and Uhlenbeck 1956; Bolinger 1958, Beckman 1986), Sluijter demonstrates that overall intensity is not a significant correlate in stress systems. The importance of vowel quality was also put into question by Sluijter's research; although this correlate is strong in American English, it is weak in Dutch. Finally, she found that once sentence intonation was controlled for, pitch is not correlated with stress systems. Refer to Sluijter (1995) for further details of the experiments and implications of these results.

Phonological use of vowel length and pitch contours complicate matters significantly; for instance, a language can make a phonemic distinction in vowel length, just as pitch can be modulated for intonation, as illustrated in (19) above. Because "phonetic resources [may] serve other phonological ends," (Hayes 1995:7), Beckman (1986) and Hayes (*ibid.*) refer to stress "parasitic." In other words, stress may employ linguistic information used for other purposes in the word or phrase to indicate

prominence. This is not typically of tone languages. Consequently, no acoustic properties have the power to decisively characterise stress. At this point, only tendencies, such as those presented by Sluijter (1995) can be correlated with stress languages. So, as Hayes (1995) noted, any theory of stress will rely on individual language facts.

As expected for accentual systems, culminativity is the key phonological characteristic of stress languages, (Hyman 1977a; Beckman 1984; van der Hulst and Smith 1988; Hayes 1995; van der Hulst 1999; Lahiri 2001, among others). This feature of stress systems was originally observed and described by European linguists of the Prague School beginning in the 1930's (Trubetzkoy 1939 [1969]; Jakobson 1931; Martinet 1954, 1960; Garde 1968). Culminativity plays a central role in stress systems, ensuring that there is one and only one prominence within the accentual unit, where the accentual unit can range from a word to a phrase – a phonological phrase, for example. Beckman (1986:2) explains that within this unit, "more prominent portions alternate and contrast syntagmatically[8] with less prominent portions," a notion which opposes the paradigmatic nature of tone explored in §3.1.1 above. The syntagmatic nature of accentual systems such as stress, is "the attempt to 'locate' an entity within a given syntagm (or horizontal stretch)" (Hyman 1977b:3). This is another key characteristic, which opposes the paradigmatic contrast of tone. Hyman (*ibid*) describes the tonal paradigm as "the attempt... to 'identify' an entity, as it is distinct from all other entities capable of occupying the same position." van der Hulst (1999:5) explains that marking stress does not mark only that one syllable, but marks the pronunciation of all syllables

[8] Note that Beckman (1984) took the notion of 'syntagmatic contrasts' from Garde (1968).

in the accent phrase. According to him, stress is clearly "a property of the whole word," not just of the accented peak, where that property is culminativity (and I would add, syntagmatic contrast). This means that stress is not just "a phonetic feature, but is the means of marking relative prominence within various organisational groupings of metrical units" (Lahiri 2001:1347).

Lahiri's quote identifies a second fundamental property of stress systems, metricality. Metricality is the ability of stress systems to organize stress patterns hierarchically. Working in tandem with culminativity, this property creates one prominence per accentual unit by relegating any stress besides the primary one to a 'secondary' position. Different levels of prosody are parsed hierarchically: segments are parsed into syllables, and syllables are parsed into feet, where a foot is a constituent built on groups of syllables[9]. Once feet are built, stress assignment occurs, falling on the head of certain feet. Given that syllable weight is often a feature of stress assignment, metrical stress theory is able to account for the crucial role weight plays by building syllable weight into foot structure. Hayes (1995:30) clarifies this hierarchy and the interplay found between culminativity and metricality: "if one assumes that stress involves structure, and that structure is created exhaustively, it is easy to see that stress will be culminative within the domain of the stress rules: since prominence relations are obligatorily defined on all layers, then no matter how many layers there are, there will be a topmost layer with just one [prominence]."

As discussed above, culminativity is an organizational tool in language. Hyman (1977a:38) claims that organising sounds into metrical groups helps the listener process

[9] See Hayes (1995) for a detailed argument of basic foot types.

the incoming stream of sounds, an idea echoed by Beckman (1984), who notes that this organizational ability is the primary function of stress. This, alongside the syntagmatic nature of stress, suggests the distinctive feature of stress is secondary. This is in stark opposition to tone, where its distinctive and paradigmatic features define the system. Beckman notes that stress can also distinguish between lexical units, but the contrast among more prominent and less prominent portions of a phrase is a far more important function of stress. Beckman (1984) does recognize cases where words in stress languages contrast paradigmatically, and in these cases, she claims that both an organization function and a distinctive function are engaged.

In opposition to tone systems where tone is a lexically specified feature, stress is either lexical or fixed, *i.e.* unpredictable or predictable. It is common that both lexical and fixed stresses are found within a language. In lexical stress systems, words are prespecified in the lexicon for stress. Their placement is unpredictable and is part of the meaning of the word; there are no rules to assign stress to that word, and so the prominence must be learned along with that word. Lexical stress (or lexical accent) can be likened to pitch assignment in tone languages, where there is no method of predicting the placement or pitch of the tone. Fixed stress is rule-based and hence, stress assignment is predictable. For further details on fixed versus lexical stress, see van der Hulst 1999.

3.1.3 Issues in the Typology of Prosodic Systems

Prior to exploring PA systems, a detour into taxonomical issues is required. The extent of the problem facing linguists exploring the nature of prosodic systems can be seen in the last line of Odden's quote: "[t]here are certainly no acoustic or physiological

properties of languages *into two or three types*" [italics added]. As basic an issue as the number of systems in prosodic typology is not transparent; whether two or three (or more or less) systems exist in the typology is a surprising gap in our understanding.

Prosodic systems used to be divided into two systems – tone and stress – (see Hyman 1977b). To complicate matters significantly, some languages are now understood to implement tone using metrical stress rules (see Pike's (1956) analysis of languages of Mexico; Haas's (1977) analysis of Creek [USA]), seriously blurring the two-tiered division. As described earlier, prosodic systems are typically divided into three types in contemporary analyses – tone, stress and PA. The issue of how to categorize prosodic systems, and the resulting number of identifiable systems is discussed below. At this point, it is clear that the indecision regarding the number of systems has lead to greater problems than simply taxonomy. Coupled with the lack of empirical standards by which 'stress', 'tone', and 'pitch accent' can be measured, there is a grave inconsistency throughout linguistic literature with respect to terminology used to describe various prosodic systems.

Analyses of pitch accent provide the majority of inconsistencies with respect to nomenclature ensuing from this array of terminological confusion. The term 'accent' often covers both stress and PA systems ambiguously; commonly no distinction is made between PA and stress systems in the literature, likely because PA systems have been traditionally viewed as a sub-type of stress systems. Alderete (1999:12) notes "the proposal to study accent systems is in some ways problematic because the term 'accent' has been used in so many different ways and applied to a wide range of phonological phenomena." Inkelas and Zec (1988:227) call pitch accent a "somewhat elusive

heading;" van der Hulst (1999:95-6) summarizes the confusion and overlap in terms:

> In many studies in this book, the term stress is used in the way that I use accent, or the term refers to the package accent-plus-certain phonetic cues. Thus, Bruce (chapter 9) uses the term stress for primary and secondary accent, and the term accent for the syllables that carry a lexically distinctive tone [or are they PA's?]. This is also how A. Liberman (1982) uses the term accent. Since many Scandinavian languages have lexically distinctive tones, one often finds the terms "accent I" and "accent II".

The terminological inconsistency is demonstrated by the range of new terms used to refer to prosodic systems; the following list presents a sampling:

Hyman (1977b:4) distinguishes between accent languages and stress-accent languages. He states that accent refers "exclusively to situations where the culminative function is met," and that "stress-accent... implies that it is the 'intonational' features associated with a given utterance or utterance type (declarative, vocative, interrogative, etc.) which will solely account for the realization of the abstractly marked syllable... [t]hat is... the accent has no physical properties of its own."

Beckman (1986:ix) distinguishes between stress and non-stress accent. For her, lexical accent, or 'stress accent' languages refer to languages such as Dutch and English, while 'non-stress accent' refers to languages using a phonetically different accent, such as Japanese [Japan]. It must be pointed out, however, that Beckman does not view Japanese as a PA language, but as a tonal one; this point will be explored in further detail later in the discussion.

Clark (1988) distinguished two types of prosodic systems, each with two subsequent subclasses: tonal systems, composed of free tone, and restricted tone, and metrical accent systems, composed of stress accent, and metrical pitch accent systems. van der Hulst and Smith (1988:xii) are suspicious of this classification since not all languages

can be categorized under this analysis.

Haraguchi (1988) divides prosodic systems in a similar fashion to Clark. He claims that languages fall into two major types, both of which are divisible into a further two categories. Language systems can be either accentual or nonaccentual; accentual systems can be divided into stress and PA languages, while nonaccentual languages can be described as tone or 'unaccented' systems.

Finally, the term 'tonal accent' is used by Haas (1977) to describe Creek (a Muskogean language), which implements tone under a metrical stress system. This list is by no means exhaustive, but should be sufficient to illustrate the disorder and lack of conventions in the literature.

Terminology for PA languages has left these systems indistinguishable from other types of prosodic systems; Abe (1981:1) notes "...it is not easy to give a precise definition of pitch accent language as opposed to tone language." PA languages have been claimed to account for "single tonal melodies" systems (Wright 1988:296) such as Japanese, and lexical systems with stress-accent, such as Russian (see Alderete 1999:12). They have been termed 'restricted' tone systems, where "specification of only one tone (or one melody) is involved" (Voorhoeve 1973; Schadeberg 1973; van der Hulst 1999:79). Bolinger's (1958) title, *A Theory of Pitch-accent in English* leads the reader to believe that even English can be viewed as a PA system. Other research lumps stress and PA languages together under the same analysis, assuming that enough similarities between the two exist to merit unification.

If it is possible to put terminological difficulties aside – it makes one wonder what would be left in the literature if one were asked put this all aside! – PA systems can be

discussed with a full understanding of the complexities involved in this undertaking.

3.1.4 Pitch-Accent Systems

Pitch accent has been conventionally described by linguists of the Prague School (including Jakobson 1931, Trubetzkoy 1939 [1969], Martinet 1954, 1960, Garde 1968) as a subtype of stress. The impetus for this grouping comes from culminativity, claimed to be a core characteristic of PA and stress systems, but never of tonal systems. According to van der Hulst and Smith (1988:4) the "accent is simply an 'abstract' mark where a culmination of prosodic features occurs." This culmination means that prominence, or location of PA, indicates the manner in which the entire word (or accentual phrase) is to be pronounced (see Hyman 1977b; van der Hulst 1995, etc). Under this analysis, prominence is assigned, either lexically or rule-based, and if acoustic features of prominence correlate with pitch alone, the system is PA, whereas if acoustic features include pitch, duration, intensity and so forth, the system is stress. In this light, both PA and stress function metrically, where syllable weight and culminativity dominate.

Size of accentable units is used as a signal of the type of prosodic system. Clearly, this indicator respects culminativity for stress and PA systems: for stress and PA systems, prominence is present minimally at the word level, and maximally at the phrasal level. In fact, van der Hulst (1999:26) even goes as far as to say that occurrence of an accent on a syllable implies that no accent may fall on adjacent syllables. Tone, on the other hand, can have the morpheme (mora, vowel) as its minimal domain. Not surprisingly, because of tone's wider distribution, it does not indicate unique domains as do stress and PA, and thus is nonculminative.

Besides culminativity, Trubetzkoy (1939) recognized PA's distinctive, delimitative, and descriptive functions. The distinctive function lies in PA's ability to distinguish lexical units. This function follows directly from culminativity, since each unit is intended to carry one PA and no more. The delimitative function is the ability of PA to signal the boundary between lexical units, since the closer to the edge of the unit PA falls, the more PA is "fulfil[ling] its linguistic function" (Hyman 1977a:41). Finally, PA is recognized for its ability to distinguish unique meanings, its descriptive function, as the minimal pairs from Beckman (1986:146) in (20) below exemplify.

(20) a. káme 'turtle'
b. kamé 'jug'

Culminativity, and all the features that fall from it, is still considered a principle characteristic of PA by contemporary mainstream linguists (Beckman 1986; van der Hulst and Smith 1988; van der Hulst 1999, among others).

PA languages include Scandinavian languages, Serbo-Croatian [Serbia-Montenegro, and Croatia], Mohawk [Canada, USA], and Fasu [Papua New Guinea], among others. Tokyo Japanese is likely most commonly cited as a PA language, recognized as a prototypical PA system (McCawley 1968, 1977; Beckman 1986; Haraguchi 1988; Alderete 1999; *cf.* Hyman 2001).

Japanese, like all PA languages, has a tonal system which is highly restricted in its distribution (Poser 1984; van der Hulst 1999; Hyman 2001, among others). Abe (1981:1) notes that for this reason "a theory of pitch accent must be restricted enough to exclude certain imaginable but not plausible pitch accent systems and rich enough to characterize a natural class of pitch accent systems of which all the attested systems constitute a subset." For words in Tokyo Japanese, there are two options when pitch

appears in a word: it will either have a HL melody (where H is a high pitch, and L is a low pitch), or simply H. This is reminiscent of melodic tone systems, illustrated by the Mende example (18). Recall that for melodic tone systems, once the underlying tonal pattern is established, tone in melodic systems becomes predictable. Likewise for Japanese, once the underlying prominence is established, the rest of the word predictably forms a contour around that accent-bearing unit.

PA differs from lexical tone languages (see Cantonese (15) or Mandarin (17) above) in a key respect; instead of having the option of H or L on each syllable, Japanese only has four lexical tone patterns available to it, instead of the eight potential patterns of a tone language (adapted from Hyman 2001:1376, where (´) indicates a high tone and (`) indicates a low tone). Note that some forms are unaccented underlyingly.

		*			*			*				
(21)	a.	inoti	'life'	b.	atama	'head'	c.	kokoro	'heart'	d.	miyako	'capital
		ínòtì			átámá			kókórò			míyákó	city'

The raised asterisk (*) is a widely accepted notational cue for PA, proposed by McCawley (1968) and Haraguchi (1977) (supporters include Abe 1981; Goldsmith 1987, among others). Under this analysis, the asterisked vowel and all preceding vowels bear H, while all subsequent vowels bear L. Therefore, in (21a), where the asterisk falls on the first vowel of the word, that initial vowel will carry H tone, while all other vowels in the word will carry L tone. Where the asterisk falls on the last vowel, (21b), the only way the drop from H to L will be realized, Hyman explains, is if an enclitic such as a nominative marker, for example, is added to the word, since only vowels found after the asterisk will bear L. Example (21c) follows the predictable pattern where, including the asterisked vowel, all vowels preceding the asterisk are H; in this case only the final

vowel is L. In words lacking an asterisk (21d), no drop from H to L will be found, and all vowels will be H in pitch, even if enclitics are added.

Since at most one change in pitch can occur per word in Japanese, it has been argued that it respects culminativity, and thus is a PA language. However, since the asterisk serves only a tonal function, others argue that Japanese is actually a tonal system (Poser 1984; Pierrehumbert and Beckman 1988). In fact, Hyman (2001:1376) describes PA languages as those with both "well-defined stress systems as well as lexical pitch phenomena." He notes that although languages such as Tokyo Japanese and Somali lack the stress system which exists independently of tone, they remain on the list of PA languages, as witnessed by the vast number of citations recognizing Tokyo Japanese as a prototypical PA system.

Contemporary accounts of PA consider a number of different correlates beyond those observed by the European linguists. One indication of PA systems is the type of rules affecting prosodic systems. If rules work to reduce the number of accents per prosodic unit to one (*i.e.* work under the auspices of culminativity), then the language has a PA system. If rules affecting pitch are the same rules of assimilation and dissimilation affecting segments in a language, the prominence system is tonal. Although McCawley (1964) proposed this prosodic typology, in a later paper (1970), he describes reasons for which his statements are inadequate. These reasons are explored in §3.2. The difference in rule types affecting PA versus tone languages is widely recognized, and is consequently integral to many prosodic theories. For many cases this simple typology is sufficient. However, as will be encountered throughout this discussion of prosodic systems (§3.2), it is not a sufficient explanation for all languages.

Another current method of defining PA systems is to describe prosodic characteristics of the language in question. This technique is problematic, reminiscent of attempts to define stress systems, discussed above. Recall that Hayes (1995:5) remarks that any theory of stress – or any prosodic system for that matter – undertaken in this manner is "in an indirect relation with the facts that support it." Furthermore, these definitions tend to focus on tendencies in PA systems, and ignore potential atypical behaviour. The quotation from Alderete illustrates that these characteristics are highly reflective of traditional stress and PA theories, leaving us to question if any progress beyond modernization of terminology has been made.

> Contrastiveness: accent is unpredictable and therefore may bring about contrast in otherwise identical words.
> Edge Effects: accent is often assigned or attracted to a designated edge of a word or phrase (cf. 'delimitative accent' from Trubetzkoy 1939)
> Culminativity and Accent Resolution: there can be at most one accent per word; in words with more than one inherently accented morpheme, all but one is deleted
> Accentual Processes: accentual processes are limited to deletion, insertion, and shift of accent; these processes may take place over long distances.
>
> Alderete (1999:13)

Perhaps the most attractive proposal for PA to date is by Hyman (2001). He recognizes the current inability to capture similarities among PA languages (see arguments above for not including Tokyo Japanese as a PA language), noting that "[a]lthough clumped together as 'pitch-accent languages', it is easy to see that this label is not a coherent one. Rather, 'pitch-accent' merely refers to the residue that obtains once the easily definable languages have been assigned to [tone, stress and phrasal level prosody] types." This observation spurred on the contemporary analysis of PA, returning to an essentially more simplistic system where tone and stress are the two

components of prosodic systems (*cf.* Inkelas and Zec 1988; van her Hulst 1999; Hyman 2001). This approach is extremely attractive to those working in a non-conforming, 'messy' system, and is supported by data from Serbo-Croatian. Inkelas and Zec (1988:227) conclude that PA can be divided into "two operative phonological entities," where tone and stress are "sufficient to characterize prosody in Serbo-Croatian." Under this analysis, prototypical features of tone and stress are recognized and allowed to mix accordingly. The prosodic system that results from this analysis is a hybrid, using Hyman's (*ibid.*) terminology, where languages are no longer forced into categories or types. For further cases of problematic systems, see Remijsen's (2003) excellent and succinct summary of the issues in classification of prominence systems. "This 'mixing' of properties," Hyman (*ibid.*) describes, "allows some stress systems to have a tonal component and causes some tone systems to seem 'accentual'," as in the case of PA systems. The prototypical features presented in Hyman (2001:1377ff.) are displayed in Table 4, below.

	TONE SYSTEMS	STRESS SYSTEMS
Prototypical distribution	**Free:** - Multiple tones may appear within same word - Toneless words may exist - Distributional constraints may apply	**Culminative:** - Only one primary prominence per word - Repair strategies to avoid closely spaced or adjacent stresses
Prototypical lexical domain	**Morpheme:** - mora - phoneme - vowel	**Word:** - Stress placement may be determined by morphological factors (e.g. root vs. affix) - May have stressless entities (e.g. clitics)
Prototypical function	**Distinctive:** - Paradigmatic relationship exists between tones	**Demarcative:** - Syntagmatic relationship exists with stress - Stress results from imposition of metrical structure

Prototypical realization	**F_0:** - Pitch - Tone-bearing unit is prototypically the syllabic segment (e.g. mora or vowel)	**Complex:** - Intonation is primary correlate - Pitch, duration, intensity *may* also be correlates - Stress-bearing unit is the syllable
Prototypical effect on phonology	**Self-contained:** - Tones affect tones - Do not affect consonant or vowels	**Non-contained:** - Consonants and vowels can be affected by stress - Consonants can be strengthened or weakened under stresslessness - Stressed vowels are lengthened/ diphtongized - Unstressed vowels become peripheral
Prototypical effect of phonology on it	**Affected by consonant types:** - Voice quality, glottal stop, and /h/ have all played an important role in tone genesis and evolution - Besides moraic structure sensitivity, tones rarely interact with vowel quality	**Affected by syllable weight:** - Syllable weight affects stress - Stress appears to result from the generalization of intonational effects at domain edges
Prototypical interaction with grammar	**Compositional:** - No necessary direct conditioning of tones by grammar	**Integrated:** - Stress is integrated into grammar - Accent may be determined by focus, and phrase structure
Prototypical rule types	**Similar to segmental rules:** - Assimilation and dissimilation rules affecting segments affect tones - e.g. Standard Mandarin Chinese	**Different from segmental rules:** - Stress is not a feature, therefore demonstrates no assimilatory processes - Stress is hierarchical

Table 4: Prototypical Properties of Prosodic Systems (adapted from Hyman 2001:1377ff.)

Hyman's theory can be viewed as a featural system, combining properties of stress and tone along two axes. Traditional prosodic theory simply allows for the categories, 'Tone' and 'Stress' to interact; type 1 is a pure tone language, and type 2 is a pure stress language. Type 3 lacks both tone and stress, implementing prosody at phrasal level,

while type 4 confusingly has both tone and stress. Type 4 represents pitch-accent languages. Despite being a [+tone, +stress] language, this type does not encompass languages such as Creek, which (unusually) implements pure tone through a metrical system. This is because type 4 languages only combine the notions of tone and stress, not their features. Creek is not a pitch accent language, but a typical stress language (it builds feet, for example), yet the phonetic prominence is purely pitch, hence restricting the appearance of secondary prominence. Unlike the traditional system, Hyman's system is able to account for Creek, since individual features of tone or stress may intermix. The traditional analysis can be summarized in the table below, adapted from Hyman (2001:1376).

BINARY FEATURES	PROSODIC TYPE	LANGUAGE
Type 1: [+tone, -stress]	Tone	e.g. Yoruba, Igbo
Type 2: [-tone, +stress]	Stress	e.g. English, Russian
Type 3: [-tone, -stress]	Phrase level prosody	e.g. Korean, Berber, Gafat
Type 4: [+tone, +stress]	Pitch/Tonal accent	e.g. Fasu, Swedish

Table 5: Contrasting of Stress and Tone Using Binary Features (adapted from Hyman 2001:1376)

Another reason that the traditional system is deficient is that Japanese is forced into a subclass of Type 1 tone systems, a restricted tone language. The need to specify subgroups indicates that classifying a major language according to this typology is problematic. This system insufficiently describes potential prosodic systems, and forces languages into categories, a method continually proven to be problematic.

Hyman's analysis of prosodic systems, on the other hand, appeals to many different theories that have come before his. For example, it is often noted that stress and tone

exist on a continuum (*cf.* van der Hulst and Smith 1988; Yip 2002), where at one end, there are 'pure' tone systems and at the other end, 'pure' stress systems. Languages fall anywhere along the axes, depending on how prototypical the prosodic features of that language are, placing PA systems near the middle. The continuum analysis is capable of accounting for languages with fully developed tone systems and restricted or impoverished tone systems, for example. Hyman's theory is able to accommodate these observations because his analysis sets up the endpoints of the spectrum: prototypical stress at one end, prototypical tone at the other.

Hyman's analysis also eliminates some problematic issues associated with the notion of a continuum; for example, metaphorical linearity of the continuum poses great difficulties when trying to classify a language such as Creek, which implements tone under a metrical system. Where would that language fall on the continuum? Presumably it would fall in the middle, since it combines the two systems at either end of the spectrum. However, as mentioned, the middle region is typically understood to be where PA systems fall. Furthermore, the continuum is unable to account for different manifestations of the same system, as seen in melodic tone and lexical tone languages. Would the continuum branch at one end to account for this split? Finally, when a subsystem is found in a language, such as the predictability of tone assignment seen in Cantonese hypocoristics, how is that language then classified? What weight does that subsystem hold in that language and how can it be represented on the continuum? As discussed above, Hyman's analysis is capable of subsuming positive features of the continuum analysis while doing away with the aforementioned abstract theoretical difficulties.

The prototype analysis proposed by Hyman is also able to account for past analyses, which lump PA under either stress systems or tone systems. Under these analyses, a common trait is used to classify PA as a subtype; the culminative nature of PA prompted its subclassification under stress systems (*cf.* Prague School linguistics, including Trubetzkoy 1939), while PA's use of pitch prompted its subclassification under tone systems (*cf.* Gandour 1978; Beckman 1986; van der Hulst and Smith 1988; Yip 2002, etc.). Hyman's proposed analysis no longer forces PA to be a subset of stress or tone, and permits more freedom in the realization of its phonetic and phonological features. It realizes that PA systems may be more stress-like or tone-like, depending on the prosodic system of the language. Finally, Hyman's proposal accounts for languages mixing phonetic properties of one prosodic type with phonological properties of a different prosodic types rendering Hyman's analysis the most attractive to date.

3.2 Mixed Systems

For those not directly concerned with classification of prosodic systems, problematic cases are regarded as a minority, and a three-pronged system, *i.e.* tone, stress, and PA, is unfortunately maintained. For example, after noting four languages where more than one primary prominence occurs, Hyman (1977a:38) notes these "exceptions usually arise under well-defined circumstances" and so "we needn't be too concerned." Although van der Hulst (1999:16) rightly suggests that exceptions may form a subsystem – true in certain situations – his comment minimizes the need to recognize systematic problems with current classifications of prosodic systems. Time and time again, the traditional three-pronged classification of prosodic systems is inadequate.

Hyman's (2001) proposal puts a contemporary slant on proposals from McCawley (1978), Clark (1988), Lockwood (1983), and more recently, van der Hulst (1999). Recall from above (page 36) that McCawley (1964) proposed a prosodic typology based on the types of rules found in prosodic systems. In subsequent papers (1970, 1978) he explained inadequacies with this theory, which he later rejects altogether. Among the inadequacies, one key argument is the example of a system displaying a split in its prosodic system. In these languages, one type of prosodic system is found in the surface phonology with another type in the deep phonology. To clarify, one specific example comes from Ganda [Uganda], where words in this language "show surface tonal contrasts greatly in excess of what a pure pitch-accent system could accommodate," (McCawley 1978:124). The dictionary entry form of a word in Ganda illustrates a PA system, but because of surface tonal rules, words show surface tones, not PA. His original proposal of dividing prosodic systems based on the type of rule affecting 'accent' (*cf.* Table 1) becomes problematic since languages like Ganda illustrate that it is possible to have different types of rules applying at different levels of the phonology. McCawley concludes that trying to ask if a language is a tone or PA language "is a stupid question to ask" (1978:127-8) because of the variety found in each system. McCawley (1978) notes that languages showing a split in the phonology of the prosodic system could be changing from one type of system to another (from a tonal to a PA language, for example).

This proposal has since been echoed in many ways: van der Hulst (1999:92), following Lockwood (1983), suggests that perhaps phonetic properties normally associated with accent languages "manifest themselves in a tonal manner." Likewise,

he suggests that perhaps phonetic properties normally associated with tonal languages occur in an accentual manner. In other words, van der Hulst, like Lockwood, is suggesting that acoustics from one type of prosodic system may be implemented under the phonology of another type.

Finally, Clark (1988:51-53) suggests that under the traditional definition of PA systems, two types of systems can be interpreted: 1) a restricted tone language which has just one lexical melody, or 2) a metrical language in which accent is realized as a high tone. Although Clark's interpretation of PA is not unique, she is suggesting that in the second interpretation, PA systems may be a mixed one; phonetically, tone is implemented under a phonologically metrical system.

She illustrates that Japanese represents an example of a restricted tonal PA system – interpretation 1 – since PA is a tone at every level of phonological representation. Furthermore, she notes these types of tonal systems lack metrical properties: the accent is generally not marked by intensity or duration, and its position is usually unaffected by syllable weight. On the other hand, metrical PA languages (interpretation 2) include languages such as Vedic Sanskrit, where PA is part of the phonetic realization of an underlying metrical accent. In these systems, every word receives accent, the location of that accent may be affected by syllable weight, and accent may be realized acoustically by intensity or duration as well as pitch.

3.3 Summary

The above summary of mixed systems is noteworthy beyond their relation to Hyman's (2001) proposed typology, and beyond the meta-theoretical implications. The remainder of this thesis is dedicated to the exploration of the prosodic system of

Blackfoot, and although it has been labelled a PA language, there is little compelling evidence for Blackfoot as a PA language. In fact, it is not clear where the language should fit in terms of prosodic type since it does not neatly correspond to any prosodic system. For that reason, it is necessary to survey the range of possibilities available when considering Blackfoot data, and explore what this new data can contribute to the debate on prosodic systems.

The accounts illustrated in §3.2, along with all other problems and inconsistencies in prosodic theory presented throughout this chapter suggest there is an unresolved need for a more flexible system in the theory of prosodic systems. At present, Hyman's (2001) analysis, which allows for 'hybrid' systems, is most attractive, since it lays out prototypical features of tonal and stress systems, and allows for individual languages to combine features without necessarily forcing languages into categorical slots. Once all the literature in the field is reviewed, it becomes clear that a large number of languages do not fit into any 'typical' group, and that these atypical languages likely form just as large of a group as the typical ones.

Chapter 4

Blackfoot Prominence

All available Blackfoot literature, of which there is very little, fails to comprehensively investigate the prosodic system of Blackfoot. Most research regards the prosodic system of Blackfoot to be accentual (Uhlenbeck 1938 [1978]; Taylor 1969, Frantz 1970; Kinsella 1972; Frantz 1991; Frantz and Russell 1995; Kaneko 1999; Van Der Mark 2001, 2003). However, besides cursory descriptions of the prominence system, only Kaneko (1999) and Van Der Mark (2001, 2003) investigate the status of Blackfoot prominence in depth. Kaneko develops an Optimality Theory (OT) analysis of the accent pattern of nominal compounds in Blackfoot. Van Der Mark's research investigates the acoustic nature of prominence in Blackfoot in order to determine its prosodic type. As these two analyses are likely the most thorough investigations of Blackfoot prominence, an in-depth review of Kaneko (1999) and Van Der Mark (2003) is taken up in §4.2. Prior to this, a summary of previous research on Blackfoot's prominence system is provided as background (§4.1). This section progresses chronologically from Uhlenbeck's (1938) early research to Frantz's (1991) more recent investigations, paying particular attention to Taylor (1969), the lengthiest phonological overview of Blackfoot to date.

Section 4.3 reviews Blackfoot data which fits traditional PA theory, delineated as presumed motivation behind the claim that Blackfoot is a PA system. Nevertheless, a large portion of Blackfoot words does not obey PA theory (reviewed in §4.4), calling into question the labelling Blackfoot as an accentual system.

4.1 Blackfoot Literature

Despite lack of substantiation, Blackfoot is commonly presumed to be a PA system, and is referred to as such in the literature. In many cases, no rigorous attestation for this statement is made (*cf.* Kinsella 1972, Frantz 1991, Frantz and Russell 1995, Kaneko 1999). In other cases, Blackfoot prominence has been variably termed 'stress' or 'accent' (*cf.* Uhlenbeck 1938, Taylor 1969, Frantz 1970). However, without making direct reference to traditional PA theory, these descriptions of 'stress' and/or 'accent' in Blackfoot tend to follow traditional PA theory quite closely. A summary of each previous discussion of Blackfoot's prominence system is presented below.

Uhlenbeck's (1938:9) grammar refers to Blackfoot prominence as 'stress', where "on one syllable, or very often even on two or more syllables, a strong expiratory accent may be observed." He differentiates primary and secondary stress with diacritics, though notes in most cases, "it is scarcely possible to decide which stress is the stronger, or strongest, one." According to the summary presented in the previous chapter, it is clear that what Uhlenbeck is describing is not a typical stress system. Culminativity is the basic principle guiding stress systems, and his description violates this fundamental attribute.

He observes disyllabic words with either equal 'stress' on each syllable, *nókós (nókòs, nòkós) 'my child'*, or "with shifting expiratory accent." Of the latter he notes, "there is only one stressed syllable, the other syllable having no stress at all." These words are capable of bearing accent on either syllable, but never on both, exemplified by demonstratives, *cf. ámo : amó*, but never **ámó* ('this', proximity to speaker, but not to addressee). Uhlenbeck also observed a pattern where emphasis on "something very

distant, or scarcely visible" ("remote" emphasis) obtains a 'stress', "lengthen[ing] the stressed vowel to an extraordinary degree."

Beyond this basic description, he provides no further discussion or examination of prominence in Blackfoot. Despite noting "wavering stress, and... two or more simultaneous stresses in one word," Uhlenbeck does not to offer an explanation for the surprising behaviour of this stress system. He simply notes the "reader will find abundant material to study the place of the expiratory accent... so that it seems quite unnecessary to point out" any further information about Blackfoot prominence. In other words, Uhlenbeck left the prominence system of Blackfoot for future investigation. His sketch includes major generalizations and noteworthy peculiarities of prominence in Blackfoot, yet they are left uninvestigated. In fact, throughout most of Uhlenbeck's work, prominence is ignored and not recorded.

Taylor's (1969) dissertation is likely the most complete academic text extant in Blackfoot linguistics. Reminiscent of Uhlenbeck, Taylor identifies primary and secondary 'stress' in Blackfoot's prominence system. Like Uhlenbeck before him, Taylor disappointingly fails to provide a rigorous account of prominence, resorting to descriptive generalizations. He claims (1969:25), "stress may appear with any syllable," which will be illustrated in Chapter 5 to be untrue- a surprisingly casual and inaccurate claim. Taylor (*ibid.*) notes that any other "suprasementals are boundary phenomena," presumably results of phrasal intonation.

Taylor proposes three levels of 'phonemic stress': primary, secondary, and weak (stressless). Greatest intensity, he claims, is found in primary stress, while weakest

intensity is found in stressless vowels, leaving secondary stress somewhere between the two. As evidence for these different levels, he provides the following examples.

(22) a. ákaitapii wa
'he is an old person'

b. akáítapii?wa
akáítapii'wa[10]
'there are many people'

(23) a. óxpɛi?pii?wa
óhpai'pii'wa
'he jumped from a height, he hurtled through the air'

b. ɔxpɛ̀ì?pii?wa
ohpáí'pii'wa
'he had another vouch for him'

Based on the investigation of prominence systems in Chapter 3, examples (22a) and (22b) suggest Blackfoot is either a (metrical) stress or PA system. The forms can be likened to the difference in stress between English *récord* (noun) and *recórd* (verb), or to the descriptive function of PA, exemplified by Beckman's (1986:146) Japanese data, repeated below for convenience.

(24) a. káme 'turtle'
b. kamé 'jug'

Example (23) indicates that Blackfoot is a (metrical) stress system since Taylor marks secondary stress, which is only found in metrical stress systems. However, the example fails to illustrate the tripartite distinction of primary, secondary, and stressless vowels Taylor proposes in Blackfoot phonemic stress. In order for secondary stress to be present, primary stress is required, since stress is relative (*cf.* for example, Hayes' (1995) syntagmatic versus paradigmatic contrasts, discussed in (Chapter 3). Although Taylor claims stress in example (23b) is somehow weaker than the primary

[10] The second line in these examples represents a transliteration of the Blackfoot word into standard orthography, as reviewed in Chapter 2.

stress in (23a), it is still the only stress, making it the most prominent portion of the word, and hence the primary stress.

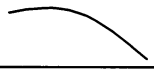
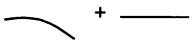
Phonologically, Taylor (1969:36) notes the importance of syntagmatic contrasts formed by Blackfoot 'stress': "the intensity of the three stress levels is not defined absolutely, but rather for each relative to the other." Since paradigmatic contrasts are only made in tonal systems, Blackfoot prominence is not be tonal according to Taylor, but either (metrical) stress or PA. Phonetically, Taylor (1969:36) claims "the phonemic feature of stress is intensity. Nonphonemic features which accompany stress are slight prolongation of the stressed vowel and a higher pitch than that of contiguous stressless vowels." Recall from the previous chapter, syntagmatic contrasts made with pitch (F_0) indicate PA systems, whereas a combination of prosodic features, including change in pitch, intensity, duration, vowel quality and/or spectral balance may all come into play in a (metrical) stress system. Therefore, according to Taylor's observed correlates for Blackfoot, the prominence system may be stress or PA.

The analysis of suprasegmentals provided at a later stage of his dissertation significantly confuses matters. (Recall Taylor (1969:25) states that any other "suprasementals are boundary phenomena.") He notes (1969:48) three phonetic pitch distinctions for Blackfoot: level, falling and neutral. He claims "pitch co-occurs with stress, [so] it is necessary to mark only one in phonemic transcription." Although Taylor continues to call Blackfoot a stress language, this new information indicates that Blackfoot must be considered a PA system since what he is describing is a PA language. The following table is intended to summarize Taylor's description of the three phonetic pitch levels in Blackfoot.

PITCH TYPE	ENVIRONMENT	REPRESENTATION
Level	- Found with a stressed single vowel, - or with a vowel cluster having both members stressed	V́ or V́V́ V̀ or V̀V̀
Falling	- Found only in vowel clusters in which the first member, but not the second is stressed	V́V or V̀V
Neutral	- Found with a single stressless vowel, - or in a vowel cluster of two stressless vowels	V or VV

Table 6: Phonetic Pitch Distinctions in Blackfoot According to Taylor (1969)

Taylor describes the realization of these phonetic pitch distinctions by classifying them into 'pitch contours', "Pitch Contour Number One" (PC1) and "Pitch Contour Number Two" (PC2). A table is provided to clarify the confusion of PC1 and PC2.

PITCH CONTOUR	SYLLABLE STRUCTURE	DECRESCENDO TYPE (as described by Taylor)	ACCENTS PER WORD
PC1 aI	(...)CV́(V́)CV	- Dropping in steady curving descent 	1
PC1 aII	CV́ (V́)CVVCVV	- Dropping in steady curving descent 	1
PC1 b	CV́ (V́)CVVCV	- Immediate drop in pitch, remaining low until end of word	1
PC1 c	CV́ (V́)...CV́...CVCV	- Accent in any syllable but first becomes secondary: $V́_2$ = V̀ - Stress subsequent to initial stress stand out in descending contour as intensity and pitch peaks	2+
PC1 d	CV́ (V́)... CV ...CV́CV	PC1 + PC2 	2+
PC2 a	CVCV...CV́	- Pronounced with slow deliberate, almost solemn cadence, and on a low pitch level - Stressed syllable distinguished by	1

		greater relative intensity, but pitch does not differ from that of preceding syllable(s) - Measured monotonous quality	
PC2 b	CVCV...CV́CV	- Same as PC2 a, above	1

Table 7: Pitch Contour Descriptions According to Taylor (1969)

Understanding PC2 is necessary to comprehend PC1; PC2 is distinguished by a monotone pitch throughout the word, where prominence is implemented by higher intensity, not pitch. PC2 is only found in words with a 'stress' on the final or penultimate syllable. Since pitch is not employed in the realization of PC2, PA is eliminated as a possible type of prominence. However, PC1 is characterised by multiple pitch decrescendos, beginning at the "first stressed syllable" (49), suggesting PA is also present in the prominence system, akin to the behaviour of the Japanese PA system, where an asterisk marks the vowel carrying PA (*cf.* example (21)).

The first decrescendo available to PC1 is a slow and steady fall throughout the word, with the highest point of the pitch contour falling at the first 'stressed syllable'. A second decrescendo associated with PC1 is a more abrupt change from the higher pitch of the first 'stressed syllable' to a low pitch, which continues throughout the remainder of the word. Taylor explains that PC1 may also be found in words with multiple 'stresses', where the second (or third, etc.) 'stress' must fall on the final or penultimate syllable. In multiply 'stressed' words, a combination of PC1 and PC2 is realized: a 'decrescendo' (constant falling) is found in the first portion of the word, while the monotone PC2 quality is found in the second 'stressed syllable' of the word.

Taylor claims that 'stressless' syllables found prior to the first 'stressed syllable' are lower in pitch than the 'stressed syllable' and any other following syllables without 'stress'. Moreover, Taylor (1969:48) notes, "the pitch levels of syllables relative to each

other are determined by the position in the utterance of the first stressed syllable. The stress and pitch patterns are the same for all utterances, regardless of whether the utterance is a multi- or a single-word phrase, with the difference only that a multi-word phrase has a greater number of actual or potential stresses." This description indicates Blackfoot is a PA system, despite Taylor's terminology ('stressed' syllables).

Essentially, Taylor suggests that depending on the relative distribution of 'stressed' vowels, a contour may form where pitch and stress co-exist within the same word. His descriptions of 'pitch contours' found in Blackfoot suggest that when prominence falls at the left-edge of the word, it is realized as PA (pitch is the phonetic correlate), whereas prominence at the right-edge of the word is realized as stress (intensity is the phonetic correlate). Taylor's analysis leads one to believe Blackfoot's prominence system is mixed, where prominence is realized as PA in some cases and stress in others.

If both PA and stress can in fact be found in Blackfoot, this would be very surprising and exciting. Only one other language is argued to have a 'split' system, where two completely separate prominence types are found in one language[11]. Regrettably Taylor fails to provide an explanation of interplay between stress and pitch, and provides no experimental data to substantiate his claim.

Likely Blackfoot does not have a 'split' system at all, and Taylor has over-distinguished the stress-like qualities of PA. This is not improbable, bearing in mind that phonetically PA implements prominence with pitch, while phonologically demonstrating stress-like characteristics. However, it is worth exploring Taylor's

[11] See Good's 2004 analysis of Saramaccan. To clarify between 'split' and 'mixed' systems, mixed systems use the phonetics of one type of prosodic system implemented in the phonology of another, while split systems have two unique types of prominence co-existing within the same language.

claim, a task undertaken in §4.2, by comparing it with results of Van Der Mark's (2003) phonetic analysis of prominence.

Taylor notes some basic (albeit peculiar) characteristics of Blackfoot prominence, notably that 'stress' is inherent in 'true' noun stems, and mobile for verb stems. Therefore in some cases, 'stress' may alternate; in other words, prominence may move within the word according to the morpheme(s) which are attaching to the word. The suggestion is made that placement and type of 'stress' are related to morphophonemic length, "often not represented at the phonemic level, and indeed possibly evidenced only by the position of stress in some cases," (*ibid.*). Similar to Uhlenbeck, Taylor does not pursue prominence assignment. He concludes (1969:70), "since [the issue of stress alternations] is still largely unclear, no effort is made to state rules of stress placement," bringing his investigation to a close at the descriptive level.

Kinsella's (1972) dissertation is not directly concerned with prominence, and so does not investigate prosody in any detail, marking prominence using two diacritics, one marking primary and the other secondary prominence. This system most certainly follows Taylor's analysis. Notably, from Kinsella's thesis onward, prominence is marked as PA without explanation in Blackfoot literature.

Frantz's dissertation (1970:8) does not explore the prominence system of Blackfoot, although he distinguishes between 'stressed' vowels, and vowels with inherent stress. Offering no further explanation to this confusing distinction, he notes that throughout his transcriptions, underlined vowels mark "stress (prominence) of the vowel (as marked primarily by pitch)," while inherent stress is marked with an acute accent. This notation is likely an imitation of his contemporary's research (Taylor, 1969).

Frantz (1991) refers to Blackfoot's prominence system as PA without explanation or argumentation. He notes (1991:34, 65) "accent assignment rules [are] poorly understood" and "are not yet fully understood by this investigator." Throughout his research and publications, there is no discussion of the prominence system besides indirect references and general descriptive remarks. He states (1991:3), "prominence... consists primarily of a relatively higher pitch than that of contiguous syllables." Furthermore, he specifies that due to intonation, which creates "a gradual drop in pitch throughout the utterance, an accented syllable toward the end of a word of several syllables may actually be of lower pitch than an unaccented syllable earlier in the word; the accented syllable will still be relatively high in pitch as compared to the syllable which follows it." He remarks on the difference between falling pitch (*cf.* Taylor 1969) and rising pitch, along with processes such as compensatory lengthening (1991:4), and accent spread (1991:28). The discussion will return to these processes in Chapter 6.

Kaneko (1999) did not make explicit the reasons for her theoretical underpinnings in her research on Blackfoot and PA. Following Frantz, she takes PA as a primitive in her research. Kaneko states Blackfoot exhibits culminativity, contrastiveness, and edge-effects, all properties of PA systems. She does not, however, provide evidence to substantiate that these attributes are found consistently throughout the Blackfoot system. For example, Kaneko (1999:ii) states, "every word contains one and only one pitch peak," which is clearly not representative of Blackfoot data. Details of Kaneko's analysis which is predominantly based on the delimitative function – or edge-effects – in Blackfoot are reviewed in §4.2.

Also reviewed in detail in §4.2 is Van Der Mark's (2003) research, focussing on the acoustics of Blackfoot's prosodic system. Van Der Mark provides phonetic evidence that Blackfoot's system uses correlates associated with PA languages like Japanese, as opposed to correlates found in stress languages like English. Although she does not compare the system to a tonal one, an element for future investigation, conclusive elimination of stress is a significant advancement in Blackfoot research. This is particularly valuable in light of Taylor's (1969) claims discussed above. A theoretical difficulty arising from Van Der Mark's research is the issue of the phonetics-phonology interface and conclusions reached when using phonetic arguments isolated from phonological arguments. Is a phonetic investigation of the prominence system enough to determine the system's prominence type, and to what degree must the system's phonology also weigh in to the discussion? As seen in, §3.2 (Mixed Systems), it is possible for languages to implement one type of phonetic prominence under another type's phonology. In sum, it is clear that the prosodic system in Blackfoot has not been rigorously investigated, although a consensus of its status as a PA language has already been accepted throughout the literature.

4.2 Previous Analyses of Blackfoot Pitch Accent

4.2.1 Acoustic Correlates of Blackfoot Prominence

Based on her analysis of a number of acoustic correlates as well as electroglottographic (EGG) data obtained from two native speakers, Van Der Mark (2003) claims on phonetic grounds that Blackfoot is a PA system, as opposed to a stress system. Pitch is claimed to be a crucial acoustic correlate to PA languages, while stress systems employ a range of

phonetic properties, including duration (length), intensity (loudness), vowel quality, and vocal fold tension. Results of Van Der Mark's (2003) research indicate that Blackfoot prominence is crucially manifested by higher pitch, as well as by secondary correlates, increased intensity, and longer duration. Although these two correlates are typically characteristic of stress languages, Van Der Mark argues that they are secondary in Blackfoot. Increased intensity is not a surprising companion to pitch; she states (2003:94), "an increase in subglottal pressure will increase the velocity of glottal airflow and consequently increase... the amplitude (intensity)."

Increase in vocal fold tension is a characteristic associated with stress languages, not with PA systems (*cf.* Sluijter 1995; Sluijter and van Heuven 1996), and since no vocal fold tension increase is found in Blackfoot, the correlated increased intensity is inconsequential. Though the lack of vocal fold tension increase is a pivotal factor confirming Blackfoot's phonetic status as a PA language, and serves to dismiss the possibility of stress, Van Der Mark recognizes that her conclusions are indirect, based on EGG data. Likewise, Van Der Mark (2003:97) explains that duration is also correlated with accented vowels in Blackfoot, "[duration] cannot be considered a primary distinguishing variable unique to stress languages." This again discounts Blackfoot's phonetic status as a stress system. A final core argument eliminating the possibility of Blackfoot as a stress language is the existence of contour pitches. Van Der Mark points out contour pitch is never found in stress languages. This research conclusively eliminates stress as a possibly prominence type for Blackfoot, but gives is no reason to eliminate Blackfoot as a tone language. This will be explored in Chapter 6.

4.2.2 Comparison of Van Der Mark (2003) and Taylor (1969)

In order to avoid misrepresentation of previous researchers, the analysis provided below is unique to this thesis and predominantly based on newly collected data. Recall from §4.1 that Taylor's claims contradict conclusions reached by Van Der Mark (2003) to some degree. Taylor claims that depending on location of prominence in a Blackfoot word, accent is realized as either pitch or stress. Prominence near the left-edge is realized as pitch, while prominence at the right-edge is realized as stress. Van Der Mark's (2003) research concludes prominence in Blackfoot is never stress, since the key correlate in stress, increase in vocal fold tension, is never found in Blackfoot.

Although Van Der Mark's (2003) research is capable of providing a direct response to Taylor's theory of Blackfoot prominence, she does not address this issue in her thesis. Throughout this section, I will address this pertinent issue by comparing results of Van Der Mark's (2003) research to Taylor's (1969) claims of Blackfoot prominence. Several elements of Van Der Mark's research can be used to establish that Taylor's claims are unsubstantiated.

Van Der Mark (2003:37-8) explains that due to the large number of words analysed in her study – 797 words – vowel context was not controlled for, meaning that she did not consider the position of prominent vowels in her experiment. However, she states, "there was a relatively even distribution of vowels from different contexts such as vowels occurring in the first versus final syllable or occurring in disyllabic versus polysyllabic words. This method did not negatively effect [sic] our results... several variables showed highly significant differences in accented versus unaccented vowels, regardless of context." It would be valuable to repeat Van Der Mark's study while

keeping track of vowel position in order to address Taylor's claims directly. However, enough evidence contradicting the theory of 'split' phonology is available from Van Der Mark's (2003) study to confidently dismiss Taylor's proposal.

Van Der Mark's findings indicate that possibly the most important correlate of stress languages, vocal fold tension, does not participate in the creation of a prominent vowel in Blackfoot. Taylor's claim that words with prominence at the right-edge realize prominence as stress predicts a significant, albeit sporadic increase in vocal fold tension. But, as seen on page 57, vocal fold tension does not appear to be a correlate in Blackfoot prominence, a strong counterargument to Taylor's claims.

Keeping in the acoustic vein of Van Der Mark (2003), further evidence opposing Taylor's theory comes from pitch contours of Blackfoot words. Drawing from the results of Van Der Mark's thesis which focus on the importance of pitch, I have created waveforms, including pitch contours, to investigate the accuracy and relevance of Taylor's claims. These waveforms illustrate that again Taylor's claims are poorly substantiated. The image below is a waveform of four words elicited from my language consultant: *í'ksisako* 'meat', *ótook* 'kidney', *iyínnit* 'hold', and *pokón* 'ball'. Below the waveform is the corresponding pitch contour. Note that prominence corresponds to higher pitch in each word. From this image, it is clear that pitch on different words can look very different, and can vary significantly. As well, notice that non-prominent syllables in Blackfoot illustrate no significant change or rise in pitch. Comparing each word to Taylor's explanation of 'pitch contours', it is clear that his theory is flawed. For convenience a summary of Taylor's 'pitch contours' is reproduced below.

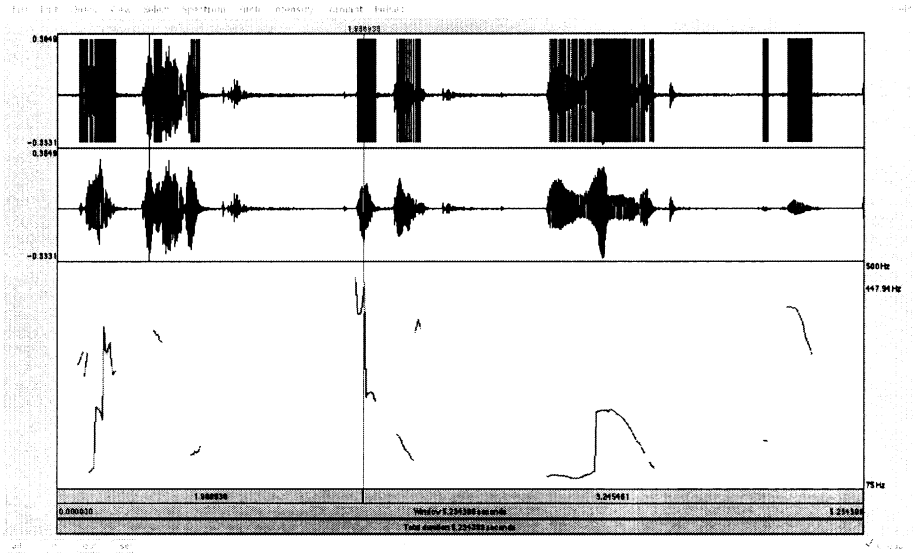


Figure2: Pitch Contour for four Blackfoot words

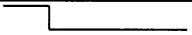
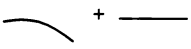
PITCH CONTOUR	SYLLABLE STRUCTURE	DECRESCENDO TYPE	ACCENTS PER WORD
PC1 aI	(...)CV́(V́)CV		1
PC1 aII	CV́ (V́)CVVCVV		1
PC1 b	CV́ (V́)CVVCV		1
PC1 c	CV́ (V́)...CV́...CVCV	$\acute{V}_2 = \grave{V}$ V_2 = intensity and pitch peaks	2+
PC1 d	CV́ (V́)... CV ...CV́CV		2+
PC2 a	CVCV...CV́	- No pitch change on prominent syllable - Stressed syllable has greater relative intensity - Monotonous quality	1
PC2 b	CVCV...CV́CV	- Same as PC2 a, above	1

Table 8: Summary of Taylor's (1969) Pitch Contour Descriptions

The first and second words, 'meat', and 'kidney' should have nearly identical pitch contours, a steady falling descent, (PC1a I, and PC1a II), since they both have one

prominence, followed by a syllable with a short or long vowel. In both cases, the prominent vowel demonstrates a significant rise in pitch, while following vowels are progressively lower in pitch. Though Taylor claims that both pitch contours are supposedly identical, the image indicates that this is not the case: 'kidney' has a much more obvious so-called steady decrescendo, while 'meat' illustrates an abrupt change from the high-pitched prominent vowel, to the lower pitched non-prominent vowels, not demonstrating the predicted steady decrescendo.

The second word, 'kidney' could fall under Taylor's pitch contour (PC2b), as does 'hold', since both of these words have a prominent penultimate vowel. Taylor's PC2 states that the prominent vowel is of greater intensity, but that there is no pitch difference (monotone pitch). This is clearly not the case, since in the image of 'kidney' there is a dramatic fall after the prominent vowel. For 'hold', there is a sharp rise to the prominent vowel, followed by a steady falling pitch throughout the remainder of the word, as is expected for PC1, not PC2, which 'hold' is supposed to be, under Taylor's analysis. There is clearly no monotone pitch in either example, again contradicting Taylor's theory.

Taylor's PC2a and PC2b predict a monotone pitch throughout the word with a rise in intensity at the prominent vowel. As the image illustrates, this contour is not necessarily found in words with penultimate or final prominence. For example, 'ball', a word with final prominence, shows a dramatic rise in pitch at the prominent vowel; the F_0 for the vowel in the first syllable is lower than that of the second syllable. A much larger scale waveform is presented below[12], where pitch (the dotted line), and intensity

[12] This waveform is created using a different elicitation for 'ball', indicating that the rise in pitch is a regular, and not exceptional, pattern of prominent-final words.

(the bolder solid line) are represented. In this image, rise in pitch of the prominent syllable coincides with rise in intensity as noted in Van Der Mark (2003). This is presumably what Taylor hears as monotone pitch with rise in intensity. Considering phrasal intonation typically results in a steady drop in pitch throughout a word or phrase, it is particularly significant that pitch rises at the end of the word (at the vertical line). Although the visible rise at the end of the word appears minimal, it is in fact substantial, considering neutralization incurred from intonational effects.

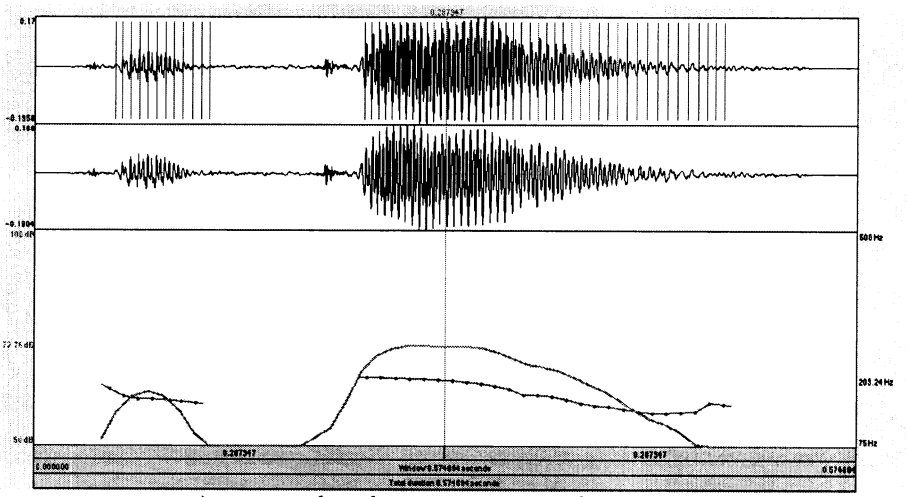


Figure3: Pitch and Intensity Contour for *pokón* 'ball'

Finally, Taylor notes that when two vowels carry prominence, the second vowel is less prominent than the first. The image below for 'spider' indicates that this too, is unsubstantiated. Although a slight decrease in pitch can be seen from the first to second prominent vowel, the decrease is insignificant when effects of word or phrasal intonation are considered. Notably, this image is important since it illustrates the difference in pitch contours with respect to prominent and non-prominent vowels. A pitch contour (along with an intensity contour, marked with the bolder bouncing solid line) can be found at the location of the prominent vowels in this word. However, the image illustrates the location of the non-prominent vowel falls to a very low creaky

pitch, a pitch level so low it is not even recorded. Considering PA is a syntagmatic distinction, this dramatic drop in pitch is reassuring. The obvious difference between the first half of the word, where prominence is found, and the second half of the word, where prominence is lacking, is enough of a contrast to indicate where prominence is located. If this opposition were not so obvious, pitch contours on the waveform would not be informative. This image also confirms Van Der Mark's (2003) conclusion that although intensity (and duration) is a correlate of the prominent vowel, pitch is the most significant of the three, confirming the system is PA.

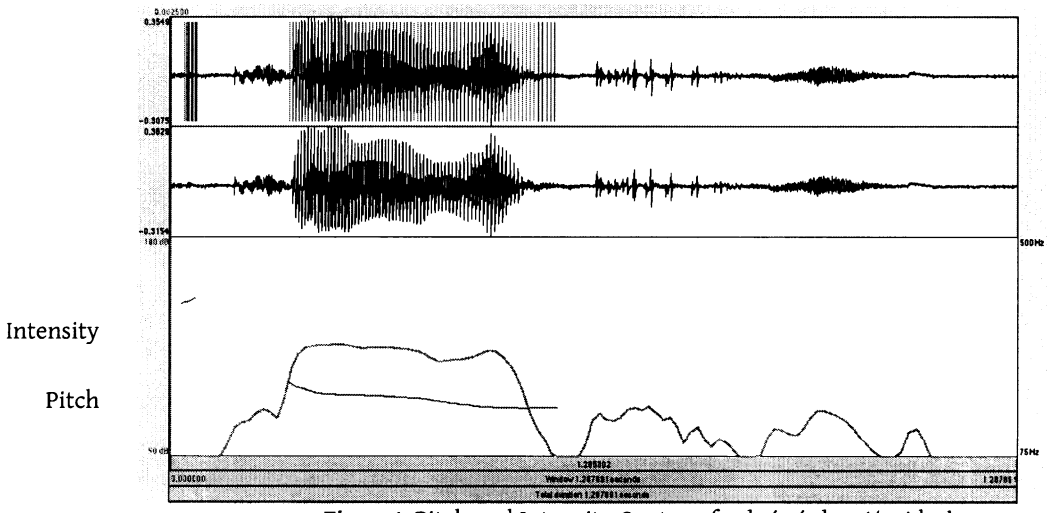


Figure4: Pitch and Intensity Contour for *ksáwáwkaasi* 'spider'

Apparent contradictions to Van Der Mark's conclusions can be found. Take as an example the waveform below, where nothing significant occurs near the prominent vowel with respect to pitch (thin, straight line).

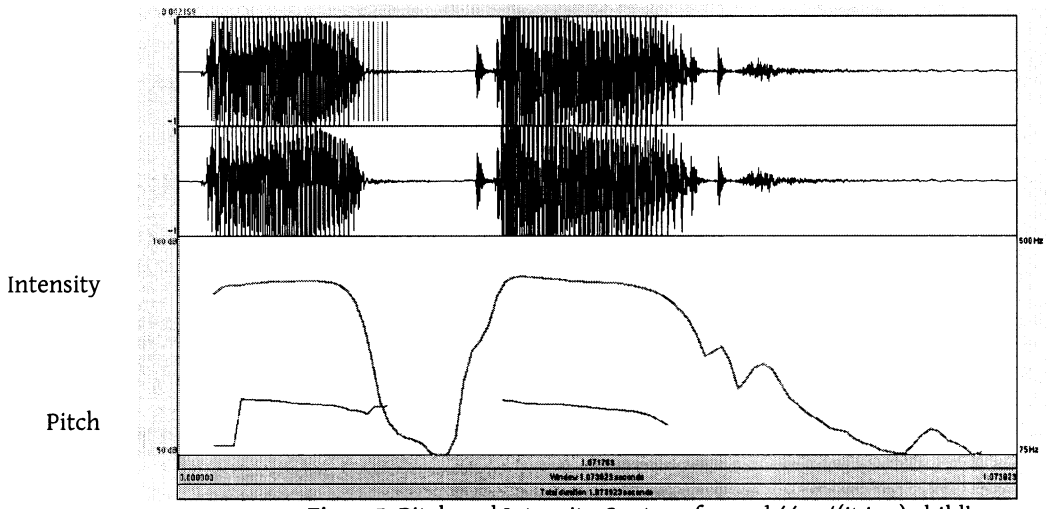


Figure5: Pitch and Intensity Contour for *pookááwa* '(it is a) child'

The second long vowel, *áá*, in '(it is a) child' is audibly more prominent than the first long vowel, *oo*. However, the image demonstrates that pitch and intensity contours are virtually identical for both vowels; the non-prominent vowel has the same pitch and intensity as the prominent vowel. Taylor's theory predicts this word would have a monotonous pitch with greater intensity at the prominent vowel. The first and second vowel demonstrate a monotonous quality, though this is not the case for the entire word (last syllable falls to very low pitch), and the predicted change in intensity is not evidenced in this image. Neither Van Der Mark's (2003) nor Taylor's (1969) theory sufficiently describes what is heard. In spite of the disparity between Van Der Mark's final conclusions and a waveform such as that presented above[13] where pitch (and intensity) is a negligible factor, no discussion is provided for words of this type.

One probable explanation for the insignificant pitch contour in Figure5 is neutralization by phrasal intonation, as remarked by Frantz (see above). As utterances typically demonstrate a decrease in pitch throughout the phrase, pitch and intonation

[13] Note that *pookááwa*, 'child' is an elicited form used in Van Der Mark (2003). However, the image is created from elicitations obtained in the present research.

are continually in conflict. It is for this reason that intonation must be acknowledged separately from pitch. Were there no PA on the second long vowel of the word, the pitch contour would presumably be much lower than what is displayed in Figure5. Therefore, although no considerable pitch contour is formed at the location of PA heard in the word, the fact that pitch does not drop significantly near the end of the word indicates that PA is present, as predicted by Van Der Mark.

Despite significant counterarguments to Taylor's theory, and inconsistencies found throughout his argumentation, impressionistic evidence does not allow for Taylor's findings to be dismissed completely (Darin Howe, p.c.). However, only on occasion does the behaviour of Blackfoot words coincide with Taylor's theory. Therefore, since it does not elucidate our understanding of prominence in Blackfoot, his theory will be momentarily set aside.

Blackfoot data supports Van Der Mark's overall conclusions, which should be valued for their contribution of interpreting one half of the puzzle - the phonetics - of Blackfoot prominence. Turning now to the phonology of Blackfoot prominence, Kaneko's (1999) research analysing PA in compound nominals is explored.

4.2.3 Blackfoot Nominal Compounds

Kaneko (1999) investigates one component in Blackfoot prominence: accent patterns in nominal compounds. Under an optimality theory (OT) framework[14], she claims that accent patterns of nominal compounds can be accounted for under one ranking of constraints, even though she notes PA is assigned both lexically, and predictably through rules. Kaneko claims that based on the accent of each member of

[14] For a description of Optimality Theory, see Prince and Smolensky (1993).

the compound (accented, or unaccented), and the status of each member in the compound (free, or bound), one of four accent patterns emerges. She concludes (1999:ii) "the leftmost accent of the compound member is retained, but the accent shifts to the juncture of them if it is word-final. If compound members are unaccented, the accent is assigned to word-final position by default." The table below represents Kaneko's claims about Blackfoot nominal compounds.

FIRST MEMBER OF COMPOUND	SECOND MEMBER OF COMPOUND	RESULTANT ACCENT PATTERN OF COMPOUND
Accented	Accented/ Unaccented	- First member retains accent
No accent	Non-final accent	- Accent remains as-is on second member
No accent	Word-final accent	- Accent shifts to juncture
Accented	Accented	- Accent defaults to word-final position

Table 9: Summary of Kaneko's (1999) PA Patterns in Blackfoot Nominal Compounds

Kaneko's ultimate result – an OT analysis using a set of constraints ranked identically for all types of compounds – is founded on the analysis of accent patterns in Blackfoot. These generalizations establish the constraints for her OT analysis and therefore she dedicates much effort to their description. Kaneko's generalizations and resulting constraints are presented in the table below. I have added 'counterarguments,' and 'counterexamples', to be discussed in detail below.

GENERALIZATIONS: BARE AND RELATIONAL NOUNS	RESULTANT CONSTRAINT	COUNTERARGUMENTS	COUNTEREXAMPLES
All nouns exhibit one and only one pitch peak.	*CULMINATIVITY*	- Frequent occasions with multiple PAs or lack of PA.	- Numerous examples found throughout this thesis.
If a noun has a heavy syllable (CVV and CVC), it bears a pitch peak.	*WEIGHT-TO-STRESS PRINCIPLE* - If there is a heavy syllable in a word, then it must be stressed.	- Inconsistent interaction between syllable weight and PA. - May be active component of grammar, but not to the degree that heavy syllables attract accent more than occasionally.	*ótook* 'kidney'
If a heavy syllable is VV (long vowel or diphthong), the pitch is realized on the first, second, or both morae.	No Constraint Required - Deals with accentual variation of long vowels/diphthongs - Lexically encoded.	- Definitely no consistent correlation between long vowels and PA. - See comments above.	*aatánaaki* 'dig' *akópskaa* 'soup broth' *amoo* 'there' *amii* 'that'
If a noun contains more than one heavy syllable, a pitch peak appears on any heavy syllable.	*Faithfulness Constraints:* *MAX-IO [X]*: No deletion *DEP-IO [X]*: No insertion *ALIGN-L (σ, PrWd)* - The left edge of a stressed syllable coincides with the left edge of a prosodic word.	- No consistent correlation between heavy syllables and PA. - Syllable weight cannot be used to predict PA assignment.	*káksaakin* 'axe' *nínai'tawaaki* 'rooster' *áímóniisi* 'otter' *mo'ko* 'autumn (to fall)'
If a noun contains no heavy syllable, a pitch peak appears word-initially or word-finally.	*MAX-IO [X]* *DEP-IO [X]* *ALIGN-L (σ, PrWd)*	- Although there is possibly left stem-edge tendencies in Blackfoot, PA can fall anywhere in the word.	*apáki* 'wide' *matápi* 'person'

There is an accentual minimal pair in words containing a long vowel.	*MAX-IO [X]* *DEP-IO [X]* *ALIGN-L (σ, PrWd)*	- Minimal pairs are very infrequent and cannot be relied on to inform about PA. - See §6.1.3 for details.	*áka ~ aká* 'old' ~ 'many'
Generalizations: Compounds	**RESULTANT CONSTRAINT**	**COUNTERARGUMENTS**	**COUNTEREXAMPLES**
If the first compound member bears an accent, it is retained and becomes the accent of the compound.	Set of constraints: *PROS-FAITH-OO* *MAX-OO[PROM]* *DEP-OO[PROM]* *NO-FLOP-OO[PROM]* *ALIGN-L (σ, PrWd)*	- Most often PAs on both members are retained. - Unpredictable PA loss is also common.	*ómahkssksssíínaa*[15] ómahk + isksssíínaa 'big insect' *pisatsaapiiniowan* pisát + náápiiniiwan fancy + sugar 'candy'
If the first compound member does not bear an accent and the second member bears an accent except word-finally, the accent becomes the accent of the compound.	*PROS-FAITH-OO*	- PAs are not consistently predictable enough to form this generalization.	*áótahkáákayis* otahko + máókayis yellow – breast 'robin' *ksáwáwkaasi* ksiw + áwákaasii low.to.ground – deer 'spider'
If the first compound member does not bear an accent and the second compound member bears an accent on word-final position, the accent shifts to the juncture position.	Non-Finality and Anti-Faithfulness Constraints: *DEP-NONFIN* - Lexical accent must not fall on the word-final position.	- This does occur somewhat regularly. - However, far too many cases exist where multiple, absent, or 'misplaced' PAs defy this generalization.	*Mí'kiai'stoowa* mi'k + mai'stóó red – crow 'Red Crow (personal name)'

[15] Kaneko (1999:58) notes that speaker variation occurs for 'big'*omákh-*. She claims that when compounds are formed with 'big' as a member occasionally multiple PAs arise. However, multiple accents in compounds using 'big' are exceedingly common according to my native speaker elicitations, confirmed by examples found throughout Frantz and Russell's Dictionary, and should not be considered "variant" forms. Cases of "speaker variation" in Kaneko's research require reanalysis.

If neither the first compound member nor the second compound member bears an accent, the accent is assigned to the word-final syllable by default.	*DEP-NONFIN* *ALIGN-L (σ', Stem)*: - The left edge of an accented syllable coincide with the left edge of a stem where the accent originally belongs. *¬DEP-R*: - The syllable into which a default accent is inserted coincides with the right edge of a compound.	- PAs are not consistenly predictable enough to form this generalization. - It is doubtful that in the many cases where this is true, the compound is viewed as two individual words. More likely the word is viewed as one entity, *e.g. Siksiká* sik + ika[16] black + foot 'Blackfoot (people/nation)'	*sikohpóós* sik + ohpoos black – cat 'black cat' *síkohpoyii* sik + ohpoyii black – oil 'motor oil' *ksisísttomo'ki* ksis + isttsomo'kaan pointed – hat 'German'

Table 10: Kaneko's (1999) Generalizations of PA patterns in Blackfoot Bare & Relational Nouns and Nominal Compounds

Kaneko's description of accent in nominal compounds is a worthy addition to the literature on Blackfoot prominence since it accurately captures some generalization in compound data. However, there are equally as many, if not more, cases where her analysis fails to represent the nature of prominence. Problematic issues in her analysis are not minor enough to overlook; the reason for this is three-fold.

Firstly, many of Kaneko's generalizations are too strong and far-reaching. What she terms 'generalizations' only account for a fraction of the data, excluding great portions of the Blackfoot lexicon. In other words, her final OT analysis of Blackfoot does not adequately encompass the range of possibilities available to a Blackfoot speaker. For example, culminativity is demonstrated in some Blackfoot words, but there is no shortage of either simplex (*i.e.* bare) or complex (*i.e.* compound) nouns with multiple

[16] It is worth noting that just as *t* → *ts* / _ *i*, also *k* → *ks* / _ *i*. This is further evidence of [ks] as an affricate.

prominences per word. The same can be said for the delimitative function (edge-effects), and syllable weight. Violations of culminativity, edge-effects and syllable weight occur regularly enough to require more thorough investigation; omitting or ignoring these points produces a vacuous and incomplete analysis. Furthermore, the generalizations are even less consistent for simplex nouns, which form the basis for the constraints applying to compounds. Problematic and faulty foundations do not provide adequate support for derivative conclusions, as is the case for this analysis of compounds. Instead of clarifying the nature of prominence in Blackfoot compounds, Kaneko has raised a large number of questions regarding these why these generalizations fail to conform in such a vast number of cases.

Kaneko does acknowledge a few cases where PA principles are violated. Chapter six of her thesis is spent explaining why the violations are exceptional cases and conclusively dismissed. As noted, these violations are regular occurrences throughout the Blackfoot lexicon, and cannot be explained by arguments of idiosyncrasies, and vowel neutralization/alternation, performance phenomenon or secondary pitch, down-step (112-119). This discussion will be taken up again in §4.3 and §4.4 below.

The second main apprehension with Kaneko's research is concerned with the nature of compounds in Blackfoot. Compounding forms an extremely large majority of words in this language, raising the question of psychological reality of compounds to Blackfoot speakers. It is doubtful that every compound is analysed into its parts, including common words such as 'spider' (literally, a "low-to-ground-deer"), 'horse' ("elk-dog"), 'grape' ("almost bursting"), and 'car' ("starts-running-without-apparent-cause"). More likely, Blackfoot speakers assume the entire form as a unit. At some

point compounded words become synchronic elements of the language, conforming to rules of the Blackfoot system. This issue is never addressed in Kaneko's work, as pertinent as it appears to be to her final results. Moreover, the majority of compounds analyzed in her research are the most transparent type. Opaque forms, indicating a deeper integration of these words into the overall system (and hence psychological reality) are not address at all in her research.

Finally, implications of Kaneko's (1999) research are unclear. Her analysis does not account for all Blackfoot data. This questions the instructive value of her research. Kaneko's conclusions are not exclusive to Blackfoot or even PA systems, since they could have been reached in tone or stress languages. The main finding in her research is that prominence dissimilates when found adjacently, but this occurs across most systems. Nonetheless, dissimilation in compounds is not predictable in Blackfoot, indicating that issues at the heart of Blackfoot prominence have not been recognized.

The claims Kaneko is making are limited: they restrictively apply to compounds (restricted in that her claims do not apply to all data) and are not fully reflective of Blackfoot's PA system. Furthermore, in setting up the dichotomy between predictable accent, where generalizations listed in Table 10 are obeyed, and lexical accent, where generalizations are not obeyed, Kaneko has set herself up with a win-win situation. No matter how prominence behaves, it will fit into her analysis. If the accent patterns according to her generalizations, the accent is predictable, and proves her generalizations are correct. If accent does not pattern according to her generalizations, the accent is lexical. The purpose of Kaneko's generalizations is not readily clear, as is seen in the following statement, "when a word contains more than

one long vowel, the pitch peak appears on the leftmost long vowel in some words [*nää.maa* 'gun']... For other words, high pitch may appear on a non-leftmost long vowel [*aakíí* 'woman']..." (1999:41-2). This generalization simply states that the pitch peak will appear on a long vowel somewhere in the word. Observations such as these are not particularly insightful, and reasons for pointing them out as generalizations are unclear.

To conclude, Kaneko contributed worthy research to an underdeveloped and little understood topic in Blackfoot. However, in order for this research to significantly increase our understanding of prominence in Blackfoot, a wide range of factors including the intent of the research and implication for the large number of violations of her analysis need to be re-examined. The fundamental value of her research as it exists now is questionable, making only a small contribution to the understanding of Blackfoot's prominence system and PA assignment patterns in compounds. Elements of Kaneko's research will be analyzed again in Chapter 5, when the morphology of Blackfoot is investigated in detail. The analysis now turns to an examination of "well-behaved" data in Blackfoot, presumably the data upon which Kaneko based her thesis.

4.3 Pitch Accent in Blackfoot

Arguably the most important characteristic of PA languages according to traditional PA theory (Chapter 3) is culminativity. Recall that culminativity is a property of languages using prominence to make a syntagmatic, as opposed to a paradigmatic distinction within the word (or phrasal) domain. The phonological result of this characteristic is that one and only one prominence is marked per accent-bearing domain. As illustrated

below, this is the case for many words in Blackfoot, including bare nouns – both simplex, (25), and complex (26); pronouns, (27); possessed items, (28); and verbs, (29).

(25) imitáá
'dog'

(26) moápsspiinosa'tsis
'eye-glasses'

(27) niistó
'I' (1st sg)

(28) nitómitaamiksi
nit – ómitaa – iksi
1st poss – dog – pl
'my dogs'

(29) nítohpimmoka
nit – ohpimm – ok – a
1st – associate with – inv – 3rd
'she associated me with...'

As examples (28) and (29) demonstrate, when pre-stem elements are incorporated into the word, culminativity is maintained.

Just as words in Japanese can be distinguished based on PA alone (meaning they adhere to the traditional definition of PA), this too can be shown to occur in Blackfoot. The descriptive nature of Japanese PA is illustrated in example (20) above, from Beckman (1986:146), repeated here for convenience.

(30) a. káme 'turtle'
b. kamé 'jug'

Minimal pairs are very hard to come by in Blackfoot[17], however, examples (31) and (32)

[17] The reason why there are virtually no minimal pairs in Blackfoot is a very interesting question, in light of its importance in a PA language. This gap raises questions regarding the purpose and function of PA in Blackfoot. If prominence is not needed to distinguish between lexical items, then it appears to be superfluous in this language. This issue will be taken up in more detail in Chapter 6.

arguably illustrate that Blackfoot is demonstrating the descriptive function of PA, as seen in the Japanese examples.

(31) a. áka 'old/ belonging to a former time/ ancient'
b. aká 'many'

(32) a. ápssi 'arrow'
b. apssí 'white buffalo berry'

One other characteristic of PA systems tends to be satisfied in Blackfoot: the delimitative function. Recall that this feature of PA systems aids in signalling the boundary between lexical units, and that the closer to the edge PA falls, the more PA is "fulfil[ling] its linguistic function" (Hyman 1977a:41) as an indicator of unique lexical items. Numerous examples can be cited where PA falls near the left-edge of the item, as is exemplified by verbs – bare (33), or conjugated (35), and nouns – bare (37), possessed (34), pluralized (also complex) (36), or both (38).

(33) ʔ ómai'taki 'believe'

(34) ʔ otááhkioohksa'tsiimai 'his boat'

(35) ʔ ksíínitosstoksisi 'touch her face!'

(36) ʔ áíksistoomatokska'tsiiksi 'automobiles'

(37) ʔ ááhkioksaa'tsis 'boat'

(38) ʔ nóótsi'tsiiks 'my mittens'

Kaneko's (1999) exploration of nominal compounds (§4.2.3) attempts to provide further evidence of the delimitative function at work in Blackfoot. She argues that leftmost PA is retained in compounds where both members are specified for PA. Furthermore, on compounds where the first member lacks prominence, and the second member bears prominence, PA moves to the juncture of the compound. Both of Kaneko's cases illustrate the delimitative function of PA at work in Blackfoot because edge-effects, a prototypical trait of PA systems, are obeyed.

Despite these compelling data suggesting Blackfoot is a PA system, above examples do not tell the whole story. In fact, impressionistically, it appears that 'well-behaved' Blackfoot data is not typical, and so-called 'misbehaved' data is more prevalent.

4.4 MISBEHAVING IN BLACKFOOT

Despite evidence presented above supporting Kaneko's claim of culminativity, this most important trait of PA systems is very frequently contravened in Blackfoot. Many words appear with multiple PAs, illustrated below in (39a), and (39b).

(39) *áímmóniisi* 'otter'

a. ómahkáímmóniisiiksi
ómahk – áímmóniisi – iksi
big – otter – pl
'big otters'

assaak 'stop and VERB for a moment'

b. ássáaksika'yáakáó'piita!
assaak – ika' – yáak – áó'piit – a
stop – for now – fut – sit – 3rd sg?
'stop and sit just for a moment'

In many cases no accentual unit exists within a prosodic word, (40a) and (40b). In fact, (40a) illustrates that PA has been lost, since PA was initially associated with the stem.

(40) *ánistsska'si* 'flaunt one's advantage; be pretentious

a. anistsska'sit
ánistsska'si – t
flaunt one's advantage – imp
'flaunt your advantage!'

ikkawatoo 'strike repeatedly with a pointed object, peck at, chip away at'

b. nitsikkawatoo'pa
nits – ikkawatoo – 'p – a
1st – strike at – theme – in.sng
'I struck at it'

A third example of culminativity violations in Blackfoot is concerned with placement of PA within the domain. Recall from Chapter 3, van der Hulst (1999) states that culminativity needs to be maintained, and further to this, accented syllables cannot be adjacent. Blackfoot examples commonly violate this limitation, as in (41a) - (41e).

(41) *áísátsaaki* 'carpenter, one who planes (e.g. wood)
sátsaaki 'shave, chip, or plane wood'

a. ᚹ áísátsaakiiksi
áísátsaaki – iksi
carpenter – pl
'carpenters'

ksiwáwákaasi 'spider'

b. ᚹ ómahksiksiwáwákaasiiksi
ómahk – ksiwáwákaasi – iksi
ómahk – ksiw – áwákaasii – iksi
big – low to ground – deer – pl
' big spiders'

ooyi 'eat'

c. ᚹ máátáaksoyiwaatsiksi
máát – áak – ooyi – waatsiksi
neg – fut – eat – 3rd sg nonaffirm
'he's not going to eat'

káksaakin 'axe'

d. ᚹ omahkohkáksáakiniksi
ómahk – oh – káksaakin – iksi
big – ? – axe – pl
'big axes'

sotám 'genuinely'

e. ᚹ sotámáwaasai'niwa
sotám – á – waasai'ni – wa
genuinely – dur – cry – 3rd sg
'she's really crying'

Examples in (41) illustrate that almost every type of segment in Blackfoot can intervene between adjacent syllables. This indicates that adjacent prominences are not

restricted by the intervening segment, and are found in a wide range of contexts in Blackfoot. The only exceptional segments not found separating adjacent accented vowels are long consonants [p:] and [m:], and marginal consonants, glottal stop, [ʔ], and velar fricative, [x]. It is not surprising that the latter consonants are not found intervening between adjacent prominences, since they are marginal in their limited distribution and overall unusual behaviour. The former two segments, however, are most likely accidental gaps. Nonetheless, the remaining segments available to Blackfoot are represented: (41a) illustrates an intervening fricative; (41b) illustrates an intervening glide; (41c) is a case where the intervening segment is a stop; (41d) shows an intervening affricate; and (41e) illustrates a nasal intervening adjacent accented vowels. These examples illustrate culminativity is often flouted in Blackfoot.

Moving on to the descriptive function of PA in Blackfoot, it is fair to claim that the example of minimal pairs in (31) and (32) is not representative of Blackfoot data. It has already been noted that minimal pairs in Blackfoot are extremely rare. Although a few cases of minimal pairs can be found, Blackfoot does not do justice to the descriptive function, as seen in other PA languages. Moreover, most of the examples of minimal pairs in Blackfoot are arguably the same word with a morpheme lexically-specified for PA indicating aspect, as illustrated in (42) and (43).

(42) ʔ ohpik**íí**paisstsimi'si
'to have pneumonia'

(43) ʔ ohpik**íʃ**paisstsimi
'to develop pneumonia'

Effectively, (42) and (43) are identical except for their prominence; contrastive segments are bolded for clarification. According to traditional PA theory, minimal pairs effectively illustrate a contrastive meaning difference and culminativity, a key

indicatory for PA systems. However, the distinction between (42) and (43) suggests PA is indicating an aspectual difference, via a morphological process, not a minimal pair.

As mentioned, examples (42) and (43) are marginal evidence of Blackfoot as a PA language. Ritter and Wiltschko (2004) claim that Blackfoot lacks tense[18] and would claim that these examples illustrate an aspectual distinction. Examples (42) and (43) exemplify this aspectual difference, and must therefore be eliminated as minimal pairs. In other words, they are not two distinct lexical items (as indicated in the dictionary), but the same word: one with aspectual marking, one without.

Frantz and Russell (1995) provide numerous examples of so-called 'alternate spellings', reproduced here as found in the Dictionary. Examples (44)-(47) are effectively the same as (42)-(43), and should not be regarded as minimal pairs. Native speaker consultations indicate that differences between the forms entail event completion.

(44) *saipstaahkaa* 'open one's own medicine pipe bundle'

nítssaipstaahkaa / nitsíísaipstaahkaa
nit(s) – saipstaahkaa / nit(s) – íí – saipstaahkaa
1st – open one's bundle / 1st – aspect? – open one's bundle
'I opened my bundle'

(45) *oksistsi'tomo* 'show appreciation to (about that which is being presented)'

nítoksistsí'tomooka / nitsííksisi'tomooka
nit – oksistsi'tomo – ok – a / nit(s) – íí – (o)ksistsi'tomo – ok – a
1st – show app. – inv – 3rd sg / 1st – aspect? – show app. – inv – 3rdsg
'she was interested in what I showed her'

[18] Ritter and Rosen (2003, 2004) argue that the tense node in Algonquian languages is 'defective'.

(46) ℘ *simatoo* 'drink' (verb)

nítssimatoo'pa / nitsíísimatoo'pa
nit(s) – simatoo – 'pa / nit(s) – íí – simatoo – 'pa
1st – drink – unspec obj[19] / 1st – past – drink – unspec obj
'I drank it'

(47) ℘ *sisowatoo* 'cut with a knife'

nítssisowatoohpa / nitsíísíowatoohpa
nit(s) – sisowatoo – hpa / nit(s) – íí – siowatoo – hpa
1st – cut – unspec obj / 1st – past – cut – unspec obj
'I cut it'

Although cases exemplifying the descriptive function may be found in Blackfoot, many cases purported as minimal pairs are not genuine examples. It is not unreasonable to conclude that the descriptive function is unsatisfactorily represented in Blackfoot data.

The delimitative function of PA is often respected in Blackfoot, again, this is not a rule. Also note 'Counterexamples' in Table 10, where much of Kaneko's analysis rests on the delimitative function of PA in Blackfoot. The following examples illustrate that, indeed, PA can fall anywhere in the word.

(48) ℘ aakííkowan
'girl'

(49) ℘ isttohkohkíítan
'pancake'

(50) ℘ nitsikáksaahkai
'she was lonesome for me'

(51) ℘ niistó
'I' (1st sg)

(52) ℘ ookakííkin?
'spine'

These examples illustrate that PA can fall on the second vowel of the word (48), the third vowel, (50), and (52), and even on the fourth vowel (49), or last vowel (51). Kaneko (1999), among others, would argue that these examples do not illustrate

[19] Unspecified object, according to Frantz (1991:41) is either an object that is "unspecified" or "non-particular."

violations of PA theory because in these cases, she would argue, PA is assigned lexically, and not based on any edge-effects. Besides the obvious circularity of the argument claiming that these are cases of lexically defined PA, these examples add to the many other problematic cases in Blackfoot. The many cases of 'irregular' data are converging evidence that Blackfoot is not the prominence system it is said to be. These examples illustrate that application of traditional PA theory is not straightforward or clear-cut in Blackfoot. Using the delimitative trait as a test for the prominence system of Blackfoot, like the other features, is inconclusive.

This section provides ample evidence that Blackfoot does not abide by PA characteristics. This does not suggest, however, that Blackfoot is a stress system. Van Der Mark (2003) presents phonetic evidence to that effect, and I can present ample phonological evidence as well. For example, Blackfoot does not alter the quality of unstressed vowels, seen in many other stress languages (like English, for example); culminativity is commonly violated; and most importantly, Blackfoot words do not form feet. There is no clear evidence of being able to build feet, nor is there evidence of a consistent foot shape, or a right- or left-headed tendency. Finally, Blackfoot examples demonstrate many cases of stress clash, and clear lack of quantity-sensitivity.

The appeal for Blackfoot as a PA language is diminished, based on this closer examination. Syllable weight may interact with PA in Blackfoot, but does so inconsistently, despite Frantz's (1991) and Kaneko's (1999) claim to the contrary, and characteristically, Blackfoot prominence can fall on either long or short vowels (*cf.* (48) and (50)). The data presented in this thesis cannot substantiate Frantz's or Kaneko's claim that syllable weight is an integral element in PA assignment, with heavy syllables

attracting prominence. Exceptions to PA characteristics are prevalent, and attempts to predict instances of multiple or absent primary prominence have not been successful. In some cases, reasons for these violations can be provided. As will be explored in subsequent chapters, prominence can be affected by phonotactics or morphology. Prior to completely dismissing Blackfoot as a PA system, a closer examination of Blackfoot morphology is in order. Considering the weight PA theory gives to culminativity, this examination explores the status of the Blackfoot word, and whether multiple or absent PA's can be explained morphologically.

Chapter 5

Blackfoot Morphology and Pitch Accent

Evidence presented to this point indicates Blackfoot does not fit the PA description, but since morphology may potentially manipulate the analysis of PA systems, a morphological analysis of Blackfoot is essential. A range of morphological correlates may interact with PA including morphological structure, status of morphological components (e.g. clitics or inflectional affixes), interface between morphology and phonology, and prosodic domains. Therefore, understanding the size, nature, and composition of a Blackfoot word is required for an analysis in keeping with PA theory.

The first section of this chapter provides background to the core argument claiming that agreement markers in Blackfoot are in fact clitics and as such, and thus potentially impact PA assignment. The second section (§5.2.1) analyses arguments involved in establishing that Blackfoot agreement is cliticization, and not affixation. Section 5.3 provides a secondary analysis completely external to the Algonquian debate, supporting the notion of cliticization, as opposed to affixation. Finally, §5.4 investigates implications of this finding on PA assignment in Blackfoot, concluding that the debate between affixation and cliticization is ultimately peripheral to Blackfoot PA assignment. Despite the overall nonessential nature of the cliticization debate, §5.5 explores derivative implications, including prominence domains in Blackfoot. Furthermore, it is shown that though the verbal agreement marker *cum* clitic does not affect assignment, it may affect location of PA in some situations in Blackfoot, indicating a misalignment between prosodic and morphological word.

5.1 Problems in Blackfoot Pitch Accent

Recall that Blackfoot contradicts traditional PA theory, for instance in its common violations of culminativity. Words appear with no prominence whatsoever, (53a), or with multiple accents, (53b).

(53) 👂 *anistsska'si* 'flaunt one's advantage; be pretentious

a. anistsska'sit
ánistsska'si – t
flaunt one's advantage – imperative
'flaunt your advantage!'

áímmóniisi 'otter'

b. ómahkáímmóniisiiksi
ómahk – áímmóniisii – iksi
big – otter – plural
'big otters'

Such examples indicate that if Blackfoot continues to be viewed as a PA language, some component of the PA analysis in Blackfoot is flawed. Possibly, traditional PA theory requires revisions to accommodate patterns in Blackfoot and other problematic languages (*cf.* Hyman 2001). Prior to proposing a shift in PA theory and confronting corresponding ramifications, a deeper investigation of Blackfoot is in order. The following section provides a more thorough exploration of Blackfoot morphology, in particular, the status of the word.

As a polysynthetic language, verbal or nominal complexes, as in (53a) and (53b), are formed by collating a number of individual elements. Fox and Frantz (1979), Jelinek (1984) and Déchaine (1999), among others, propose that certain agreement morphemes are pronominal clitics in Blackfoot. This is relevant to the claim that Blackfoot is a PA language because clitics, something between affixes and separate words, may be capable of carrying PA provided they fulfil phonotactic requirements (although they

would rather shun this responsibility). This would allow what is ostensibly one Blackfoot word to carry multiple accents, resolving the main conflict (culminativity) between Blackfoot and PA theory. This analysis does not completely resolve the conflict, since it does not account for simplex words with multiple PAs, such as the stem in (53b). Moreover, this proposal forcing a word to bear multiple PAs is theoretically unsatisfactory. Alderete (1999:19) notes "when a word is composed of more than one inherently accented morpheme, only one may realize its accent because accent is culminative."

This disappointing conclusion is not inconsequential since it feeds into the treatment of prominence domains in Blackfoot. Prominence tends to be restricted to elements attaching at the left-edge of a Blackfoot stem, with only one case of an prominent-bearing element attaching at the right edge. Despite the proclitic's ability to bear prominence, it is actually part of the prosodic word (PWd), not the morphological word (MWd), as its ability to carry PA suggests. Where left stem-edge elements bear PA, a misalignment between the MWd and the PWd is created.

5.1.1 Blackfoot Morphology

Blackfoot verbs are typically composed of an agreement marker, *nit-* '1st person', *kit-* '2nd person', or *ot-* '3rd person'[20] and a stem. Additional information, or adjuncts, including adverbials, question or negative markers, along with tense and aspect affixes can intervene between the agreement marker and stem.

[20] This affix only appears when 3rd person is acting on 4th person.

(54) nitáakahkayi (Frantz 1991:21)
nit – áak – ahkayi
1st – future – go home
'I'm going home'

Grammatical relations are not affixed to the verb according to function in the verb phrase; in other words, there is no set position for subject, object and indirect object affixes. Nevertheless, a template can be devised for Blackfoot verbs, (55), though individual agreement positions are not reserved for subject, object and indirect object. Agreement positions are filled by the winner of an animacy competition for each templatic position.

(55) AGR1 + tense/aspect + adjunct + STEM + direct/inverse + *-hp* + AGR2 + AGR3

There are up to three potential positions for agreement affixes: AGR1 and AGR2 are person agreement positions, and AGR3 is a number agreement position. Direct and inverse affixes mediate between the animacy hierarchy and grammatical relations, and the affix *-hp* signal actions between 1st and 2nd persons plural. The animacy competition, direct/inverse affixes, and *-hp* are not directly relevant to this discussion, and will be excluded from further consideration.

The verb complex in (56) is an example of how various positions of the template are filled. No particular AGR positions must be filled, as demonstrated by the absence of AGR3 in the example below. However, in order for a verb to be grammatical and interpretable, at least one AGR position must contain an affix.

(56) nitsíípohkisstoyooka (Frantz 1991:57)
AGR1 – aspect – STEM – direct/inverse – AGR2
nit – íí – pohkisstoyi – ook – wa
1st – aspect – shave – inverse – 3rd sg
'He shaved me'

Like verbs, nouns are inflected with various agreement markers, indicating number, animacy and possessivity. For the sake of this discussion, it is only necessary to note that possessed nouns are marked with the same person prefixes as verbs: *n(it)-* '1st person possessor', *k(it)-* '2nd person possessor' and *o(t)-* '3rd person possessor'. Example (57) is an instance of a 1st person possessed noun.

(57) nitómitaamiksi
nit – ómitaa – iksi
1st poss – dog – pl
'my dogs'

5.2 Verbal Agreement: Clitic or Inflectional Affix?

Since the beginning of contemporary Blackfoot research, the status of AGR1, 2 and 3 as inflectional affixes has been questioned. Fox and Frantz (1979) originally identified three situations wherein Blackfoot suffixes unexpectedly change shape according to their position in the phrase. They conclude that the suffixes are not inflectional affixes but clitic pronouns in complementary distribution with agreement markers.

Based on the study of non-configurational languages, Jelinek (1984) proposes agreement markers in these languages are clitic pronouns serving as verbal arguments. Overt nominals, she claims, are simply adjuncts with non-argumentative functions, and for this reason non-configurational languages permit free word order. Déchaine (1999) more recently provides morphosyntactic evidence supporting pronouns as separate DPs, and inflectional affixes in Algonquian verbs are clitic-agreement positions.

An overview of the literature on clitics and affixes in non-configurational and Algonquian languages is provided below, supplemented by a description of independent tests to identify clitics versus affixes, developed by Zwicky and Pullum (1983). Their tests will be applied to determine the best fit for Blackfoot morphology.

5.2.1 Agreement by Cliticization

Fox and Frantz (1979) observe that inflectional suffixes in Blackfoot are shorter when the nominal with which they agree follows the verb, as shown in (58) and (59)[21].

(58) Nóko'sikisi áyo'kaayaawa (Fox and Frantz 1979:152)
nóko'sikisi áyo'kaa – **yaawa**
my kids sleep – **3rd pl**
'My kids are sleeping'

When 'my kids' precedes the verb 'sleep' (58), the suffix has a longer form, *-yaawa* than when 'my kids' follows the verb, 'sleep' in (59)[22], *-yi*.

(59) Áyo'kaayi nóko'sikisi
áyo'kaa – **yi** nóko'siksi
sleep – **3rd pl** my kids
'My kids are sleeping'

A second instance of unexpected change in the suffix noted by Fox and Frantz occurs when direct objects are expressed via overt noun phrases. The number of the direct object only appears on the verb when the direct object is not expressed as an overt noun phrase. In example (60), the direct object, 'your kids' appears as an overt noun phrase. The only number "agreement" on the verb is that of the subject, 'my son'; there is no plural affix on the verb indicating agreement with the direct object.

(60) Nohk'ówa iinoyííwa kóko'siksi
nohk'ówa iinoyíí – wa kóko'siksi
my son saw – 3rd sg your kids
'My son saw your kids'

In (61), instead of the overt noun phrase, 'your kids', only the number of the direct object is marked directly on the verb. In this situation, they observe that both singular number triggered by the subject 'my son', and plural number of the non-overt direct object is present on the verb.

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[21] Morphological decompositions will only be provided when relevant.
[22] Unless otherwise noted, all Fox and Frantz (1979) examples are from page 152.

(61) Nohkówa iinoyííwaiksi
nohkówa iinoyíí – wa – **iksi**.
my son saw – 3rd sg – **3rd pl**
'My son saw them'

A third and final example of suffix shape change provided by Fox and Frantz occurs with 3rd person nominals. This situation is similar to that described above, where non-overt terms are reflected in the number "agreement" found on the verb. In example (62), no number marking corresponds to the overt noun 'rabbits'.

(62) Nitsítapsskonaki omíksi áattsistaiksi
nits – ítap – sskonaki omíksi áattsistaiksi
1st – toward – shot (IT) those rabbits
'I shot toward those rabbits'

However, number "agreement" can be found on the verb reflecting what Fox and Frantz call "non-terms," or items in the phrase which are neither subject nor object. There is no overt phrase for *rabbits* in (63), yet their plurality is overtly marked. Fox and Frantz claim that this type of number marking only surfaces on the verb when no overt noun phrase is found in the clause for the "non-terms."

(63) Nitsítapsskonakiaawa
nits – ítap – sskonaki – **aawa**
1st – toward – shot (IT) – **3rd pl**
'I shot toward them'

They argue that suffixes behave unusually and change their shape because they are not merely verb agreement affixes, but pronominal suffixes. Recall from (55) that AGR3 is the position under discussion. Their claim, therefore, is that certain affixes in AGR3 are not agreement suffixes, but enclitics. Fox and Frantz defend this claim by providing a series of independent tests, indicating whether an item is indeed a pronoun. One key argument is the complementary distribution of "agreement" suffixes and pronominals. The full forms of the suffixes, *-(y)aawa* and *–iksi*, appear only if the nominal triggering

agreement is not in post-verbal position. Otherwise, the more typical short forms, *-yi* and *-wa*, surface on the verb. Fox and Frantz claim that longer suffixal forms are pronominals because complementary distribution is found with pronouns but not verb agreement. Agreement, they argue, is generally not affected by location or presence of the nominal triggering agreement. Since these "agreement" suffixes are indeed affected by both location and presence of the triggering nominal, the longer forms must be pronominals. Accordingly, pronouns replace nominal constituents, and in fact (62) and (63) demonstrate that 'rabbits' and the longer suffix *-(y)aawa* do not co-occur in the same phrase. Since longer suffixal forms never co-occur with the triggering nominal constituents, they conclude that these are pronominals.

Further confirmation Fox and Frantz provide to support particular suffixes as pronominals entails relative ordering of pronouns and full noun phrases. Precedence constraints between the special "suffixes" and the full noun indicate that these "suffixes" are pronominals. It is not necessary to cover the full extent of their argument; however, it is useful to recount Fox and Frantz's claim that a pronoun in the main clause may not precede its controller in the subordinate clause. This constraint is obeyed by the affix, indicating that the special "suffixes" are enclitics, not simply agreement affixes.

Finally, Fox and Frantz claim that the "suffixes" in question remain the same throughout all of the many orders and modes of Blackfoot verbs. This, they claim, is conclusive proof that longer "suffixes" are enclitics.

A number of issues arise from Fox and Frantz's analysis. As it stands, the discussion concerning the special affixes as enclitics is incomplete. There is no systematic

explanation for why some affixes in AGR3 are pronominal enclitics, such as *-(y)aawa*, while others like *-wa,* are simply agreement. A core argument supporting this claim is that the longer suffixal form and overt noun phrases do not co-occur. For the most part, this reasoning is convincing. Taking (60) and (61) for instance, the overt subject, 'my son' and *-wa* co-occur in the phrase, indicating that *-wa* is agreement while 'your kids' and *-iksi* never co-occur, suggesting that *-iksi* is a sort of pronominal enclitic, replacing 'your kids'. However, this does not account for the first case they present in (58) and (59), repeated here for convenience as (64) and (65). Not only do both the overt noun phrase and the long suffix *cum* enclitic co-occur, but the full noun phrase actually precedes the verb with the special suffix. Presumably, the special suffix supplements the information in the phrase in order to be more fully understood by the listener. However, if the special suffix follows the already-indicated full triggering nominal, the purpose for the special suffix is obscured.

(64) Nóko'sikisi áyo'kaayaawa
nóko'sikisi áyo'kaa – **yaawa**
my kids sleep – **3rd pl**
'My kids are sleeping'

(65) Áyo'kaayi nóko'sikisi
áyo'kaa – **yi** nóko'siksi
sleep – **3rd pl** my kids
'My kids are sleeping'

Finally, significance of a consistent shape of the special suffix throughout all modes and orders is unclear. This consistency supports the argument that these elements are pronominals, but not necessarily their clitic status. We will return to this issue in §5.3 using independent evidence to compare and juxtapose inflectional affixes and clitics.

Along the same lines as Fox and Frantz, Jelinek (1984) syntactically argues that

verbal agreement affixes may be pronominal clitics in non-configurational languages. Jelinek describes the role clitics assume in finer detail but with a more global approach than Fox and Frantz; clitics, she claims mark both grammatical relations and case. She also describes the clitic's role within the larger phrase. Akin to "non-terms" in Blackfoot as seen in example (63), Jelinek (1984:42) notes that in Warlpiri [Australia] sentences "there may be no nominal corresponding to a particular argument."

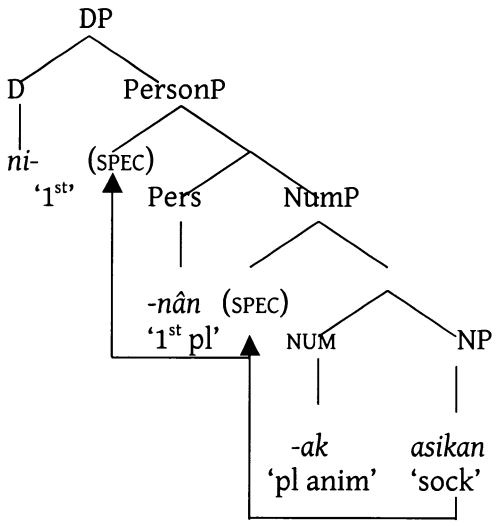
Jelinek claims that agreement items *cum* pronominal clitics mark not only grammatical relations, but case as well. Furthermore, she states that these agreement morphemes are clitic pronouns serving as verbal arguments. Accordingly, nominals never occupy argument position and clitic pronouns "do not constitute agreement with a nominal" (44). Nominals, then, are simply adjuncts and have non-argument functions within the phrase. This gives rise to one of the properties of non-configurational languages: free word order. Nominals, once posited as adjuncts, have nothing to bind them to a fixed word order; clitic pronouns, conversely, fall in fixed positions on the verb. In Blackfoot, clitic pronouns fall into a set template dictated by the animacy hierarchy, in (55). Jelinek's proposal then encompasses all agreement positions, AGR1, AGR2, and AGR3 in Blackfoot, as opposed to Fox and Frantz's proposal concerning only specific AGR3 suffixes. Jelinek's proposal is appealing since splitting person and number markers into two types – affixes and clitics – as suggested Fox and Frantz, is an undesirable inconsistency to force on an otherwise united group of elements.

Jelinek states that phrases with overt pronouns are marked, indicating emphasis. This appears to be the case for Blackfoot, and has been affirmed by Frantz (1991:21), though I have not been able to confirm this in my native-speaker elicitations.

Determining whether an overt pronoun is an option or a necessity is crucially important: if the absence of the overt pronoun is unacceptable, there are serious consequences for Jelinek's wide-reaching claim that all AGR positions are clitics.

Déchaine (1999) also argues, this time for Algonquian languages generally, that agreement prefixes and suffixes are actually proclitics and enclitics. She makes the widest claim yet – that cliticization applies to agreement prefixes and suffixes, both nominal and verbal, along with other pre-stem elements. Working within Government and Binding syntax, Déchaine (1999:44) argues that the stem is phrasal because it undergoes Spec-to-Spec movement, motivated by the structure in (66) for 'our socks', *nitasikaninânak*, in Plains Cree, along with other evidence from possessors in Cree[23].

(66)



Déchaine claims (46) "that the constituent which bears agreement is phrasal and moves Spec-to-Spec entail[ing] that agreement is by cliticization." This statement is widely accepted for Algonquian and is supported by the other research presented throughout this chapter. Further to this claim, Déchaine states that since "attachment of bound

[23] For further details, refer to Déchaine (1999) directly.

morphemes is syntactic," this predicts 1) that all pre-stem elements are proclitics, and 2) that some suffixes attach by encliticization, while others are affixal. While the latter statement is in line with Fox and Frantz's (1979) proposal reviewed above, the former statement is debatable, but let us first turn to Déchaine's analysis of agreement morphemes as clitics.

Arguing within the principles of a syntactic model, Déchaine poses the risk of theory-specific reasoning. Nevertheless, most of her syntactic arguments are supported by non-syntactic evidence, deflecting inherent dangers of a purely syntactic analysis. For example, phonological data is used to support the syntactic prediction that "suffixes" are not part of the stem and are instead a separate clitic-like entity. She argues that "suffixes" are not morphemes affixed to the stem, but enclitics, because they are commonly excluded from phonological rules. In Blackfoot, for example, epenthetic *i* is inserted between V(owel) and *s*, unless *s* is part of the suffix. The phonological rule originally stated by Frantz is presented in (67).

(67) ø → i / V(') + _s, where s is not part of a suffix (Frantz 1991:89, 152)

(68) Isskáí'soka'piiwa (Frantz 1991:92)
sska' – sok – a'pii – wa
extra – good – be – inanim sg
'It's extraordinarily good'

(69) Áánistsisa ikkámáakaistoosi (Frantz 1991:139)
waanit – is ikkám – áak – waistoo – si
way – 2nd sg:3rd imp if – fut – come – 3rd subjunc
'Ask him if he will come'

(70) *ikkámáakaistooisi

In (68), the rule applies between "prefix" and stem, since epenthetic *i* is inserted when the V(owel), *á*, is adjacent to *s*. Surprisingly, this rule does not apply in (69);

epenthetic *i* is not inserted between the last segment of the stem, *o*, and the first segment of the 'suffix', even though the environment is present for the rule to apply. When *i* is inserted, as in (70), the form is ungrammatical, according to Déchaine.

This phonological evidence presented by Déchaine, corroborates the syntactic claim that the suffix is a different entity from the stem, allowing for a boundary to be identified between them; Déchaine also provides evidence for a division between "prefix" and stem in Plains Cree. The discussion will return to boundaries and domains below (§5.5), since the interface between morphology and phonology can be detected at boundaries like the one explored above in (67).

The prediction Déchaine claims arises from her arguments of agreement by cliticization is that other pre-stem elements must also be clitic-like. She claims evidence for this claims comes from the "many adverbial modifiers occurr[ing] in doublets." Reduced forms of the doublets appear as the pre-stem element, while full forms appear as unique elements outside the verb complex, indicating these pre-stem elements are clitics as well. Doublets can be found for a portion of the adjuncts I analysed based on Frantz's (1991:84-98) list. In total, 24 pre-stem elements were investigated: 15 items did not have longer counterparts, seven did have counterparts, while two items were inconclusive. These numbers for Blackfoot align somewhat with Déchaine's claim. Though not forming a considerable segment of the research in this thesis (interesting future research), I do propose an alternate image of these elements based on the interaction of prominence with these elements, beginning in §5.4.

Early work on this cliticization debate by Fox and Frantz (1979) fails to discuss all agreement morphemes in the Blackfoot verb, but concludes that only certain suffixes

are pronominal, a statement apparently (weakly) supported by Déchaine (1999). Evidence supporting Fox and Frantz's claim comes from the complementary distribution of certain pronominals and full noun phrases. Jelinek (1984), on the other hand, would claim that agreement positions in Blackfoot, AGR1, 2 and 3, are clitics based on her research on non-configurational languages. Déchaine proposes AGR positions in Algonquian are filled by clitics, not affixes, although she suggests AGR3 is split into clitic elements and affixes, along the lines of Fox and Frantz's proposal. As well, Déchaine extends the analysis of agreement elements as clitics to all pre-stem elements.

5.3 AFFIX OR CLITIC: A SECONDARY TEST

The analyses discussed to this point have been driven by data from individual languages. Although both Jelinek and Déchaine's works encompass a larger scope (Jelinek investigated of non-configurational languages while Déchaine worked within the Algonquian family, extrapolating to polysynthetic languages) the analyses are data-driven. Zwicky and Pullum (1983) offer a series of independent tests aimed at distinguishing clitics from affixes. This approach is designed to aid the "diagnosis" of clitics Zwicky and Pullum analogize, in a language-free context.

These tests risk being somewhat circular, if not inconclusive: a false conclusion may be drawn in favour of the popular position when test results are not clear-cut. Zwicky (1985:285) warns that the tests are far from definitive, and that they simply point to "characteristic *symptoms* of a linguistic state of affairs, not to invariant concomitants of it" [emphasis his]. As a secondary, external testing-method, these tests will simply confirm or contest the conclusions from §5.2.1 above. Only particular tests out of the six developed by Zwicky and Pullum (1983) apply to Blackfoot, presented and discussed

below, beginning with (71).

(71) *Clitics can exhibit a low degree of selection with respect to their hosts, while affixes exhibit a high degree of selection with respect to their stems.*
(Zwicky and Pullum: 1983, 503)

According to the Dictionary (1995:xv) the following morphological types (or word-classes) are listed: nouns, verbs, uninflected (e.g., exclamations), adjuncts, medials (noun roots which must be incorporated into a verb as a noun or suffix), finals (suffixes which must attach to other verb roots or stems), verb roots, demonstratives, and pronouns. Using agreement "prefixes" as a representative sample for the group of agreement affixes, only five morphological types are relevant to the test presented in (71). Verb roots, adjuncts, medials, and finals all attach to another morphological type before becoming functional, excluding them from the test. Moreover, Frantz explicitly remarks that "uninflecteds" do not take any affixes associated with nouns or verbs. Of the remaining group, nouns, verbs, pronouns, and demonstratives, three of the four select *nit-*, *kit-*, *ot-*. Demonstratives are the only type that do not select the prefixes, and may be inflected with only nominal inflections (e.g., animacy). Examples (72)-(74) illustrate compatibility of *nit-*, *kit-*, and *ot-* with nouns, verbs, and pronouns, respectively. (72) and (73) are examples repeated from above. According to test (71), the 'prefixes' are clitics and not inflection.

(72) nitómitaamiksi
nit – ómitaa – iksi
1st poss – dog – pl
'my dogs'

(73) nitáakahkayi
nit – áak – ahkayi
1st – future – go home
'I'm going home'

(74) niisto[24]
n – iisto
1st – pronom. base
'I'

Test (71) is an example where previous research (surveyed in §5.2.1) may influence the conclusion. Results from test (71) are at best 75% in favour of declaring the

[24] *n-* is the shortened form of *nit-*.

elements a clitic. The problem with this test is that there is no threshold beyond which enough categories combine with the element to definitively conclude the element is in fact a clitic. With such a limited number of morphological types, the "affixes" appear to attach indiscriminately. On the other hand, a closed class like demonstratives does not typically inflect (particularly for person); therefore its exclusion from the group is not surprising, supporting the decision to declare the element a clitic based on this test.

(75) *Arbitrary gaps in the set of combinations are more characteristic of affixed words than of clitic groups.*

(Zwicky and Pullum: 1983, 504)

Zwicky and Pullum suggest clitics attach more indiscriminately than affixes. Illustrating the more arbitrary behaviour of affixes according to test (75), take for example English plurals. A series of nouns with no plural distinct from the singular can be identified along with nouns with plural markers other than –s: *deer, sheep, fish*, and *oxen, children,* respectively. In Blackfoot, this is not at all the case. Markers *nit-, kit-,* and *ot-* appear throughout nouns, verbs and pronouns, consistently and without arbitrary gaps. This suggests that these elements are clitics, and not affixes. This test is more conclusive than the first test presented above, since no threshold is required to determine the consistency with which *nit-, kit-,* and *ot-* apply.

At least one more morpho-lexical test is available to Blackfoot. This test is also conclusive, since it is answerable by simply "yes" or "no", and requires no calculations.

(76) *Morphological idiosyncrasies are more characteristic of affixed words than of clitic groups.*

(Zwicky and Pullum: 1983, 504)

English plurals can be used again for this test to illustrate affixal behaviour; idiosyncrasies are rife in English plurals. Unexpected suffix *-en* indicates plural in some

words (*oxen* and *children*), internal morphophonological change is found in others (*teeth, geese* and *mice*). *Deer, sheep, fish*, encountered above, do not change their form in order to indicate plural. This illustrates the variable behaviour found with affixes. Idiosyncratic behaviour is absent from Blackfoot 'agreement prefixes'; their form is always consistent, confirming that they are likely clitics, and not inflectional affixes.

Of the three tests focussing on morpho-lexical features, and despite wavering reliability of test (71), evidence from each points to the same conclusion. Tests for "clitic-hood" described by Zwicky and Pullum, combined with the variety of arguments presented by Fox and Frantz (1979), Jelinek (1984) and Déchaine (1999), suggest that person and number inflection is marked via cliticization in Blackfoot. A synopsis of the generalizations drawn from this portion of the analysis is presented in (77).

(77) *Generalizations and Conclusions*

a. Blackfoot words are composed of a stem and clitics carrying person and number agreement information.

b. The stem is divisible from the clitics, recognizable by phonological rules, which apply only stem-internally. Recognizing this division is valuable since it permits identification of domains within the word.

c. The net effect of the stem and the combination of clitics, Déchaine explains, is the derivation of complex words. If Blackfoot words are only composed of a stem plus inflectional affixes, words with multiple PAs become problematic and puzzling. However, supposing clitics have sufficient phonological constituency, clitics may bear pitch, explaining why many words have multiple PAs.

5.4 Clitics and Pitch Accent

For the time being, let us assume Déchaine's claim that all pre-stem elements in Algonquian are clitics is acceptable. Clitics are capable of carrying PA, and Blackfoot words behave unusually with respect to PA, therefore the relationship between PA and

clitics is worth investigating. Recall, however, that multiply accented words are not readily accepted in current prosodic theory. Alderete (1999:19) states "... in multiply accented lexical forms, the mapping from input to output may be viewed as a type of competition for a unique surface accent." Furthermore, if a special secondary PA-bearing responsibility should be permitted in Blackfoot, this would only helpful under certain conditions, signifying an extremely limited relationship, as delineated below.

Déchaine claims that all pre-stem elements, not just person and number agreement, are clitics. A number of these clitics have lexically specified PA, such as the future, *áak*, the durative, *á*, the negative, *máát-*, along with adjuncts such as 'try', *ssáak-*, and 'big', *omáhk-*. Therefore, a word with multiple PAs can be formed by combining a stem with pre-stem clitics carrying lexically-specified PA.

(78) *ssáak-* 'try'
áak- 'future'

nit**áaksssáak**ohka'po'taki
nit – áak – ssáak – ohk – a'po'taki
1st – fut – try – find – work
'I will try to find work'

(79) *áak-* 'future'
á'pohp'áttski 'cause displacement by jarring or bumping'

áaka'pohpáttskima
áak – á'popáttski – m – a
fut – cause displacement – tr.an.final – in.sg
'she will bump it out of place'

(80) *máát-* 'negative'
á'pohp'áttski 'cause displacement by jarring or bumping'

máátakohkottá'pohpáttskimaatsiksi
máát – akohkott – á'pohpáttski – m – aatsiksi
neg – able to – cause displacement – tr.an.final – nonaffirm
'he can't budge it'

(81) 👂 *ksisáíki'taan* 'arrowhead'
ómahk- 'big, old'

ómahksiksisáíki'taanisiti
ómahk – (si)ksisáíki'taan – isiti
big – arrowhead – pl
'arrowheads'

In all of these examples, clitics provide additional PAs, regardless of whether the stem is lexically-specified for PA or not. Though the stem bears no prominence in (78), the combination of *ssáak-* 'try' and *áák-*, 'future' creates an item with multiple PAs. Where the stem does bear prominence (79)-(81) additional clitics specified for PA also form a word-complex with multiple PAs. Therefore, in Blackfoot PA assignment, where an element is composed of stems and clitics and more than one element is lexically-specificed for PA, multiple PAs arise.

This discussion is particularly relevant to Kaneko's (1999) research, reviewed in the previous chapter. Her core argument, that nominal compounds consistently comply with culminativity, can be rejected based on results in this chapter. Formation of compounds (nominal, or verbal complexes) is the most likely environment to find multiple PAs, since elements pre-specified for PA typically combine with their PA intact, contrary to her core argument. Occasions of compounds with multiple PAs are supported by data presented throughout this thesis, and from Frantz (1991:90-1).

(82) 👂 *aapánii* 'butterfly'
aakíí 'woman'

aapániáakiiwa
aapánii – aakíí – wa
butterfly – woman – 3sg
'butterfly-woman'

Both compound members in (82) are specified for PA. As predicted by Kaneko, there is movement of the PA toward the juncture. However, quite opposite to Kaneko's

prediction, both accents remain in the final compound. Another counterexample is in (81). Although the stem is already a compound itself – notably a compound with only one PA – using this stem as the base for a new compound forms an item where culminativity is violated, and multiple PAs surface. This suggests that these counterexamples form the basis for a counterargument to Kaneko's proposals, since elements incorporated into the compound are more important to the final PA patterns of the compound than Kaneko predicts.

Although morphological analysis explains many cases of multiple PAs in Blackfoot, other cases are not so clear. In fact, decomposing Blackfoot words into their morphological parts does not provide direct insight into PA assignment for two reasons. First, multiple accents occur in simplex (not compound) words. In these cases, occurrence of multiple PAs is formed regardless of morphology (clitics or compound members). This is demonstrated by (83), repeated from (53b) above.

(83) 👂 *áímmóniisi* 'otter'

ómahkáímmóniisiiksi
ómahk – áímmóniisii – ksi
big – otter – plural
'big otters'

Although the clitic, *ómahk-*, 'big' is lexically-specified for PA, the stem is lexically-specified for two pitch-bearing units. Distinguishing the clitic as a distinct unit from the stem does not resolve the violation of culminativity. The word contains multiple accents, and the presence of PA on the clitic is insignificant. Although no significant research regarding the psychological nature of words in Blackfoot has been undertaken for this thesis, native speaker consultations suggest this word is not complex[25]. This

[25] And if it were complex from a historical viewpoint, I would argue that this is insignificant since native speaker intuitions indicate that synchronically, it is a simplex form.

simplex status eliminates any benefit from further morphological investigation. Moreover, recall from (53a) that words may appear with no PA at all, another violation of culminativity in PA theory. Identifying clitics and stems in Blackfoot morphology does not explain this complete lack of prominence.

The clitic/affix debate in Blackfoot morphology is not insightful for PA violations for a second reason: phonology can force pre-stem elements (be they clitics or not) to bear PA, though they are not lexically-specified to carry PA. Details of these cases are explored later in the chapter. In these cases, whether or not the pre-stem element is a clitic or affix does not matter, since it is the phonology that is forcing it to bear PA. Nonetheless, it is valuable to recognize the degree to which morphology is involved in PA assignment. Although its role is not crucial, it eliminates the possibility of morphological interference with the assignment of PA. This must be acknowledged before any credible assignment theory of a PA language is developed, since all elements affecting PA assignment must be accounted for. The conclusion that clitics are separate from the stem is also helpful information, permitting identification of the phonological and morphological word. This interface between the phonological and morphological word is relevant to the distribution of prominence as will be seen later. Indeed, all discoveries regarding the nature of Blackfoot words assist in determining and describing the pattern of PA assignment.

5.5 Domains in Blackfoot

Déchaine argues for a division between stems and clitics, where clitics include post-stem elements and all pre-stem elements. Recognizing these distinct items permits the identification of a boundary between stem (morphological word), and stem plus all

other morphemes (prosodic word). Recall that Déchaine (1999:46) provides only one argument suggestive of the clitic status of pre-stem elements: adverbial doublets. She argues that reduced forms of free-standing adverbials appear as pre-stem elements, indicating they are clitics and not affixes. For Blackfoot, I calculate that less than one third of adverbials fit Déchaine's doublet pattern, and I intend to argue against her claim. Person and number agreement markers behave differently than other pre-stem elements claimed to be clitics.

Déchaine argues that since phonological processes do not affect the suffix (example 67), these elements must be clitics, separate from the stem. This argument should be applicable to all clitic elements, not just those at the right-edge of the stem. However, phonological rules apply to pre-stem elements, just as in the stem. Using Déchaine's own example, repeated from (68) above, the rule applies to pre-stem elements, 'extra' and 'good', despite her claim that these elements must be clitics.

(84) ø → i / V(') + _s, where s is not part of a suffix (Frantz 1991:89, 152)

(85) Isskáí'soka'piiwa (Frantz 1991:92)
sska' – sok – a'pii – wa
extra – good – be – inanim sg
'It's extraordinarily good'

Unlike the suffix, which she argues is a clitic based on its rejection of the phonological rule, these elements undergo phonological change, contradicting her reasoning that all clitics must reject these (stem-affecting) rules, and behave similarly to the stem, indicating they are affixes. Furthermore, 'good' is a reduced adverbial, from the longer version, *soka'pii* 'be good', or *sokimmohsi* 'feel good/well', while 'extra' does not appear to have a full-adverbial counterpart. Since the rule applies across

these pre-stem elements, this calls into question the applicability of Déchaine's full-reduced adverbial argument to the clitic-affix argument.

The second argument against Déchaine's proposal that pre-stem elements are clitics is based on their interaction with prominence. Like the stem, pre-stem elements may be lexically-specified for prominence. Just as seen in the stem, prominence on non-agreement pre-stem items may delete or move around within the word. Although some pre-stem items, such as the future *áak* and durative *á* appear to be very stable, they may lose their prominence when combined with other elements in a word. Pre-stem clitic agreement, on the other hand, is never lexically-specified for prominence, and may only bear prominence in very restricted cases where the phonology forces it to do so, discussed in detail in below. This reluctance to bear prominence is in keeping with expected clitic behaviour discussed above; when phonotactically capable, clitics may bear prominence but only under highly irregular circumstances. In fact, viewing only AGR elements as clitics permits a series of generalizations to be made. These clitics never bear prominence except under duress, and the only case where prominence is lexically-specified on a (agreement) clitic is with the singular "distinct third person" pronoun (DTP) (see Frantz 1991:48-50), bolded below in (86).

(86) Otsáápioyisi ksikksináttsiw**áyi** (Frantz 1991:48)
ot – iáápioyis – yi ksikksinattsi – wa – **áyi**
3rd poss – house – in.sg white – in.sn – 3rd sg.DTP
'His house is white'

This is not detrimental to the claim that only agreement markers are clitics, however, since prominence on this item is exceptionally stable. Unlike the stem and other pre-stem elements where prominence moves about actively, these clitics behave in a very particular manner with respect to prominence, which will be reviewed below.

Another argument countering Déchaine's claim that all pre-stem elements are clitics concerns the regular past aspect marker *í*. Recall from examples (42)-(47), aspect marking may modify a vowel of the stem, making it in some way infixal. This behaviour is not clitic-like, hence supporting the claim that non-agreement pre-stem elements are affixal.

A final argument in favour of maintaining certain pre-stem items as affixes concerns their morphological behaviour. Person and number markers are always found in the same position of the verb, despite their role in the phrase. Other pre-stem elements, on the other hand, may switch position with each other, indicating that they must be in a (affixal) domain separate from the person marker. For example, negative is marked with five distinct forms occurring in complementary distribution in Blackfoot (see Frantz 1991:84f). However, these negative markers do not always occupy the same position of the word. Three negative markers, *máát-*, *kátá'-*, and *miin-*, always occur before aspect markers, such as future, *áak-* or durative, *á-*. The other two negative markers, *sta'-*, and *say-* always occur after aspect markers, including future, *áak-* and durative, *á-*. Person markers, on the other hand, always maintain the same position on the word. This is further evidence that clitic agreement markers are not the same entity as pre-stem elements, which can be considered affixal.

These arguments permit the identification of a boundary between the PWd and MWd; this time the boundary does not fall between the stem and all other elements in the word-complex as Déchaine suggests, but between the agreement markers, and the stem. This division can be represented iconically with the use of brackets as in (87).

(87) [AGR [pre-stem elements + stem(s)] AGR]

MWd

PWd

This division is important to prominence issues in Blackfoot, since it allows for differences in prominence behaviour found throughout the word to be explained. Prominence found outside the MWd is very stable; it is not lexically-specified to occur outside the MWd and on the only occasion that it is (on the singular distinct third person pronoun), prominence is never altered or deleted. Conversely, prominence within the MWd is subject to frequent deletions and alterations. This suggests that the core domain for prominence is within the MWd, and explains cases where prominence moves onto the proclitic. These cases illustrate a misalignment of MWd and PWd. Prominence is intended to fall within the MWd, but under certain phonologically definable conditions, the proclitic assumes a duty intended for elements within the MWd, and bears prominence. In these unusual cases, the PWd – not the MWd – is the domain for PA assignment. Although distinctions between MWd and PWd are not unusual, illustrated by Szpyra's (1989:226) evidence of Polish prefixes functioning unlike the stem and blocking certain phonological processes, misalignment between MWd and PWd is noteworthy. Kager and Zonneveld (1999) suggest that prosodic well-formedness tends to have priority over morphological well-formedness, occasionally resulting in the reanalysis of the MWd as the PWd. Hurch (1994:197-8) notes that accent variation may surface as a result of "interactions between segmental phonological operations with morphological formations." This is a case when

communication between phonology and morphology is required to ensure well-formed elements are produced.

The only environment where a proclitic is forced to bear prominence is where the syllable within the MWd intended to bear prominence cannot, due to its phonological deficiency. I have termed these syllables "deficient" because they are no longer true syllables capable of carrying prominence. In Blackfoot phonology, where C is an obstruent, /axC/, /oxC/ and /ixC/ are comparable to syllabic [x̩C], [x̩ʷC] and [ç̩C], respectively. Since these syllables no longer carry a true vowel in their nucleus, the inferior syllables are no longer capable of bearing prominence. The accent-bearing units, (*ahC, ohC, ihC)* can no longer act as a docking location, since the vowels are either devoiced, or deleted completely and simply realized as fricatives. The following examples, with waveforms included, illustrate this spirantization.

(88) isttohkihtsít
i ˈstx̩ʷkç̩tsíˈt
'lie down!'

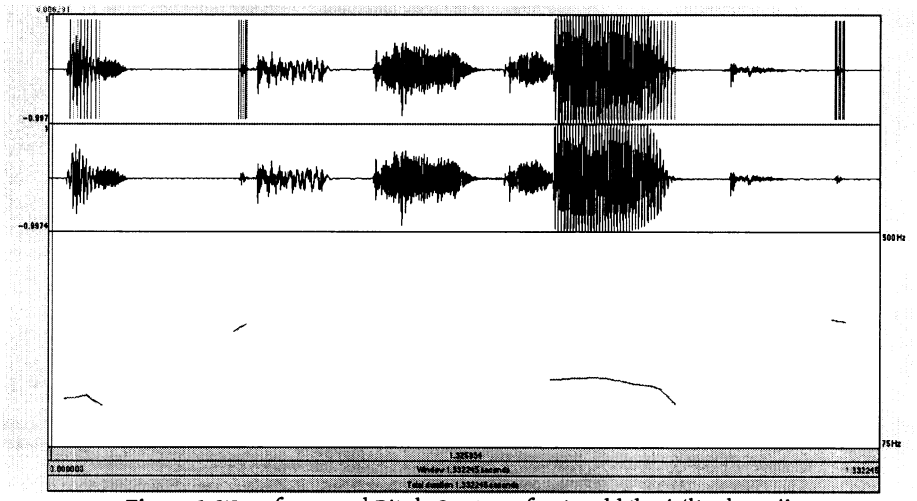


Figure6: Waveform and Pitch Contour for *isttohkihtsít* 'lie down!'

(89) 👂 áwahka
á˙w(ạ)xka
'play'

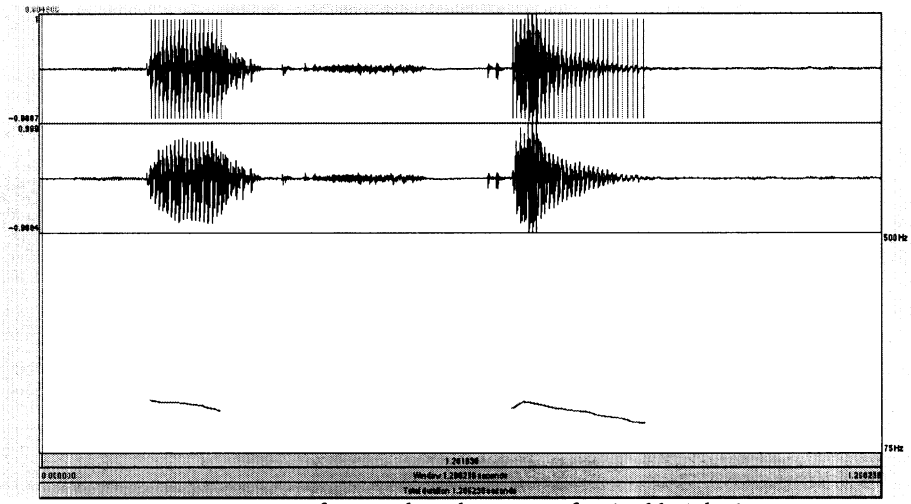


Figure7: Waveform and Pitch Contour for *áwahka* 'play'

(90) 👂 nítohkanaistohkohpihpiinnaan
nítu̯xʷkanɛstxˌʷkxˌʷpi˙ç̣pi:n:a˙n
'we fell'

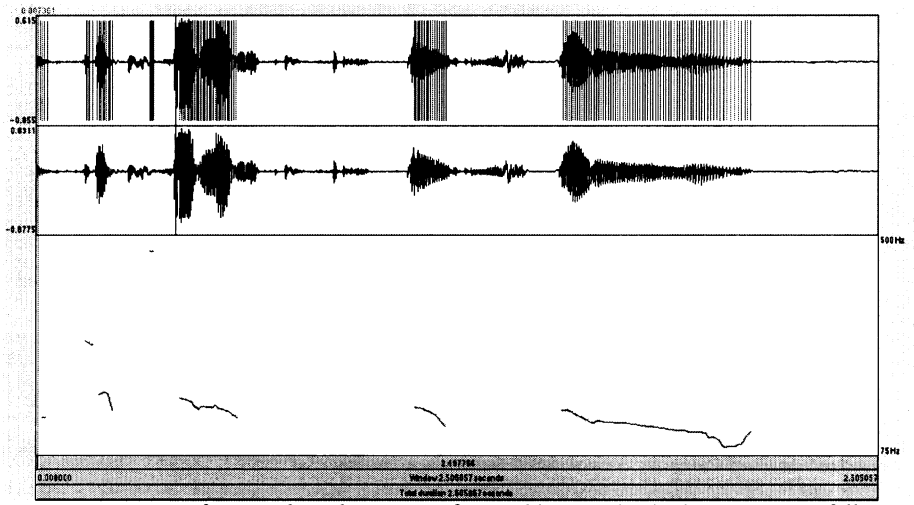


Figure8: Waveform and Pitch Contour for *nítohkanaistohkohpihpiinnaan* 'we fell'

In each of these examples, there is no significant waveform activity in the location of the sequence /ahC/, /ihC/, or /ohC/. Considerable activity in the should occur wherever a vowel is found in the word, but when the "deficient syllable" sequence

arises in the word, wave activity decreases to a level comparable to a fricative, not to a vowel. For example, compare the waveform of the first and last /a/ in 'play' (89), to the second /a/; the middle vowel does not show wave activity comparable to that of the first and second vowel, but instead to something very non-vocalic.

In cases where the syllable is deficient, prominence must search for a more suitable location to dock, since that syllable no longer has an accent-bearing unit. When the first syllable of the word is deficient, this eliminates the possibility of conformity to left stem-edge effects. In this situation, one of two options is available- either prominence can move onto the person marker, or it can move rightward into the stem. The first option, where prominence employs the person clitic, is commonly found in Blackfoot, consequentially misaligning MWd and PWd by moving prominence outside the MWd and onto the proclitic. Person markers *nit(s)* '1st person', *kit(s)* '2nd person', or *ot(s)* '3rd person', do not have lexically-specified PA, but are found to carry prominence under the circumstance of deficient syllables.

(91) *ohpimm* 'associate with something or someone'

c. nítohpimmoka
nit – ohpimm – ok – a
tohpi [tx̣pi]
1st – associate with – inv – 3rd
'she associated me with...'

d. nitsííkohpaimmawa isstónnikii ki sítokihkiitaani
nit(s) – iik – ohpimm – a – wa
kohpi [kx̣pi]
1st – very – associate with – dur[26] – in.sg
'I associate her with ice cream and pie'

[26] Frantz notes that the durative, *á* follows *ohp*. Blackfoot does not have infixation, and that this 'durative' morpheme changes form in the verb (*ai*). Therefore, I posit that the verb with *á* following *ohp* is in fact a different word or form of the verb altogether.

Example (91a) presents a situation where the deficient syllable falls at the leftmost edge of the morphological word. Pitch accent has moved further leftward onto the person marker in this situation. (91b) exemplifies that whenever possible, the proclitic avoids carrying prominence, and other pre-stem non-clitic elements, such as 'very' in this case, a domain of the Blackfoot word that may bear prominence. Understanding the relationship between prominence, MWd and PWd sheds light on this otherwise unusual, and obedient behaviour of Blackfoot prominence.

As noted, the likelihood of the clitic to bear prominence is small, and often when faced with a deficient syllable, prominence will opt for a rightward move instead of forcing a misalignment of MWd and PWd. Example (92) is a case where prominence moves into the stem to avoid misalignment.

(92) *ohkowaitsim* 'complain about'

nitohkówaitsimoka
nit – ohkowaitsim – ok – a
1st – complain about – inv – 3rd sg
'he complained about me'

Recall that to date, no restrictions have been suggested for distribution of prominence in Blackfoot. In fact, Taylor states (1969:25), "stress may appear with any syllable" (see page 48). It has been illustrated that prominence may be found on a syllable positioned anywhere throughout the word (first versus last, for instance), but not on "deficient syllables" and not likely on the proclitic. Prominence is also never found on enclitics, besides the one case where prominence is lexically-specified, on the singular distinct third person pronoun. Taylor's statement is misleading and indicates that prominence is restricted in certain situations. Although these cases do not reveal where prominence is found, it does indicate where it will not be found.

5.6 Discussion

Although a morphological analysis did not provide direct answers to Blackfoot prominence assignment, the analysis proved to be constructive. First and foremost, it has been established that Blackfoot morphology is composed of person and number clitics, stems, and other pre-stem elements which are in fact affixes. Individual affixes may be lexically-specified for prominence, and may contribute to multiple prominences when combining to form a word-complex. Importantly, this indicates that Blackfoot's system should no longer be referred to as PA, since multiple prominences eliminate the accentual possibility, since "accent systems may be contrasted from other types of tonal systems and stress systems where there is no 'uniqueness requirement' on accent" (Alderete 1999:19). In fact, elements typically maintain their lexically-specified prominence when combined into a word complex in Blackfoot. Since compound words and verb-complexes are most commonly found bearing multiple prominences, a reanalysis of Kaneko's (1999) research on nominal compounds is required.

Morphological analysis also enabled the identification of MWd and PWd. The MWd is the domain for prominence, since the PWd displays very strict and rigid behaviour with respect to prominence. The occasion where prominence is found on the enclitic, on the singular distinct third person pronoun, always maintains that prominence, never deleting or altering it. When the proclitic is found with prominence, it is under very restricted conditions, where the prominence-bearing syllable of the MWd is phonologically not capable of carrying prominence. When the proclitic bears prominence, a misalignment between the MWd and PWd occurs, indicating that

prosodic well-formedness of a Blackfoot word outranks the need to maintain the boundary between PWd and MWd.

Although non-clitic suffixes were not explored in detail in this analysis because of their irrelevance to prominence, analysing person and number markers as clitics is attractive if only for reasons of having them in a cohesive group. Hurch (1994) notes that it is common for groups or classes of affixes to act with the same behaviour.

A key goal of this analysis was to ensure that separate prominences do not imply separate words, and to eliminate the possibility of morphology affecting PA assignment. Blackfoot word structure is a prime suspect capable of interfering with PA assignment, considering the language's polysynthetic nature. It is also known that, as a prosodic category, PA can be affected by the structure within which it is embedded. Piggott (1994:226), for example, states that a prosodic category such as PA is a "primitive linguistic unit," likely interacting with lexical, morphological, syntactic or phonological features. It was of primary importance to eliminate Blackfoot word structure as the principle intervening element in PA assignment. Blackfoot morphology accounts for violations of culminativity in certain situations, but not to the degree that the language can be maintained as a PA system. The following chapter is devoted to making a case for Blackfoot as a tone language.

Chapter 6

Further Aspects of Blackfoot Prominence

Thus far, the prominence system of Blackfoot has been examined from a traditional phonological standpoint, and from a phonetic and morphological perspective. Clearly Blackfoot cannot be described according to traditional PA theory since data consistently violates most of the theory's core principles. Most notably, Blackfoot does not illustrate the type of regularity expected in PA systems in terms of maintaining culminativity, where only one prominence is found per word/phrasal domain. The consistent violation of culminativity deeply impacts the entire system and is not isolated simply to the number of accents seen in each domain. This violation results in an absence of accent reduction rules, expected in PA systems; the size of the accentable unit is not what is expected in PA systems; and the distribution of prominence far exceeds what is viable in PA systems.

Phonetic investigations illustrate prominence is realized with pitch, a correlate expected in PA or tonal systems. A morphological examination has illustrated that Blackfoot words are composed of stem(s), person and number clitics, and a number of affixes carrying grammatical information such as aspect, and discourse information (i.e. question markers, negation markers, and so forth). Morphology explains some cases where multiple prominences are found under a traditional analysis– words where both affixes and stem are lexically-specified for prominence combine while maintaining their prominence as specified. A deeper understanding of word prosody, including location of the boundary separating the morphological and phonological word also resulted from this investigation. However, morphology does not fully

account for the unusual behaviour found in Blackfoot with respect to prominence. A reanalysis of morphology is futile, since multiple accents are banned in PA systems; there is no accounting for simplex words with multiple accents (93); stems with lexically-defined PA combining with clitics carrying no PA, producing a word with multiple PAs (94); PA loss (95); or words with no PA whatsoever (96) in a PA system.

(93) 👂 *atsíkínya*
'shoes'

(94) 👂 *ksaahkoiikimsskomo* 'muddy waters for/ upset the plans of with one's own'

nítssksááhkoiikimmsskomooka
nits(s) – ksaahkoiikimmsskomo – ok – a
1st – muddy waters for – inv – 3rd sg
'she muddied waters for me'

(95) *ánistsska'si* 'flaunt one's advantage; be pretentious

anistsska'sit
ánistsska'si – t
flaunt one's advantage – imp
'flaunt your advantage!'

(96) 👂 *ikkawatoo* 'strike repeatedly with a pointed object, peck at, chip away at'

nitsikkawatoo'pa
nits – ikkawatoo – 'p – a
1st – strike at – theme – in.sg
'I struck at it'

This chapter explores possible motivation for the irregular behaviour found in Blackfoot's prominence system. The first section (§6.1) provides several arguments supporting my proposal that Blackfoot was a PA system and has now developed into a tone system. The following section, §6.2, explores benefits of analysing Blackfoot as a tone over PA language.

6.1 Blackfoot as a Tone Language

Mixed systems are one avenue I explored to explain the odd behaviour of Blackfoot prominence (Chapter 3). Mixed systems are where, in some languages, phonetics of one prominence system is implemented in the phonology of another. A number of languages exemplify this type of system: Creek (Haas 1977, Hayes 1995), Ganda (McCawley 1978), Vedic Sanskrit (Clark 1978, Roca 1992), Mandarin Chinese (Duanmu 1999), Serbo-Croatian (Inkelas and Zec 1988) and even perhaps Japanese (Clark 1978). Taking Creek as an example of a mixed system, phonologically Creek's prominence system is metrical; feet are formed, and accent is predictable based on these feet. However, phonetically, pitch is the primary exponent of stress. Consequentially, no secondary stress occurs in Creek, violating its predictable occurrence in metrical systems, yet typical of pitch systems.

When analysing Blackfoot from a mixed system point of view, no critical stress correlates are found phonetically or phonologically. This is demonstrated by Van Der Mark's (2003) phonetic study, and with phonological evidence including lack of metricality in the language, i.e. culminativity, foot structure, weight-to-stress, etc., (see page 80 for argumentation). This leaves only PA and tonal systems as combinatory options. Considering pitch is the phonetic correlate of both systems, the possibility of a mixed system is completely eliminated; if the phonetic correlate of pitch mixes with tonal phonology, then the system is tonal, and if the phonetic correlate of pitch mixes with accentual phonology, then the system is pitch accent. Mixed systems are a vacuous venture when stress is eliminated.

Throughout this thesis, it is shown that Blackfoot inconsistently abides by PA theory. My proposal, then, is that Blackfoot was once a PA system and is in transition toward becoming tonal. When viewed through the lens of a tonal system, keeping in mind that some PA relics are present, significant deviances found in Blackfoot's PA system are explained. Furthermore, several processes typical to tone systems are found in Blackfoot, suggestive of the tonal status of Blackfoot's phonology.

This proposal suggests that either the shift from a PA to a tonal system is isolated within Blackfoot only, or that Blackfoot's prominence system is supporting evidence for the theory that PA is subset of tone, a notion introduced in Chapter 3. Recall that this position has long been argued for in prominence theory research (Gandour 1978; van der Hulst and Smith 1988; Yip 2002). The idea can be summed up by Yip (2002:260) who states that PA systems "occupy transitional ground" between 'pure' tone and 'pure' stress languages, and that PA is simply "a convenient descriptive term for a particular type of language in which tone is used in a rather limited way, with one (or perhaps two) tone melodies." Yip's statements feel appropriate considering the difficulties Blackfoot prominence displays.

The language's persistent violation of culminativity[27] is a strong argument in support of a transitional system from PA to tone. Alderete (1999:19) states "tone languages... do not limit the number of tones in a form to exactly one, and consequently, there is no loss of all but one lexical tone," indicating Blackfoot should no longer be viewed through the lens of a PA system. Instead of reviewing the topic of

[27] Bantu languages are not prototypical tone languages (*cf.* Yip's (2002) Asian tone), since their tone pattern results in one contour per domain. Michael Dobrovolsky, p.c., suggests that Bantu languages may be better characterized as PA systems. However, I stand by the more standard view of these languages as authentically tonal, following Clements and Goldsmith (1984), Hyman and Kisseberth (1998).

culminativity in isolation since it has already been discussed a great deal, it has been incorporated into the discussion in terms of distribution, prominence bearing unit and so forth. These issues are reviewed in §6.1.4 onward. Beyond culminativity, the three strongest arguments in favour of Blackfoot moving toward a tonal system are the tonal processes of glottalization, accent spread, and tone dissimilation. An explanation of these processes follows, complemented by lesser supporting evidence.

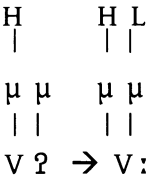
6.1.1 Glottalization

One of the key characteristics of tone systems, observed by Yip (2002:65), is the many-to-one trait. This states that "multiple tonal features surfac[e] on a single host segment." In other words, more than one tone can occur on one tone-bearing unit. In Blackfoot this tonal trait is realized through the process of glottalization. The widespread occurrence of glottalization in Blackfoot is reinforced by its recognition in other independent research (Frantz (2004) and Van Der Mark (2003:11, footnote 5)), indicating that my data is not idiosyncratic or unique to only a few speakers, or to one dialect. Taylor (1969:35) also notes effects of glottal stop on surrounding vowels as compensatory lengthening, the key factor to glottalization in Blackfoot, stating, "vowels before /ʔ/ almost always have the quality of long vowels, even though their absolute duration may be shorter than that of a long V."

Glottalization arises in Siksiká Blackfoot from compensatory lengthening. Glottal stops are frequently deleted, resulting in lengthening of the preceding vowel. Compensatory lengthening is not a rare or isolated process and has been attested with Van Der Mark's (2003) consultants as well as my own. Van Der Mark points out that

along with compensatory lengthening, "an additional process of tonogenesis is occurring, when a falling PA is created over the resulting long vowel" (*ibid.*). Glottal stop is lowering pitch on the vowel, generating L(ow) tone in Blackfoot. Consequently, glottalization creates a contour tone. This process, depicted schematically below in (97), is also active in the language of my native speaker.

(97)



Glottal stops are moraic; this is evidenced by their restricted distribution to coda position as well as their behaviour in syllables containing long vowels. In these syllables, vowel shortening occurs, indicating that in order to maintain a maximally bimoraic syllable in Blackfoot the vowel reduces its contribution from two morae to one mora. It can be deduced that glottal stop contributes one mora to the syllable from this process since otherwise there is no motivation for vowel length reduction. The resultant syllable then maintains bimoraicity, since both glottal stop and the shortened vowel contribute only one mora each. This argument can be rearticulated for velar fricative, /x/, since it demonstrates the same properties described above for glottal stop (see examples (10)-(12)).

Where glottal stop deletes, a mora remains in its place, and compensatory lengthening is expected. Upon deletion of glottal stop, L tone surfaces, indicating a correlation between L tone and glottal stop. Examples below, accompanied by their waveforms, illustrate this process.

(98) 👂 ómahkapi'sii
ómaxkapi̲ː siˈ
'timber wolves'

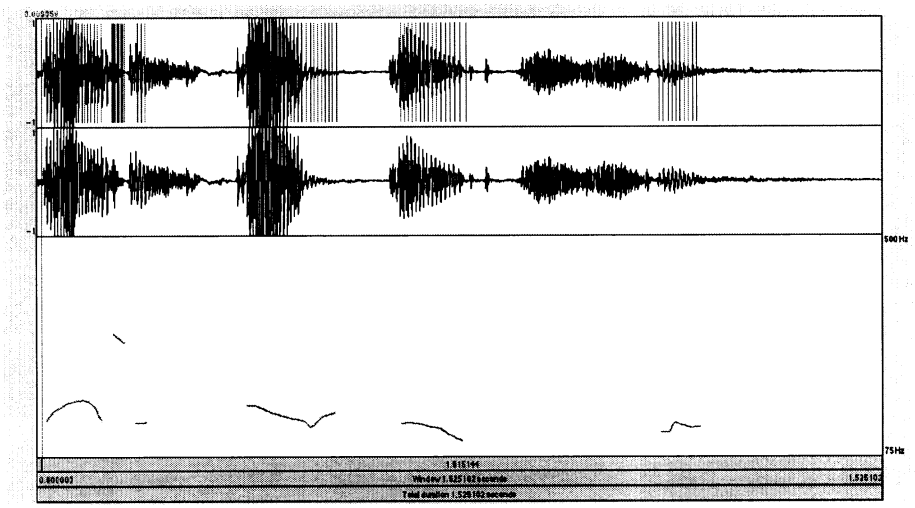


Figure9: Waveform and Pitch Contour for *ómahkapi'sii [ómąxkapi̲ː siˈ]* 'timber wolves (coyotes)'

As the waveform illustrates by the higher pitch of the first vowel, *ó* is the prominent vowel of the word. The second vowel, *ą*, illustrates significantly less wave activity than the other vowels, indicating that it underwent predicted spirantization and has become voiceless. The second last *i* is quite long, and drops significantly in pitch, resulting in a creaky quality. These features demonstrate what is not audible to the reader: that the vowel has undergone glottalization. A further example indicating that this is not an isolated or idiosyncratic event is presented in (99).

(99) 👂 ááhkioksaa'tsis
áˈxkioksàːtsis
'boat'

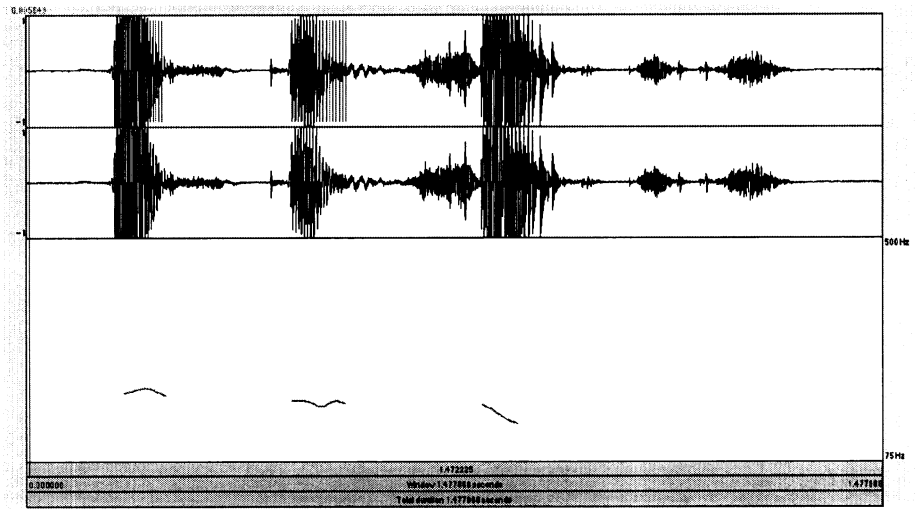


Figure10: Waveform and Pitch Contour for *ááhkioksaa'tsis [á· xkioksà:* t̥*s̥is]* 'boat'

Again the dramatic fall and significant lengthening of the vowel involved in glottalization can clearly be seen in the waveform. Like the example above, deletion of glottal stop causes compensatory lengthening, accompanied by a surfacing L tone.

Interestingly, compensatory lengthening only tends to occur toward the right-edge of the word. Example (100) illustrates that glottal stop is realized when found in the leftmost portion of words, disallowing the occurrence of compensatory lengthening, and of course, the correlated drop in pitch.

(100) mo'ko
moʔko
'autumn; to fall'

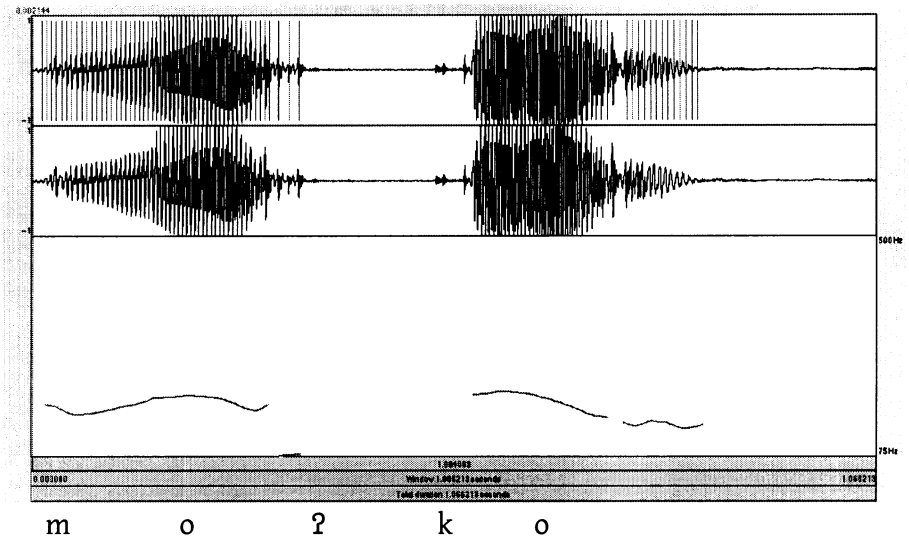


Figure11: Waveform and Pitch Contour for *mo'ko [moʔko]* 'autumn; to fall'

If Blackfoot is becoming a tone language, albeit an impoverished one, alignment tendencies such as the one displayed in (100) may illustrate relics of the previous PA system. Examples of these relics exist in a few cases where PA characteristics such as alignment and culminativity are obeyed. Conversely, Blackfoot's transformation toward an underlying tone system explains cases where traits of PA systems are violated. However, alignment tendencies are not limited to PA systems. A constraint available to tone systems, presented in Yip's (2002:82-3) description of "central properties of tone" is the left-to-right association effect. This constraint, ALIGN-L[28], states that "each T[one] should align with the left edge of the domain." We will return to this issue below in §6.1.3.

Attestation of glottalization by other researchers indicates that examples (97)-(99) above are not isolated incidents of glottalization, particularly since Frantz notes occurrences of glottalization in Káínaa (Blood), a different dialect of Blackfoot. Glottalization is a process typically found in tone systems. Accounting for this regular

[28] Based on McCarthy and Prince (1993).

and wide-spread process with tonal phonology allows for the most elegant and succinct explanation for Blackfoot. Although glottalization has been attested in non-PA, non-tone languages such as Finnish, and Swedish, a putative PA language, these cases are largely (?) a result of sentence intonation, where glottalization is correlated with low terminal intonational contours (Michael Dobrovolsky, p.c.). Furthermore, effects of glottalization on the prosodic system in Blackfoot is far deeper, since for Blackfoot, a L tone has developed in the system, as opposed to the mere correlation between lower pitch and glottalization, as is found in Finnish. The strong connection between glottalization and development of tone is widely recognized and explains tone development in a large number of languages. Furthermore, the convergence of evidence in favour of the tonal proposal outweighs the unusual occasion of a non-tone language showing effects from glottalization. In fact, Poppe describes a language in which glottalization developed from PA, subsequently leading to compensatory lengthening (Michael Dobrovolsky, p.c.). This is further support for the hypothesis that Blackfoot was a PA system that is in transition to a tone language.

Glottal stops are widely accepted as being directly involved with tonogenesis (Hombert 1978:78, Hombert, Ohala, and Ewan 1979, Mithun 1999, Hyman 2001, Yip 2002, etc.). Those researching Asian languages typically report that /ʔ/ lead to high tone on a preceding vowel (Hombert, Ohala, and Ewan 1979, and more recently Yip 2002), a belief Mithun (1999:25-6) notes is surprising, considering the astounding array of data to the contrary. Athabaskan languages, for instance, demonstrate post-vocalic glottal stops can develop into high or low tone. Moreover, lowering effects of /ʔ/ are attested throughout a wide range of languages of different geographic and genetic heritages.

Mithun (1999) cites only three Algonquian languages distinguishing tone, Arapaho [Wyoming; USA], Cheyenne [Montana, Oklahoma; USA], and Kickapoo [Oklahoma [USA], Mexico]. Two of these tone languages, Arapaho, and Cheyenne, are relatively close neighbours to Blackfoot (see illustration in (1)) and recall from Chapter 2 that they are closer to Blackfoot in their divergent nature than other languages of the Central and Plains branch of Algonquian. Tonogenesis in these three Algonquian languages in the same geographic region suggests the development may be triggered by areal influences. It is possible that tone developed in Arapaho, Cheyenne and/or Blackfoot autochthonously, but the areal nature of tone is attested by tonal development in Crow. Crow is a Siouan language of Montana directly neighbouring Cheyenne, and despite a general absence of tone in other Siouan languages, it is reported to have developed tone triggered by vowel length. It is not implausible that development of tone in Crow was triggered by the same development in Algonquian; moreover, possibly Blackfoot tone was influenced by tonal development in either Arapaho or Cheyenne.

Also striking is the proximity of Blackfoot to Tsúùt'ina, an Athabaskan language located in the Calgary region. This language has the most fully developed tone system of all Athabaskan languages, with three levels of tone and tonal contours (Cook 1971). A plausible link between the development of tone in Blackfoot and this language could also be made on areal grounds. Further research regarding possible areal links between these languages would make for very valuable future research. As it stands these links are highly suggestive of the plausibility of Blackfoot as a tonal system.

Mithun (*ibid.*) notes a vast number of tone systems of North America which have developed tone in the same way as Blackfoot, including Caddo [Oklahoma], Keres [New

Mexico], Hopi dialects [Arizona], Takelma [Oregon], Quileute [Washington], Bella Bella Heiltsuk [British Columbia], Coast Tsimshian [British Columbia], Kiowan-Tanoan languages [USA] and the Sanya-Henya Tlingit dialects of southeastern Alaska. Mohawk, for example, exhibited the process of deletion of syllable-final glottal stop causing compensatory lengthening and even creakiness, exactly as in Blackfoot, whereas Montagnais (also known as Innu, an Algonquian language spoken in Quebec and Labrador) is developing high tone from the same process.

Glottalization is not idiosyncratic in Blackfoot and along with evidence of the connection between glottalization and tonogenesis, this process supports the proposal that Blackfoot has correlations with tonal systems. Further evidence supporting this claim is another tonal process found in Blackfoot, accent spread.

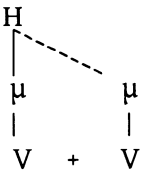
6.1.2 Accent Spread

A second key characteristic of tone systems is the one-to-many trait. Again following Yip's (2002:65) descriptions, the one-to-many characteristic states that "a single tonal feature [may be] shared by two or more segments." In other words, one tone can spread to other tone-bearing units. This process, like glottalization, is typically found a tonal system. Frantz (1991:155) recognizes this spreading process in Blackfoot as the "Accent Spread Rule."

(101) $V \rightarrow [+accent] / V_{[+accent]} + \_\_\_$

This rule indicates, according to Frantz's description (1991:28), "a vowel at the start of a morpheme is accented if the preceding vowel is accented," or in other words, the H tone spreads and is shared by neighbouring vowels. A schematic explanation of this rule is provided in (102), followed by the possible segmental combinations in Blackfoot.

(102)



(103) *ó + o* → óó *á + a* → áá
ó + i → ói *á + o* → áó (ɔ́ː)
í + i → íí *á + i* → ái (ɛ́ː)

This process is substantiated by the examples below. In each example, the prominent vowel spreads its prominence (tone), to the following toneless vowel. Examples (104)-(106) illustrate that this process is permitted across nominal or verbal morphemes. A waveform has been included to illustrate the process to the reader. Each example has been verified by a native speaker.

(104) 👂 *okska'si* 'run'

áókska'siwa
á – okska'si – wa
dur – run – 3rd
'he runs'

(105) 👂 *kakkóó* 'pigeon'

kakkóíksi
kakkóó – iksi
pigeon – pl
'pigeons'

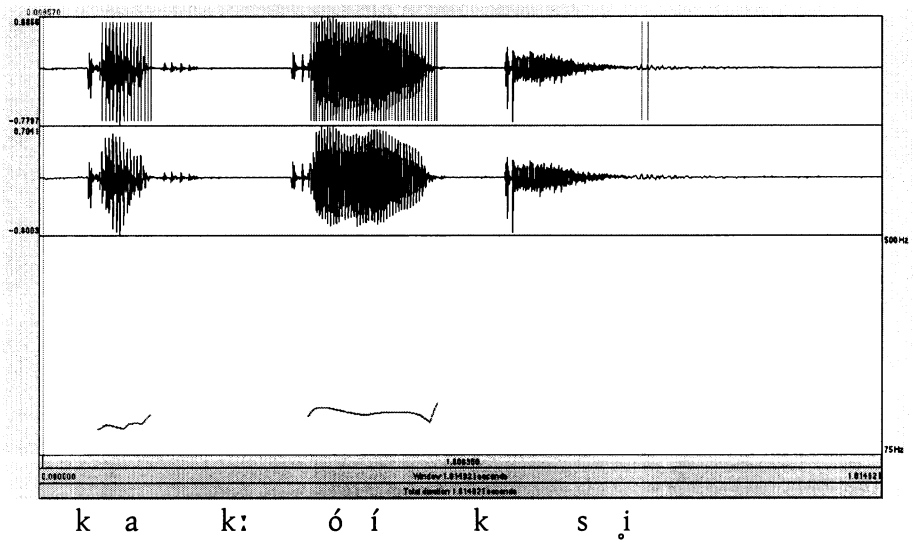


Figure12: Waveform and Pitch Contour for *kakkóíksi [kak : óíks̯i]* 'pigeons'

(106) 👂 *iniitsi* 'drown'
omahksikanaisskiinaa 'rat'

náíniitsinianisk omahksikanaisskiinaaisk
ná – iiniitsi – anisk omahksikanaisskiina – aisk
neg[29] - drown – 3rd pl rat – 3rd pl
nɛ́ni : tsinianisk omąxksikanɛs : ki : na : isk
'they drowned the rat'

This type of pitch spread is common in tonal systems. This spreading is readily found in Blackfoot, supporting the theory that Blackfoot's prominence is more tonal than accentual. Considering PA has been eliminated as a possibility for Blackfoot, predominantly based on frequent violations of culminativity, it is not surprising to find pitch spreading in the language. Pitch spreading is basic to a large number of tone languages, whereas it is not typical or widely reported in PA languages. Some PA languages, such as Japanese and Serbo-Croatian[30] demonstrate accent spread, but to what extent this trait is found is not well-reported. Furthermore, spreading seen in Blackfoot is not particularly discriminating; where an accented vowel in morpheme-final position is adjacent to a vowel in morpheme-initial position, prominence spreads. Spreading in PA languages, however, appears to be confined to more specific cases, such as onto specific unaccented words (Michael Dobrovolsky, p.c.). Spreading in Blackfoot lends growing support to the hypothesis that Blackfoot is better viewed as a tone than a PA language.

Glottalization is an apparent contradiction to Accent Spread. Upon deletion of glottal stop, Accent Spread predicts H tone would spread to the following vowel.

---

[29] Note that this negative marker is only used in Siksiká Blackfoot.
[30] Recall that the status of PA in both Japanese and Serbo-Croatian is unique. Japanese is commonly argued to be an impoverished tonal system (Poser 1984, for example), and Inkelas and Zec (1988:227) claim "tone and stress are the two operative phonological entities sufficient to characterize prosody in Serbo-Croatian."

Instead, a contour tone, H + L develops. Bearing in mind that a correlation between glottal stop and L tone can be made, this apparent contradiction can be readily explained. Once glottal stop deletes, it lowers the pitch of the preceding lengthened vowel, essentially associating a L tone with that vowel and blocking Accent Spread.

Another apparent contradiction to Accent Spread is presented below.

(107) *aapánii* 'butterfly'
aakíí 'woman'

aapánáaakiiwa
aapánii – aakíí – wa
butterfly – woman – 3sg
'butterfly-woman'

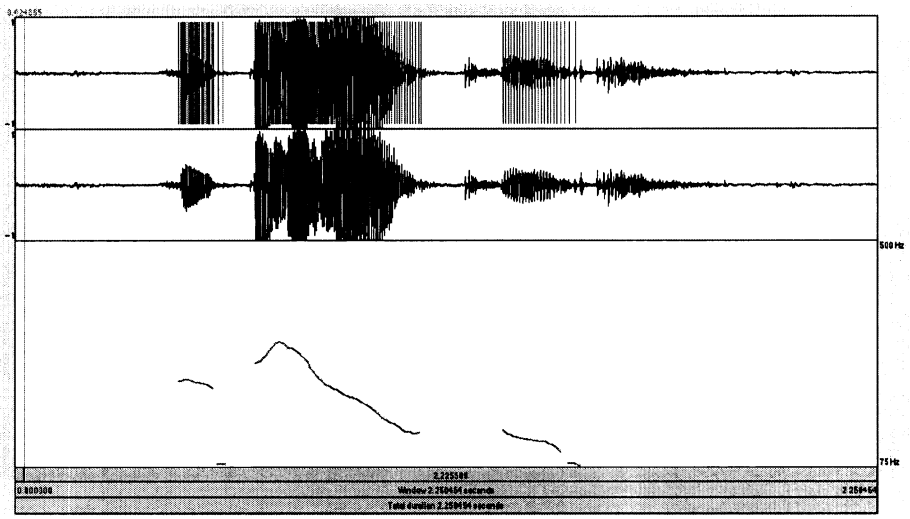


Figure13: Waveform and Pitch Contour for *aapánáaakiiwa [a˙ páná: ki˙ wa]* 'butterfly woman'

(108) *á-* 'durative'
ipoina- 'frantically'
ookataki 'bead (v.)'

áípoináókataki(wa)
á – ipoina – ookataki – wa
fur – frantic – bead – 3rd sg
'she is beading frantically'

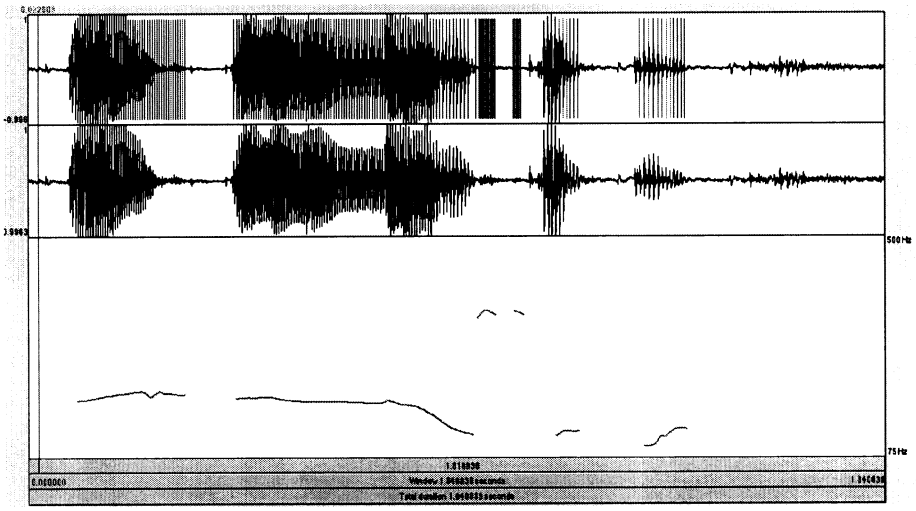


Figure14: Waveform and Pitch Contour for *áípoináókataki(wa) [époináókataki]* 'she is beading frantically'

Notice in both of these examples, falling pitch occurs at a morpheme boundary with a vowel and a long vowel (or diphthong)[31]. Frantz (1991:90-91) also notes the occurrence of this falling tone.

In order to understand this apparent contradiction, a number of elements must be drawn together. First, there is no compelling evidence to suggest an underlying L tone exists in the vowels of (107) or (108) above. An examination of the role L tone has in Blackfoot beyond as a correlate to glottal stop would make for interesting future research. However, at this point, the important issue is that underlyingly, vowels are not marked for L tone. Second, there is no compelling evidence that Blackfoot would permit super-heavy, tri-moraic syllables, such as those found in the examples above, *áaa*, or *áoo*. In fact, evidence elsewhere in the language indicates that Blackfoot has an aversion to tri-moraic syllables (see §6.1.1). Recall that both velar fricative, [x], and

[31] Note that a prominence appears at the juncture of these compounds. In these cases, when combining two morphemes, either the prominence has moved to the juncture of the compound, as predicted by Kaneko (note that culminativity is violated), or the prominence can be viewed as some sort of linker, along the lines of the *o* in the English example, *Greco-Roman.*

glottal stop, [ʔ], are heavy elements capable of occurring in coda position, and contribute a mora to the syllable. When either of these segments is found following a long vowel, the vowel becomes short (*cf.* examples (10)-(12)), indicating Blackfoot restricts syllable size to two morae; [x] or [ʔ] contributes one mora, while the reduction of a long vowel to a short vowel reduces its mora contribution to only one mora. This vowel reduction clearly indicates Blackfoot's aversion to tri-moraic syllables. For these reasons falling tone in the above examples is not surprising.

The three vowels forming the so-called super-heavy, or super-long vowel in Blackfoot is simply a case of two vowels, one short, and one long, spread across a syllable boundary. Accent does not spread across the syllable boundary, hence forming an apparent falling tone. Therefore, examples (107) and (108) do not illustrate L tone blocking accent spread, as seen in the case of glottalization, but simply a syllable boundary across which accent cannot spread.

6.1.3 Tone Dissimilation

A final core piece of supporting evidence is local dissimilation found in Blackfoot prominence. Local dissimilation is expected only in stress or tone languages as 'stress clash' or the 'Obligatory Contour Principle' (OCP), respectively. Since stress has definitively been ruled from the list of possibilities for Blackfoot, and since pitch dissimilations in Blackfoot do not necessarily delete or reduce multiple prominences completely, a PA analysis is not compatible, and the dissimilations are suggestive of a tonal system. There are many occasions where tone dissimilation does not occur and adjacent tones are permitted; this topic provides plenty of future research. It is clear,

however, that some sort of tonal dissimilation occurs within the pre-stem affix domain in Blackfoot verbs. Consider the combinatorial possibilities in the following table.

	kátá' 'negation'	*máát* 'negation'	*á* 'durative'
á 'durative'	☹káta'ya	😐 máátá OR mááta	-
áak 'future'	☹ káta'yáak	☹? máátáak (1 case of máátaak)	☹ áyaak
omá 'yet'	☹ kátao'ma[32]	☹ máátoma	-?

Table 11: Combinatorial Possibilities for Blackfoot Affixes

An unhappy face (☹) indicates tone deletion. The neutral face, 😐, indicates the affix may or may not lose its tone. A dash (-) indicates the combination is impossible. Affixes beside the face icon provide the acceptable form of the affix combination.

Note that in most cases, bringing two affixes with tones together causes tonal deletion. Some tone dissimilations may appear more like PA deletion rules, eliminating multiple PAs since only one tone remains in the affix combination (e.g., *káta'oma*, or *áyaak*), but more tones are present throughout the rest of the word (e.g., *kátao'maikííkihpa?* 'have you won anything yet?'), indicate that the process is in fact local dissimilation. Of the two cases where alternations are permitted (*máát* + *á*, and *máát* + *áak*), it is reasonable to suggest that these illustrate the transitional change from PA to tone occurring in the system. I would predict that eventually only combinations with non-adjacent tones would be permitted within this affixal domain.

Although this argument is essentially a sketch at this stage, it demonstrates another tonal process in Blackfoot. The apparent outstanding problem with adjacent tones occurring elsewhere in the language suggests that tonal domains require further

[32] Note that glottal metathesis is occurring.

investigation. Like blocking of Accent Spread across syllable boundaries, tone boundaries likely exist, permitting apparent contradictions to the OCP.

6.1.4 Further Considerations

Glottalization and accent spread –realization of the many-to-one and one-to-many trait of tonal systems – along with tone dissimilations are suggestive of an emerging tone system in Blackfoot. Other evidence consistent with this theory, though not as strong as the tonal processes seen above, is the lack of minimal pairs in Blackfoot. The minimal pair argument is frequently considered when weighing a language between PA status and tonal status (Brown 2004).

Beckman (1986:29) claims that fewer minimal pairs will be found in stress and PA languages, since the functional load of these systems is lower than that found in tonal systems. This means that more minimal pairs should be found in tonal systems than any other type of system, because the primary function of tone is to differentiate items (syllables, for instance), as opposed to hierarchically organize a word or phrase, as with PA and stress. Although this argument is viable under certain conditions, it is not compelling and is problematic. Besides the meta-theoretical problems of this statement ignoring the fluidity and creativity of language, concrete evidence is available to discredit Beckman's proposal. Chen (1992:57), for example, claims that the importance of "functional load of tonal contrast has been greatly exaggerated." Evidence for this counterargument is based on combinatorial possibilities found in tonal languages. Chen claims, for instance, that although 64 combinatorial possibilities are available to a language with eight underlying tones, full realization of

combinatorial possibilities is rarely found. For example, Old Chongming, a system with eight underlying tones, realizes only seven combinations. Beckman's argument also ignores African tone systems, which behave very differently than she suggests.

For Blackfoot, this implies that either the functional load of tone has not yet developed to its potential, and is still in transition from the lighter functional load of the PA system (following Beckman), or that Blackfoot tone does not carry as great a functional load as in some other tone languages (following Chen). This second option is by far most realistic, considering the features of the Blackfoot language. Considering Mandarin Chinese, for example, greater functional load for tone is not surprising, and results in more minimal pairs than in Blackfoot. Viewed from the perspective of word size (typically monosyllabic versus polysyllabic) and morphological type (isolating versus synthetic), minimal pairs and high functional load are a virtual necessity in Mandarin, whereas they are merely optional in Blackfoot. Tones are crucial in distinguishing between the many homophonous monosyllables in Mandarin (resulting in many minimal pairs) and hence carry a greater functional load. Blackfoot, on the other hand, has the option of using tones to create a distinction among words, but does so rarely, since the chance of homophones in Blackfoot is minimized by its polysyllabic, synthetic nature, forming large words with varying combinations of affixes and clitics.

In fact, it could be argued that for a language like Blackfoot, with polysyllabic words and synthetic morphology, PA has a greater functional load than tone. Since the necessity of using tone in this type of language to distinguish between words is very minimal, tone bears a small functional load, as argued above. But the potential size of words in this (type of) language would place a far greater burden on a PA system, in

terms of functional load. PA's mandate as an organizational property would become extremely useful, contributing to the parsing of utterances. It is expected that speakers would make use of this functional element of the language. The functional load and minimal pair argument is not as clear cut or decisive as Beckman (1986) suggests. A range of correlates influences the amount of functional load tone, PA, and stress carry. Although not a strong argument for Blackfoot as a tone language, it is consistent with the data and helps to explain an unusual gap in Blackfoot's system. This argument may be weakly suggestive of a tone system since minimal pairs in Blackfoot appear to be an accident, rather than a functional element of the language.

A final element considered at this point is the effect of alignment in Blackfoot. Data throughout this thesis demonstrate left alignment tendencies some of the time. If Blackfoot were a PA system, it is expected that edge-effects would be active most of the time. The inconsistent nature of alignment is further evidence consistent with a tonal, and not accentual, proposal for Blackfoot[33]. Although like the minimal pair issue, alignment effects do not form a strong argument in favour of a tonal system, but are consistent with the data and the nature of tonal systems.

The unreliable character of left-alignment in Blackfoot may be explained by relics of edge-effects (delimitative function) of the previous PA system. For example, in the presence of a deficient onset, prominence may move leftward, onto adjuncts or person clitic markers, but sometimes moves rightward, deeper into the stem. It is not predictable when prominence moves right or left although the clitic avoids bearing tone when possible. Assuming left-edge effects are relics of the previous PA system is

[33] One committee member has noted that this behaviour is akin to free stress.

in fact not required in order to explain the alignment affinity seen in Blackfoot. This is because the left-edge is widely known to be the favoured edge in language (Beckman 1999; Nelson 2003). Beckman (1999:49) argues "[o]ne source of evidence for initial-syllable positional privilege may be found in the domain of lexical access and language processing," which she complements with an extensive list of research, beginning in the 1960's. She also provides a wide range of phonological evidence in favour of left-edge preference in language. In fact, Nelson (2003) goes as far as to argue against the existence of ANCHOR-R, a mirror-image constraint to ANCHOR-L, indicating that the right-edge has no special status in language.

Therefore, since left alignment is not exclusive to metrical stress and accentual (PA) languages, it in no way compromises Blackfoot's status as a tone language. Instead, Blackfoot obeys the cross-linguistic tendency for left-edge saliency. This saliency is evidenced by such universal constraints in Optimality Theory as ALIGN-L. ALIGN-L is a markedness constraint, stating that the left-edge of every X (tone, for example) is to align with the left-edge of the phonological phrase. This constraint may be violated, of course, but illustrates the general tendency for languages to place the most salience on the left-edge of the phonological phrase.

Erratic left-edge behaviour is in line with the tonal proposal. On one hand, various alignment effects reinforce Blackfoot's atypical nature as a tone system, though these effects are evidenced in other tonal languages, such as Bantu (see Kenstowicz and Kisseberth's (1990) analysis of Chizigula, for example). On the other hand, alignment effects tend to be concentrated in the most salient psychological salient (stem-initial) position, and therefore have a functional purpose. Nonetheless, in conjunction with

evidence of tonal processes and evidence reviewed below, left-edge effects seen in Blackfoot are not strong enough to suggest it is a PA language.

6.2 Comparison of Blackfoot as Tone versus PA Language

Reproduced below from Chapter 3 is a table of basic prototypical features of standard prominence systems. Blackfoot's violations of PA theory have been discussed throughout this thesis, though benefits of viewing Blackfoot as a tone language have not yet been fully exposed. The stress column has been removed from the table, since stress has been decisively eliminated for Blackfoot prominence. Reanalyzing Blackfoot as a tone language facilitates the understanding of many irregular, or unusual aspects of the language when viewed through the lens of PA theory.

	TONE	**PA**
Acoustic correlate(s)	Pitch	Pitch
Prominence-bearing unit	Morpheme: - Mora, vowel, syllable	Word or phrase: - Minimally the word; maximally the phrase
Distribution	Free: - Multiple adjacent tones acceptable	Culminative: - Only one primary prominence per accentual unit
Rules affecting prosody	Assimilatory, dissimilatory, spreading	Accent reduction rules & spreading rules
Function	Distinctive: - Paradigmatic	Organizational: - Syntagmatic

Table 12: Prototypical Characteristics of Tone and PA

1. *Acoustic correlate(s).*

It has been illustrated that both PA and tone systems employ pitch as the primary phonetic correlate. This feature is not capable of distinguishing between a tonal or accentual system for Blackfoot.

2. Prominence-bearing unit.

PA languages minimally employ the word and maximally the phrase as the accent-bearing unit (ABU). Blackfoot has demonstrated its ability to severely stray from this size-limit, permitting both entire phrases with no accent whatsoever, and simplex words with multiple accents. Tone languages, on the other hand, permit the mora as minimal tone-bearing unit (TBU). This neatly fits with both the Blackfoot data, including its multiple tone-bearing words, and the morphological analysis presented in Chapter 5. Bearing in mind that each affix and stem may be lexically-specified for tone, this indicates that the prominence-bearing unit for is tone accurately represented by Blackfoot data. A large number of morphemes are lexically-specified for tone, such as aspect/tense markers (*áak* 'future', *á* 'durative', *í* 'past'), negation (*máát-*), adjuncts (*ssáak* 'try', *póína* 'erratic, frantic') and so forth. The tonal analysis provides great benefits from the point of view of the type of prominence-bearing unit.

Further support for Blackfoot as a tone language over a PA language based on the size of the prominence-bearing unit comes from the singular pronoun enclitic, *-áyi*. This previously unaccentable morpheme (based on its domain, an enclitic) is now regularly found to carry prominence. This indicates Blackfoot is moving toward a tonal system where all elements, not just elements near the left-edge, are free to bear tone.

3. Distribution.

This feature is likely the most clear-cut in resolving whether it is more beneficial and accurate to view Blackfoot as a PA or tone system. Although intimately linked with the previous feature (prominence-bearing unit), a consideration of distribution is not redundant. PA systems strive to maintain culminativity, where one and only one

accent may appear per ABU. In order to preserve culminativity, accent rules are typically based on suppression, where multiple accents delete or reduce. In many tone systems, however, tone distribution tends to be free and persistent, in that tones do not delete and are subject only to phonotactic restrictions based on idiosyncratic historical accidents, analogous to segmental restrictions (see Beckman 1986:44 and tone dissimilations in §6.1.3). This distribution of Blackfoot prominence is more compatible with a tonal analysis, since data has illustrated that multiple tones can be found in one word, and that their distribution is free, meaning that tones may fall adjacently[34]. Therefore, again a tonal analysis is more appealing when considering the facts of Blackfoot.

4. *Rules affecting prosody.*

Although both rules of PA and tone allow for spreading, a process found in Blackfoot, support for Blackfoot as a tonal as opposed to a PA system with respect to this feature are two-fold. Firstly, the most important element in PA rules is reduction of accents to one per accentual domain, so as to maintain culminativity. There is no evidence that there are any rules in Blackfoot striving for accent reduction.

Although at this point there are no cases where prominence spreads across syllables in Blackfoot, the underlying explanation for the observed accent-spread indicates that potentially this may happen (see example 102). This reasoning may seem circular, but in tandem with other evidence for Blackfoot as a tonal system, doubts should be eliminated.

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[34] Exceptions to this are discussed in the tone dissimilation section above (§6.1.3) and are likely due to tonal domains within the word.

Glottalization is representative of the many-to-one trait of tone systems, and in Blackfoot, two tones (H and L) appear on one single long vowel. Since this process is not permitted in accentual systems, it is evidence enough to illustrate that Blackfoot is tonal. Additional evidence of "accent" spread supports the argument that spreading in Blackfoot is tonal, and not some type of accentual spreading. Finally, rules of accentual systems tend to be hierarchical, meaning that if there were to be more than one accent in a PA system, it would be secondary to the primary accent. This is clearly not the case for Blackfoot, demonstrated by waveforms, which illustrate that each tone is of equal value, where one is not any more prominent than the other.

Additionally, dissimilation of prominences is also indicative of Blackfoot's tonal nature. The dissimilations are local, indicating the system is either metrical or tonal. Since metricality is clearly not found in Blackfoot, it must be tonal. The dissimilations occur among the pre-stem affixes, and although adjacent tones are found elsewhere in the word without dissimilation, this is likely because they occur in separate domains.

5. *Function.*

The function of prominence is not clear for Blackfoot. It is evidently not an organizing tool as is the case for PA systems, since it does nothing to aid in parsing an utterance. This is demonstrated by extremely long words which have no prominence, and short or simplex words with up to four tones. However, prominence in Blackfoot is not especially distinctive, as is the case for many tone systems. As reviewed above, Blackfoot evidence argues against the simple view of a proportional relationship of high functional load to many minimal pairs, since the main function of tone is not its

ability to distinguish morphemes in Blackfoot, resulting in few minimal pairs, contrary to Beckman's (1986) proposal.

6. Other aspects.

Other evidence supporting Blackfoot as a tonal as opposed to an accentual (PA) language can be seen in three further features. The first is the tonal contour developed by glottalization. Glottal stop is associated with L tone and upon its deletion (which causes compensatory lengthening), a H+L tone falls on the subsequently lengthened vowel. By definition, this is a tonal contour because a modulation in pitch occurs within the same TBU. Tonal contours are typical of pure tone languages, and less commonly found in PA systems (*cf.* Serbo-Croatian[35]).

Past aspect is arguably marked by *í-*. Likely due to its minimal prosodic nature, the vowel often deletes completely (especially where a surrounding segment is also an *i*, see examples (42-43)), and the prominence simply ends up marking aspect. This suggests that a floating tone may develop for aspect. It is common for tone to assume a grammatical function, as seen in many African languages (see Schuh 1978, for example). Both the potential for tone to take on a floating character and for tone to have a grammatical function suggest prominence in Blackfoot is tonal.

One final argument for tone in Blackfoot, already discussed above, can be made based on the unusual prominence-bearing enclitic, the distinct singular third person pronoun. As the only clitic lexically-specified for prominence, it is an irregularity. However, I believe that development of prominence on that item is suggestive of the

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[35] In Serbo-Croatian, contours are only found on long vowels (Inkelas and Zec 1988:229). In this case the contour is likely apparent, since only one element of the syllable, the latter for the rising accent, and the former for the falling accent, would carry PA. For further information on Serbo-Croatian PA, refer to Inkelas and Zec (1988).

transition in the system toward tone. No other clitic is specified for tone, but now an element typically with no tonal specification at all is bearing tone. This indicates that tone is beginning to pervade the system and freely associate with all elements of the language.

This evidence undoubtedly indicates that Blackfoot fits better as a tone language than as a PA language. Although there is much room for study, this early research into the phonology of Blackfoot prominence suggests a number of correlations with tonal phonology.

Chapter 7

Conclusion

For Native America the task has become "renegotiating its subjectivity through the absence of itself, and the presence of another it feels itself not to be."
Jean Fisher, Unsettled Accounts of Indians and Others

This thesis has investigated the nature of Blackfoot prominence. Although not every aspect of the prominence system could be included in this investigation, an exploration of Blackfoot's system was undertaken. This thesis has pointed to many future areas of research which would enhance our knowledge of Blackfoot. There is much to discover and understand in Blackfoot prosodic phonology; as noted by Cook (1994:82), "the pitch accent, consonantal and vocalic lengths, and consonant clusters, among others, in the Blackfoot phonology, will offer a great opportunity to anyone who is willing to tackle the problems, taking advantage of recent advancements in prosodic phonology."

A broad and extensive review of prominence theory literature is provided in an attempt to clarify its nearly unwieldy content. This review also intends to critique and eliminate irrelevant preceding theories. Previous research on Blackfoot's prominence system is undertaken in Chapter 4. Interestingly, a thorough investigation of the prominence system has never been carried out until very recently. Based on assumptions from early research (Uhlenbeck, for example), Blackfoot has been held as a PA language since Frantz's (1970) dissertation, and Kinsella's (1972) dissertation. Taylor (1969) states that Blackfoot is a stress language, where pitch and stress happen to fall at the same place in the word. His analysis proposes a split system where both stress and pitch are found within the same word, according to specific contexts. Van Der Mark's

contemporary research (2003) did not provide a comparison of her work to Taylor's (1969) research, even though it addresses it directly. I undertook this task in §4.2.2, and show that Taylor's proposal is fallacious.

Van Der Mark's valuable research illustrates that Blackfoot is acoustically not a stress language, but has acoustic and possibly physiological correlates in line with a PA system. Unfortunately, she does not control for vowel position (the location of the vowel within the word) in her experiments measuring acoustic correlates of Blackfoot prominence, a gap needing to be filled by future research. Her work also overlooks the possibility of Blackfoot as a tone language, despite pitch being the core phonetic correlate of both PA and tone systems. In line with her suggestion of Blackfoot as a PA language, I attempt in §4.3 to illustrate that phonologically, it is a PA system. This proves extremely difficult and unsuccessful. However, her work is the first major contribution where verifiable evidence is used in her argumentation on Blackfoot's prominence system and provides foundations for future research.

Kaneko's (1999) thesis, reviewed in §4.2.3, is concerned with patterns of nominal compounding and presents a large number of generalizations about Blackfoot's prominence system, which she claims is PA. When confronted with more data, Kaneko's generalizations are unable to encompass the wide range of patterns found in Blackfoot. Admittedly, many of her generalizations were correct for some Blackfoot data and should not be ignored. However, her generalizations did not capture all the counterexamples posed by additional data. Furthermore, generalizations identified by Kaneko are better explained by principles other than those based on PA theory. It is possible that Kaneko's analysis was skewed by assertions of Blackfoot's status as a PA

language. To this end, a level of bias shades the data used by Kaneko. Although much more research is required to explain tonal interactions within the morphological word, (MWd), it is likely that Kaneko's descriptions of what appear to be PA suppression rules (deleting of multiple accents until culminativity is achieved), are in fact tone dissimilations within a specific domain. In fact, §5.5 illustrates that counterexamples to Kaneko's research form the basis for the main counterargument against her position that Blackfoot is a PA language. This section illustrates that compounds, either nominal compounds or verbal complexes, are the most likely source of multiple prominences, since more often morphemes attach to the stem with prominence in tact.

This thesis reveals new information about Blackfoot's morphology, which is unable to provide an acceptable explanation for multiple prominences,. Firstly, a Blackfoot word is composed of stem(s), pre-stem affixes and person-number agreement clitics. The stem and affixes fall within the MWd, a domain where elements may be lexically-specified for prominence. The agreement clitics fall outside the MWd and are part of the larger PWd. Only in one case do these clitics bear prominence (on the singular distinct third person pronoun enclitic), otherwise these elements are not lexically-specified for prominence. The prominence seen in this particular enclitic is extremely stable, unlike that seen within the MWd. The only occasion where the proclitic bears prominence is where a syllable of the stem undergoes spirantization and becomes phonologically deficient, unable to carry prominence. In these cases, prominence may move onto the proclitic. If there are any affixes preceding the stem, it will fall there instead, but it may move rightward, deeper into the stem.

All of the conclusions in this thesis point to Blackfoot as an emerging tonal system. Persistent violations in culminativity are the strongest argument pointing to a tonal system. There is no way to resolve the violations, forcing the PA option from the list for Blackfoot prosody. Three further arguments in favour of the tonal proposal, along with a number of other clues hint at a tonal system as well. The three key processes typically of tone languages, glottalization, accent spread, and tone dissimilation, form the strong arguments for Blackfoot as a tone language. Other minor arguments, such as the lack of minimal pairs in a language of Blackfoot's morphological type, development of a tonally specified element in a typically non-tonal domain (the enclitic, *-áyi*), the contour tone resulting from glottalization, the mora as the prominence-bearing unit, the surprising number of tone languages areally surrounding Blackfoot, and the potential for a floating tone with grammatical significance, among other facts, are suggestive of Blackfoot as a tonal, and not accentual system.

Yet, Blackfoot does not readily fit into any prosodic system and contradicts prototypical tonal criteria. For example, numerous instances of multiple pitch prominence in compound forms are not correlated transparently with individual morphemes. The language fits better as a tone language than as a PA language, but shows indications that it is a system in transition from a PA language to a tonal one.

This thesis suggests a number of starting points for new research and future studies since it has revealed more questions than it has answered. McCawley (1978:127-8) boldly claims that asking if a language is a PA or tone language "is a stupid question to ask," because of the variety found in each system. For Blackfoot, this is not such a bad

question to ask. Clarifying Blackfoot's ostensibly inconsistent and unruly behaviour has lead to the proposal that Blackfoot is an emerging tone language.

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