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M. A. thesis proposal

Northern East Cree Stress and its Acquisition

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1. Introduction

Researchers in linguistics strive to reach a universal understanding of how languages function and, from a developmental perspective, how they are typically acquired with such apparent ease by young children. However, in order to achieve these research goals, we must recognize all the structural commonalities and differences of the world's languages and correlate them with observations of the speech patterns produced by language learners. One challenge for research in these areas is the relative lack of documentation of minority languages. The proposed study will contribute to this area of research by investigating the phonology and phonological development of Northern East (NE) Cree, as it is spoken in Chisasibi, Québec. While there has been some work done on Western Cree dialects (e.g. Bloomfield 1928; Ellis 1971; Wolfart 1973 and Dahlstrom 1991), this work has only just begun for Eastern dialects, including NE Cree.

I propose to contribute to the description of NE Cree by investigating both the stress system of this language and how Cree-learning children acquire it. Stress makes a particular syllable more salient in a word or phrase. Acoustically, stress is realized through a change in fundamental frequency (pitch), vowel duration (length), or amplitude (loudness) (Hayes 1995). The use of each of these phonetic cues to mark stress varies across languages; languages can use one or more of these cues, and attribute to these cues different degrees of importance. Most of the research done on the acquisition of stress has investigated learners of language such as English (Allen and Hawkins 1980, Pollock, Brammer and Hagerman 1993; Kehoe, Stoel-Gammon and Buder 1995; Schwartz, Petinou, Goffman, Lazowski and Cartusciello 1996), Spanish (Hochberg 1988a,b), Dutch (Fikkert 1994), Swedish and Japanese (Ota 2003a,b), with some research involving the bilingual acquisition of French (LaBelle 2000; Champdoizeau 2006). The acquisition of other stress systems remains largely undocumented. Through a combination of acoustic and phonological analyses, I will uncover how stress is realized in NE Cree as well as the development of this system in child speakers over time.

This paper provides an outline of my proposed research. In Section 2 I will describe the theoretical framework which is the basis of my research. In Section 3 I will summarize background literature on stress in NE Cree and the acquisition of stress. In Section 4 I will describe the methodology for my research project. Section 5 provides some preliminary results from the acoustic analysis that I have already completed.

2. Theoretical Framework

2.1. The phonetics of stress

Stress is what makes a particular vowel or syllable relatively more prominent in a word or phrase. The change in phonetic properties of stressed syllables provides rhythmic structure in language. As mentioned in the previous section, this relative prominence is achieved through an increase in fundamental frequency, duration, amplitude, or a combination of the three (Hayes 1995). Such phonetic cues are often used to mark stress based on what is available in the language's phonology. For example, languages that use duration for phonemic contrasts often make use of duration to mark stress (Hayes 1995: 7). This explains, in part, why the phonetic correlates of stress vary across languages.

2.2. The phonology of stress

All normally developing children are born with the innate ability to learn language. This ability is what linguists generally refer to as the Language Faculty, or Universal Grammar (UG). Chomsky (1975: 29) defines UG as "the system of principles, conditions and rules that are elements or properties of all human languages". Within Chomsky's model of UG, children are equipped with an inborn acquisition device. This device contains a set of principles and parameters. Principles are a series of linguistic constraints regulating all of the world's languages, whereas parameters are grammatical settings which are given a value based on the language being acquired (i.e. what varies across languages) (Cook 1988). How and when children acquire the parameter settings required for accurate production of stress is of particular relevance to my research. Halle and Vergnaud (1978), Hayes (1995), and Dresher and Kaye (1990) identify possible universal parameters involved in acquiring the metrical structure of language. The proposed parameters regulate the size, shape and parsing of linguistic constituents regulating stress patterns.

The theory of Metrical Stress, as proposed by Hayes (1995) provides several metrical parameters which can be used to account for the stress rules of a language. These parameters are listed below:

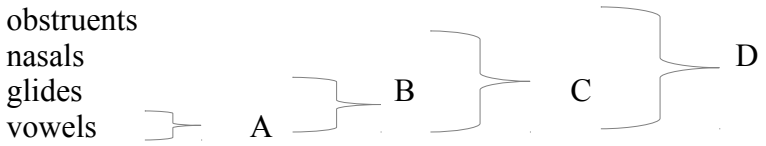
- **Foot Domain:** Bounded/Unbounded
- **Quantity Sensitive:** Yes/No
- **Degenerate Feet:** Yes/No
- **Headedness:** Left/Right-headed
- **Direction of Footing:** Left-to-right/Right-to left
- **Foot Construction:** Iterative/Non-iterative
- **Extrametricality:** Yes/No
- **End Rule:** Right/Left

In the following paragraphs I will provide a brief description of each of these parameters.

Foot Domain: The parameter for foot domain determines the maximum size of the domain for stress. This parameter provides either a maximally binary (bounded) or maximally unlimited number of syllables (unbounded) (Hayes 1995).

Quantity Sensitivity: Some languages are sensitive to syllable weight. These languages are quantity sensitive. One unit of syllable weight is called a 'mora'. Universally, a vowel is moraic. This means that a CV syllable is monomoraic and therefore light. Bimoraic syllables are CVV and sometimes CVC syllables, in languages where codas (tautosyllabic, post-vocalic consonants) are assigned moras. Languages can also differ in which coda segments carry weight. Zec (1994) provides segmental classes that languages may use as moraic codas. These classes are illustrated below.

(1)



The above illustration represents the levels at which languages allow classes of segments to be moraic. Subset A represents languages in which only long vowels make a syllable bimoraic, or heavy. Other languages allow both long vowels and glides in the coda position to create a heavy syllable (Subset B). Less restrictive languages have moraic vowels, glides and nasals (Subset C), and some languages allow any coda consonant to carry syllable weight (D). Quantity sensitive languages vary in what can carry syllable weight, however, universally these languages must

assign stress to a heavy syllable (Hayes 1995).

Degenerate Feet: Whether a language has restrictions on the minimum size of a foot is another parameter which is relevant for metrical structure. This parameter determines whether or not the language allows degenerate feet. A degenerate foot is a "single light syllable in systems that respect syllable weight [...] and single syllables in quantity insensitive systems" (Hayes 1995:86).

Headedness: In cases where languages have bounded feet, maximally made up of two syllables, it is important to determine which syllable can be stressed. The headedness parameter determines whether a language has right- or left-headed feet. Iambic languages, i.e. languages that are right dominant, generally allow the following feet: (LL), (LH), (H), and (L) if the language allows degenerate feet ('L' represents a 'light syllable' and 'H' represents a 'heavy syllable'). Trochaic languages, by contrast, are left dominant. Two types of trochees have been attested: moraic trochees and syllabic trochees. Moraic trochees are quantity sensitive and allow the following feet: (H), (LL), and (L) if the language allows degenerate feet. Syllabic trochees, by contrast, are quantity insensitive, and therefore allow any disyllabic foot, and monosyllabic foot, if the language allows unary feet.

Direction of Footing: This metrical parameter decides the edge from which foot parsing begins. Feet are built from left-to-right or right-to left. Hayes, however, claims that iambic (right-headed) languages appear to universally build feet from left-to-right (1995:262).

Foot Constructions: This parameter determines whether a language has iterative or non-iterative foot construction. Iterativity predicts whether a language will have one or more stresses in a prosodic word.

Extrametricality: This parameter, first proposed by Liberman and Prince (1977), makes a prosodic constituent invisible to stress assignment. Hayes (1995) explains that an extrametrical constituent must be a segment, a syllable, a foot, a phonological word or an affix. Furthermore, extrametricality must be peripheral, meaning that an extrametrical constituent must be at the edge of a domain, such as at the end of a prosodic word or phrase. Extrametricality must also be non-

exhaustive. This means that extrametricality is blocked if it would make the entire domain unstressable.

The End Rule: This parameter determines which end of the domain will have primary stress (Hayes 1995). In the case of iterative foot parsing, several feet are built, each of which has a stressable syllable. However, a domain, especially the word, can only bear one main stress. The End Rule determines whether or not it is the rightmost or leftmost stressable syllable that is assigned main stress.

In order to illustrate the parameters described above, I will discuss how they are used to derive the stress rule for a modified version of Icelandic, which I have named 'Exlandic.' I have modified stress rules and lexical items in Icelandic in order to illustrate extrametricality and to better demonstrate quantity insensitivity. Below are some lexical items from Exlandic:

(2)

i)	σ̲	Jón	' John'
ii)	σ̲σ	tá.ska	'briefcase'
iii)	σ̲σσ	héf.ðin.gja	'chieftain'
iv)	σ̲σσ̲σ	ák.va:.rè.la	'aquarelle'
v)	σ̲σσ̲σσ	bí.o.grà.fi.a	'biography'
vi)	σ̲σσ̲σσ̲σ	skó.la:.bò.ka.sà.fen	'school library'

The metrical parameters for Exlandic are as follows:

- **Foot Domain:** Bounded
- **Quantity Sensitive:** No
- **Degenerate Feet:** Yes
- **Headedness:** Left-headed
- **Direction of Footing:** Left-to-right
- **Foot Construction:** Iterative
- **Extrametricality:** Yes
- **End Rule:** Left

In the following paragraphs I will discuss evidence for the parameters listed above.

Foot Domain: In Exlandic feet are bounded and maximally binary. This is revealed through words with more than one stress. Looking at (iv) for example, regardless of whether or not there

are left- or right-headed feet, there must be a maximally binary foot.

(3)

trochaic	(σσ)(σσ)	ák.va:.rè.la	'aquarelle'
iambic	(σ)(σσ)σ	ák.va:.rè.la	'aquarelle'

Quantity Sensitivity: Exlandic is not quantity sensitive. Based on (iv), as shown above, there is a long vowel /a:/ in an unstressed environment and the following light syllable receives secondary stress. As previously discussed, Hayes (1995) explains that in quantity sensitive languages, a heavy syllable must be stressed. Quantity sensitive languages must also minimally have a CVV heavy syllable (Zec 1994), and therefore if Exlandic were quantity sensitive, the long antepenultimate vowel would have to carry stress.

Degenerate feet: Exlandic does have degenerate feet. This is illustrated through example (i) in which we find a monosyllabic stressed word.

Headedness: Exlandic has syllabic trochees. By looking at even number syllables, such as examples (iv) and (vi) (shown below), it is clear that an iambic structure would be ill-formed. As previously discussed (HL) is an impossible iambic foot, therefore the above iambic footing is ill-formed. Syllabic trochees are quantity insensitive, and do not have such restrictions.

(4)

	Iamb	**Syll. troch.**		
iv)	*(L)(HL)L	(LH)(LL)	ák.va:.rè.la	'aquarelle'
vi)	*(L)(HL)(LL)L	(LH)(LL)(LL)	skó.la:.bò.ka.sà.fen	'school library'

Direction of Parsing: Footing in Exlandic must be left-to-right. If foot parsing were right-to-left, incorrect stress placement would result. Both parsings are illustrated below. In the table below I will assume the final syllable is extrametrical (marked using angular brackets). I will discuss evidence for extrametricality later in this section.

(5)

	Right-to-left	**Left-to-right**		
iv)	*(σ)(σσ)<σ>	(σσ)(σ)<σ>	ák.va:.rè.la	'aquarelle'

vi) *(σ̲)(σ̲σ)(σ̲σ)<σ> (σ̲σ)(σ̲σ)(σ̲)<σ> skó.la:.bò.ka.sà.fen 'school library'

Based on the above example, we can see that a left-to-right parsing yields the correct stress in Exlandic.

Foot Construction: Exlandic is iterative. There is secondary stress in this language, and therefore more than one metrical foot must be built.

Extrametricality: Evidence for extrametricality comes from words with an odd number of syllables. Examples (iii) and (v) have two unstressed syllables word finally. I have previously illustrated that Exlandic allows degenerate feet, therefore if there were no extrametricality, the final syllable would be stressed. The parsing of (iii) and (v) are given below:

(6)

	No extrametrical	**Extrametrical**		
iii)	*(σ̲σ)(σ̲)	(σ̲σ)<σ>	héf.ðin.gja	'chieftain'
v)	*(σ̲σ)(σ̲σ)(σ̲)	(σ̲σ)(σ̲σ)<σ>	bí.o.grà.fi.a	'biography'

Above in (6) a final extrametrical syllable predicts the correct stress assignment in Exlandic.

End Rule: Main Stress is always the first stressed syllable in a prosodic word revealing that End Rule left is in place.

The current section has described metrical parameters and how they are used to derive the stress rule of a simulated language. In the following section I will describe how these metrical parameters are used to analyze the stress system of NE Cree.

3. Literature Review

The metrical parameters described in the previous section have been used to derive the stress system in Southern East Cree (Brittain 2000; Piggott 2003), and more recently the stress system of NE Cree (Dyck et al. 2006; Wood 2006). In 3.1, I will discuss the metrical parameters of NE

Cree based on Dyck et al. (2006), as well as the alternate analysis offered by Wood (2006). In section 3.2, I will present a survey of research in the phonetic and phonological acquisition of stress respectively, in other languages.

3.1. Stress in NE Cree

Both Dyck et al. (2006) and Wood (2006) agree on most parameter settings for NE Cree. In section 3.1.1, I describe the metrical parameters of NE Cree based on the analysis by Dyck et al. (2006). I will then, in section 3.1.2, discuss the areas in which Dyck et al. (2006) and Wood (2006) differ in their analyses.

3.1.1. Parameters in NE Cree

The parameter settings discussed in the analysis are given below:

- **Foot Domain:** Bounded
- **Quantity Sensitive:** Yes
- **Degenerate Feet:** No
- **Headedness:** Right-headed
- **Direction of Footing:** Right-to-left
- **Extrametricality:** Yes
- **End Rule:** Right

Foot Domain: NE Cree has a bounded, maximally binary foot. An unbounded analysis can be ruled out by examples such as the one below (the stressed syllable is underlined) (Dyck et al. 2006:10):

(7)

pi.<u>chi</u>.wi.yân L(<u>L</u>L)<S> 'cloth'

Dyck et al. (2006:5) state that in the example above stress would occur on the initial syllable if NE Cree had left-headed, unbounded feet and on the penult, if NE Cree had right-headed unbounded feet.

Quantity Sensitivity: NE Cree is quantity sensitive; however, codas are not moraic. In this dialect, historically long vowels are heavy, while historically short vowels are light (historically long vowels are marked with a circumflex in standard Cree orthography). Evidence for quantity

sensitivity comes from the fact that NE Cree assigns stress to the penultimate syllable if it is heavy; otherwise the antepenultimate syllable is stressed. This is illustrated below (Dyck et al. 2006:4).

(8)

i.	î.ti.nim	'hold like so'
ii.	ni.pâ.win	'bed'
iii.	wâ.pu.shuch	'rabbits'
iv.	a.wâ.shish	'child'

Headedness: Dyck et al. (2006) note that many Algonquian languages have been described as iambic, therefore Proto-Algonquian was most likely an iambic language. The stress system of NE Cree appears to conform to this pattern. Most data collected from NE Cree can be analyzed as iambic, as illustrated by the examples below (Dyck et al. 2006: 9):

(9)

a.si.nî	(LL)<H>	'stone'
a.ni.ku.châsh	L(LL)<H>	'squirrel'

The above provides evidence for a right-headed language, as the right syllable in a (LL) foot is stressed. There are however some which are parsed as syllabic trochees. As shown below:

(10)

mis.chi.shin	(LL)<L>	'shoe'
mi.ku.shân	(LL)<H>	'feast'

An explanation is provided to account for stress on the antepenultimate syllable in such cases. This explanation is based on the observation by MacKenzie (1980) that the dialect of Cree spoken in Chisasibi is undergoing a stress shift in order to avoid homophony. Dyck et al. provide the following illustration (2006:11):

(11)

pâ.yi.kush.tâw	(H)(LL)<H>	'nine'
pâ.yi.kush.tâw	(H)(LH)<H>	'there's one object sitting over there'

Degenerate Feet: There are no degenerate feet in NE Cree. There are, however, cases where degenerate feet can occur. In words that are monosyllabic and light, stress can occur. Some examples are shown below:

(12)

miht	L	'firewood'
pit	L	'soon'

Direction of Footing: As previously discussed, Hayes (1995) claims that iambic languages are universally built from left-to-right. However, Dyck et al. (2006) state that footing is right-to-left in NE Cree, but do not elaborate on this theoretical issue.

Extrametricality: The final syllable in NE Cree extrametrical. Since extrametricality is nonexhaustive (Hayes 1995:48), it is blocked in monosyllablic words, as it would render the word unstressable. Dyck et al. (2006:5) provide the following data to illustrate cases where extrametricality is blocked:

(13)

ât	H	'even; if; though;' etc.
pîn	H	'wooden clothespin'
miht	L	'firewood'
pit	L	'soon'

End Rule: Based on the data presented in this section, there is evidence that End Rule right assigns main stress in NE Cree. This is illustrated by the fact that stress occurs closer to the right edge than the left edge. This is best illustrated through multisyllabic words, as illustrated below (Dyck et al. 2006:9):

(14) pâs.chi.si.kin 'gun, rifle'

(15) ti.pâ.chi.mu.win 'story'

(16)

End Rule				*	
Foot level		*		*	
Syllable level	(*	*)	(*	*)	<*>
	ti	pâ	chi	mu	win

In (16) above, metrical parameters are used to derive stress for the word meaning 'story'. The metrical parameters described derive the correct stress placement for NE Cree, in this and most cases.

Dyck et al. (2006) verified stress placement through preliminary acoustic analysis of a sample of forms. Based on this analysis, Dyck et al. (2006) found that pitch and amplitude were the relevant cues for stress in NE Cree. Additionally, they noted that syncope and devoicing optionally occur in metrically weak penults.

3.1.2. Outstanding Issues

Wood (2006) provides a slightly different analysis of NE Cree. Based on the description above, there are three areas in which Wood (2006) has a different approach: direction of footing, extrametricality and degenerate feet.

Firstly, Wood (2006) claims that stress in NE Cree is assigned from left-to-right. He does not provide evidence for this. He cites Hayes' (1995) claim that all iambic languages are built from left-to-right, and indicates that this direction of footing predicts the correct stress placement in his transcriptions.

An additional difference in Wood's (2006) analysis is his treatment of apparent trochaic feet in a portion of the data. Dyck et al. (2006) propose that forms like those given in (10) are built from a trochaic foot to avoid homophony, however, Wood (2006) provides an alternate explanation. He claims that NE Cree has preserved an extrametrical foot in some lexical forms. The motivation for having an extrametrical foot comes from the fact that Southern East (SE) Cree, a closely related dialect, consistently has foot extrametricality (Brittain 2000). Wood (2006) also notes that several other Algonquian languages have extrametrical feet, including Passamoquoddy and Ojibwe. This would account for the same data as discussed by Dyck et al. (2006) as illustrated below:

(17)

	Dyck et al.	**Wood**	
<u>mis</u>.chi.shin	(<u>L</u>L)<L>	(<u>L</u>)<LL>	'shoe'
<u>mi</u>.ku.shân	(<u>L</u>L)<H>	(<u>L</u>)<LH>	'feast'

Based on this analysis, we can say that the exceptional data represent the metrical structure of an earlier form of East Cree, whereas Dyck et al. (2006) propose that these are an innovation to avoid homophony. Wood's (2006) analysis does not exclude the possibility that this structure remains in a list of forms for the same reason. Perhaps NE Cree retained these forms because changing them would cause homophony.

A third dissimilarity illustrated in (17) above, is that Wood's (2006) analysis imposes fewer restrictions on degenerate feet. The analysis presented in the last section revealed that degenerate feet may only occur in monosyllablic words consisting of one light syllable. In Wood's (2006) analysis, a degenerate foot can also occur when it is the only metrically visible syllable in a word, as illustrated in his parsing of the lexical items in (17).

The two different analyses of NE Cree pose a number of questions which I propose to address in my research. However, before undertaking this task myself, it is important to have the most accurate stress transcriptions. As non-native speakers of Cree, stress judgments by transcribers are often inaccurate. This has caused some variation in stress transcription by Dyck et al. (2006) and Wood (2006), as illustrated below.

(18)

Orthography	**Dyck et al.**	**Wood**	**Gloss**
a.ku.chin	a.<u>ku</u>.chin (2006:9)	<u>a</u>.ku.chin (2006:54)	'It is hanging up'

In order to resolve ambiguities such as this one, I propose to conduct acoustic analysis of the entire corpus, to ensure that the transcription of stress is as accurate as possible. Accurate stress transcriptions will, in turn, provide a good foundation for metrical analysis.

In this section I have introduced the metrical parameter settings in NE Cree based on Dyck et al. (2006) and Wood's (2006) analyses. As we have seen, further analysis is required in order to answer the questions addressed in this section. These questions will be addressed and supported by results of objective measurement taking which will provide a sound foundation for looking at the development of stress.

3.2. Acquisition of Stress

In Section 3.1, I discussed analyses of the stress system of NE Cree. In addition to this, the way that this stress system is acquired by children is also relevant to my research. As previously

discussed, there has been no work done on the acquisition of stress in any Algonquian language. Therefore, it is important to look at the available evidence from the acquisition of other languages. This section will discuss previous research done on acquisition from a phonetic and phonological viewpoint.

3.2.1. Acquisition of phonetic cues for stress

The majority of the research on the monolingual acquisition of the phonetic cues for stress focuses on English-speaking children (Allen and Hawkins 1980; Kehoe et al. 1995; Pollock et al. 1993; Schwartz et al. 1996).

Allen and Hawkins (1980) measured duration and fundamental frequency of syllables produced by English-speaking children of approximately three years of age. Based on these measurements they found positional effects on stress. Final stress in child speech is marked by duration, whereas non-final stress is marked by an increase in pitch. Allen and Hawkins (1980) also noted that children often have unreduced unstressed syllables. They concluded that learning to reduce weak syllables represents an important step in the acquisition of stress.

Kehoe, Stoel-Gammon and Buder (1995) examined the question of whether or not young children (in this case 18-30 months) have the same acoustic correlates of stress as adults, or whether they acquired these acoustic correlates over time. This study was conducted with English speakers, English stress being marked by an increase in pitch, amplitude, and length. Unlike the conclusions of Allen and Hawkins (1980), the authors found that children have the same stress correlates as adults at an early age. They note, however, that the difference in amplitude of stressed syllables compared with unstressed syllables increases significantly with age. At 18 months of age the mean difference between stressed and unstressed syllables is 3.5 dB, whereas at 30 months the mean difference is 5.6 dB. Kehoe et al. (1995) also note that all children produce relatively long unstressed syllables in disyllabic words.

Pollock, Brammer and Hagerman (1993) conducted a study in which they looked at the acoustic correlates of syllables in nonsense words, produced by two-, three-, and four-year-old children. They found that children aged three and four years old produced target-like stress, whereas two-year-old children used only one cue for stress: duration. Pollock et al. (1993) also found that the duration of stressed syllables remains steady over time, but that the duration of unstressed syllables decreases with age.

Most recently, Schwartz, Petinou, Goffman, Lazowski and Cartuciello (1996) conducted a study involving children aged 22-28 months. Similar to the results of Allen and Hawkins (1980) they found positional effects for amplitude and duration in child speech. They found that word-initial and word-final stress are marked mainly through duration. Schwartz et al. (1996) also found that children do not reduce unstressed syllables to the same degree as adult speakers do.

The studies completed on English in some ways present conflicting results. Both Allen and Hawkins (1980) and Schwartz et al. (1996) find positional effects on the phonetic cues for stress, whereas Pollock et al. (1993) find that younger children use only duration to mark stress. Kehoe (1995), by contrast, observes that children have target stress cues from an early age. Aside from these differences, all these studies find that children up to three years of age do not reduce unstressed syllables to the same degree as adults. These works all suggest that the reduction of weak syllables is something that develops gradually over time.

In the above paragraphs I have summarized research done on the acquisition of the phonetic cues for stress. However, it is also important to understand how children acquire the appropriate metrical parameters for their target language. I address these issues in the next sub section.

3.2.2. The phonological acquisition of stress

In section 2.2, I outlined the metrical parameters required to derive the stress rule for a language. Dresher and Kaye (1990) attempt to link metrical theory to acquisition. They hypothesize that by looking at the acquisition of metrical parameters, the developmental stages in stress acquisition can be understood. They propose that there are default parameter settings and that evidence from stress errors in child language would provide evidence for these default settings. Furthermore, Dresher and Kaye (1990) suggest that different metrical parameter settings are acquired at different stages, in which case stress errors should be systematic in specific age groups. Some default parameter settings proposed by Dresher and Kaye (1990) are listed below:

- **Foot Domain:** Unbounded
- **Quantity Sensitive:** No
- **Headedness:** Left-headed
- **Direction of Footing:** Left-to-right

- **Extrametricality:** No
- **End Rule:** Left

A small number of studies have tested Dresher and Kaye's (1990) hypothesis, by trying to identify developmental stages in the acquisition of metrical parameters. Fikkert (1994) and Kehoe (1998) formalized these developmental stages by looking at child data from Dutch, and English respectively.

Fikkert (1994) was the first to employ Dresher and Kaye's (1990) hypothesis through a longitudinal study of twelve Dutch-speaking children. Based on these children's stress errors, Fikkert (1994) described four stages in the acquisition of stress. At stage 1 the child maps everything on to a trochaic foot. In his or her production of *SW*[1] words, the child can produce a disyllabic word. In the production of *WS* and *SWS* words, however, the child initially produces only the strong syllable. At stage 2, the child can still only produce one foot. During this stage, the child can produce a disyllabic foot for *WS* and *SWS* words, however, he or she produces it with a trochaic stress pattern. For example, the word meaning 'guitar' is pronounced [χiːˈtaːr] in the target language, but in the child language at this stage it is pronounced [ˈsiːtaː]. At stage 3, the child can produce two feet, but assigns equal stress to each foot. Fikkert (1994) explains that at this stage, the child has expanded its prosodic template to two feet, but the child has not yet acquired the End Rule. At the fourth stage, the child has acquired the End Rule, and can produce a target-like stress pattern. Based on the patterns found in the development of Dutch stress Fikkert (1994) finds that the some of the initial parameter settings are as follows:

- **Quantity Sensitive:** No
- **Headedness:** Left-headed
- **Direction of Footing:** Right-to-left

Kehoe (1998) takes a cross-sectional approach to studying the acquisition of stress in English-speaking children, in order to find evidence of Fikkert's (1994) developmental stages in the acquisition of stress. Kehoe (1998) argues that English and Dutch have similar stress systems, and therefore Fikkert's (1994) observations should provide good predictions for English stress development. Based on data from English-speaking children, Kehoe (1998) finds evidence for

1 Fikkert (1994) uses *S* to represent a strong syllable, and *W* to represent a weak syllable.

some of the developmental stages proposed by Fikkert (1994), and discusses three stages in the acquisition of stress. The first stage (at approximately 22 months) is consistent with Fikkert's (1994) stages 1 and 2, in which the child mapped words onto a trochaic template. Kehoe, however, explains that there were a small proportion of *SWS* and *SWS* words in which the child produces final stress. Kehoe's (1998) second stage is labeled the 'Experimental Stage.' At this stage (approximately 28 months), the child produces more stress errors, and level stress. The children often move stress to the final syllable, indicating they have not yet acquired extrametricality (Kehoe 1998:19). The final stage of stress development is 'The Consistent Stress Pattern Stage' in which the child (aged 34 months) produces a target-like stress placement, having acquired extrametricality and the End Rule.

The findings from Fikkert (1994) and Kehoe (1998) do not provide full support for Dresher and Kaye's (1990) hypothesis. From a theoretical standpoint, Dresher and Kaye's (1990) hypothesis is not uncontroversial. There are others that prefer the Neutral Start Hypothesis which assumes that children do not show a preference for any stress type (e.g. Hochberg 1988a,b; Klein 1984; Pollock et al. 1993). One obvious problem with the studies testing Dresher and Kaye's (1990) hypothesis is that they are all based on trochaic languages (Yvan Rose p.c). It is possible that in the early stages children do not produce iambs, because their language has trochaic footing. Investigating the acquisition of stress in NE Cree will contribute to this area of research, as many of the metrical parameter settings in this language are marked, with respect to Dresher and Kaye's (1990) proposed defaults. If metrical parameters are initially set to the defaults presented by Dresher and Kaye (1990), we would expect consistent errors in stress placement in young speakers of NE Cree.

4. Methodology

4.1. Participants

The data required for my research project will come from three sources. Firstly, a portion of the adult language data comes from recordings of two adult females from Chisasibi: Adult Speaker 1, and Adult Speaker 2. A second source of adult language data will come from my own fieldwork. I will travel to Chisasibi in February and will elicit data from two language consultants. A third source of data will come from the Chisasibi Child Language Acquisition

Study (CCLAS). This ongoing project involves four members of the faculty of Linguistics at Memorial University: Julie Brittain, Carrie Dyck, Marguerite MacKenzie and Yvan Rose. The study currently has digital video recordings of five Cree speaking children: two in Cohort A (12-48 months), and three in Cohort B (36-72 months). I will focus on longitudinal data from one speaker in Cohort A, speaker A1. The child data will range from age 23 to 48 months. The child data is currently being transcribed by myself and two other linguistics students. The adult renditions of these child forms are also being provided by Adult Speaker 2. These forms will be particularly important as they will provide the direct target forms of all A1's utterances.

4.2. Analysis

4.2.1. Acoustic Analysis

In order to verify my own transcription of stress, and in order to uncover the relevant phonetic cues for stress in NE Cree, I will measure the peak fundamental frequency, peak intensity and duration of each vowel. This acoustic analysis will be completed using the *Praat* package for speech analysis. I will carry out this acoustic analysis on both the adult and child language data. This will provide accurate stress transcription, and will uncover any patterns in the acquisition of phonetic cues for stress over time.

4.2.2. Phonological Analysis

The phonological analysis of the adult language will be based on the descriptions provided by Dyck et al. (2006) and Wood (2006). However, based on section 3.2.1 there are still some questions which I will address through my own metrical analysis. Once the stress is properly transcribed in the child language, I will compare the transcriptions with those of the adult forms. Based on the errors made in the child language, I will provide an account of the metrical parameter settings of the child at different stages. This analysis will help provide evidence for, or against, the default parameters proposed by Dresher and Kaye (1990) and the developmental stages proposed by Fikkert (1994) and Kehoe (1998).

5. Preliminary Results

Thus far I have conducted acoustic analysis of each vowel in 223 words from Adult Speaker 1.

This has provided some insight into the phonetic cues relevant for stress in NE Cree. Based on the measurements taken from three-, four- and five-syllable words, there is evidence that pitch is the main marker of stress in NE Cree. Adult Speaker 1 relies on pitch 98% of the time in her production of stressed syllables. This is significantly higher than her use of intensity, which is 86% and duration, 33%. Dyck et al. (2006) noted that stress is marked by both pitch and intensity. Based on results from Dyck et al. (2006) as well as my own results, intensity appears to also be used to mark stress in numerous cases. As pointed out by Lagefoged (2005), we can see that this relationship between pitch and intensity is a result of the articulatory requirements in producing higher pitch. A higher pitch can be produced one of two ways in the vocal tract: through greater force in the respiratory muscles (resulting in a large puff of air) or though greater tension in the vocal folds. The former also results in a syllable with higher intensity, however, the latter does not. The Cree data thus suggest that in most cases an increase in pitch in stressed syllables in NE Cree is produced through an increase in respiratory strength. My study will help determine how this phonetic behavior is acquired by NE Cree children. These results will then be discussed in light of the results from other languages as presented in section 3.2.1.

6. Conclusion

To summarize: in this proposal I have introduced several research questions that I will address in my thesis. I will uncover the acoustic correlates of stress, as well as the metrical parameter settings required for stress assignment in NE Cree. Once the target system has been described , I will explore the development of the acoustic correlates and target metrical parameter settings in one child speaker of NE Cree. This child language data will provide a means to test Dresher and Kaye's (1990) hypothesis. This will, in turn, provide insight into the initial stage of stress acquisition—whether children have access to default metrical parameters, or whether their grammar is unbounded at the onset of acquisition.

This research is significant, in that there have been very few studies done on the acquisition of stress, and no work investigating the acquisition of an Algonquian language. This research will thus provide the first description of the acquisition of one aspect of the NE Cree grammar. Furthermore, the data collected during my fieldwork will remain in the linguistics archive at Memorial University, where they will be accessible by future researchers.

7. Outline

Below is a preliminary outline for my thesis:

1. **Introduction:** Scope and objectives of my research; introduction NE Cree.
2. **Theoretical Framework and Literature Review:** Acoustic properties of stress (the phonetics of stress); metrical stress theory (phonology of stress); Research done on the acquisition of stress; Existing literature on NE Cree stress.
3. **Methodology:** Participants; Acoustic analysis; Phonological analysis.
4. **Stress in NE Cree:** Description of the phonetics and metrical parameter settings in NE Cress based on my own analysis
5. **Acquisition of stress in NE Cree: A case study:** A description of the stress development (both phonetic and phonological) from one NE Cree speaking child
6. **Conclusion:** A summary of research findings.

8. Timeline

8.1. Work Completed

Sept. 2005-Apr. 2006	Completed a literature review
Jan. 2006-present	Transcription of child language data for the Chisasibi Child Language Acquisition Study
March 2006	Received ethics approval from ICEHR
April 2006	Received funding from the Institute for Social and Economic Research ($3450.00)
April 2006	Completed a first draft of Chapter 2
Sept. 2006-Oct 2006	Acoustic analysis of Adult Speaker 1
Nov. 2006	Preliminary travel plans discussed

8.2. Work to be Completed

Ongoing	Acoustic analysis of Adult Speaker Data
Dec. 2006-Jan. 2007	Finalize fieldwork arrangements and travel plans
Jan-Feb 2007	First draft of chapter 1 and 3; final draft of chapter 2
Feb. 15-22, 2007	One week trip to Chisasibi with supervisor Julie Brittain
March 2007-April 2007	Final draft of chapters 1 and 3; First draft of chapter 4.
March 2007-April 2007	Analysis of child language data
May 2007-June 2007	First draft of chapters 5 and 6, Final draft of chapters 4, 5 and 6.

July 30th, 2007 Target date for submission

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Appendices

Page 22-25: Certification of Informed Consent (as approved by ICEHR).