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Foreward

We are pleased to make the proceedings of the 13th annual Workshop on American Indigenous Languages (WAIL) available as the 21st volume of the Santa Barbara Papers in Linguistics. We are grateful for the continuing support of the University of California, Santa Barbara as a whole and the faculty, staff and students of the Department of Linguistics. We extend our special thanks to Marianne Mithun. She offers us her support as well as opening her home for the conference.

We also thank those who come from near and far to attend the conference. These proceedings represent only a portion of the papers presented. Thank you to all of you who helped expand our collective knowledge of the indigenous languages of the Americas.

Nahow. Miigwech.

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Ejectives in Nez Perce

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Abstract
This paper discusses ejectives in Nez Perce, a Penutian language spoken in western Idaho, northeastern Oregon and eastern Washington. Using words collected in carrier phrases, VOT, burst amplitude, f0, intensity, and jitter are analyzed to provide a description of ejectives in Nez Perce. Kingston (1985, 2005) proposed a stiff/slack dichotomy for ejectives, however, researchers (Wright et al. 2002, Ingram & Rigsby 1987, Kingston 1985, Grossblatt 1997) using this typology have found great inter- and intra-speaker variation. The use of this dichotomy and a possible alternative are discussed.

1. Introduction
Ejectives are typologically common in the indigenous languages of North America (Maddieson 1984). Nez Perce, a Penutian language of western Idaho, northeastern Oregon and eastern Washington, is one such language. It is a highly endangered language with about 20 native speakers (A. Sobotta personal communication, August 30, 2010). Ejectives in Nez Perce and how Nez Perce ejectives fit into the ejective typology (Kingston 1985) is discussed. Statistical analysis will show that Nez Perce ejectives demonstrate more features of slack ejectives than stiff ejectives.

1.1 Previous Research
Current typological research on ejectives has led scholars to categorize these phones based on a stiff/slack distinction (Kingston 2005). Tense/lax (Ingram & Rigsby 1984) and fortis/lenis (Kohler 1984) are also terms that have been used. Kingston, however, uses the terms stiff/slack in his 2005 paper because the terms describe the state of the vocal folds during the production of the ejectives whereas tense/lax and fortis/lenis describe the muscular tension of the vocal tract rather than just the vocal folds. In an effort to describe how ejectives vary cross-linguistically the descriptions of Lindau (1984) and Kingston (1985; 2005) have been used to develop a typology to describe ejectives. Stiff ejectives are typified by a long VOT, intense burst amplitude, high f0, modal phonation, and fast (intensity) rise time[1] in the following vowel. Slack ejectives, however, have a short VOT, normal[2] burst amplitude, low f0, creaky phonation, and slow (intensity) rise time in the following vowel.

VOT, burst amplitude, f0, voice quality, and rise time (intensity) are all interconnected by the articulatory movement during the production of an ejective. The larynx raises, which also compresses the air during an ejective and causes the f0 of the following vowel to raise or lower (Kingston 1985). Slack ejectives can affect the phonation of the following vowel, causing it to become creaky (Lindau 1984: 154). Lindau saw this difference in creak between Navajo and Hausa. To measure creaky

voice one uses a computer program, such as PRAAT (Boersma & Weenink 2010), to determine the jitter as described by Ladefoged (2003: 169-177). As will be mentioned in the results section, jitter measurements require sustained periods of voicing. Age can affect the amount of jitter which will be seen later (section 3.5). Wilcox & Horli (1980) studied twenty young adult males (mean age 23.3) and twenty older adult males (mean age 69.8). The older adults displayed greater jitter than the younger adults. Creaky phonation, measured using jitter, affects the intensity and fundamental frequency, lowering both of them (Gordon & Ladefoged 2001). All of these features -- creaky phonation, lowered f0, and slow rise time -- are associated with slack ejectives (Kingston 2005). Stiff ejectives, on the other hand, have modal or tense phonation and fast rise time (Kingston 2005). Modal voice has the most consistent vocal fold phonation and therefore less jitter and greater intensity (Ladefoged 2003: 179).

In both stiff and slack ejectives the vocal folds are held closed, however for a stiff ejective the oral cavity is "maximally contracted to compress the air inside it" (Kingston 2005: 146). The greater compression causes a more intense burst. There is also a long closure of the vocal folds. Slack ejectives on the other hand, do not occur with the oral cavity maximally contracted, the vocal folds are not closed for a long period of time (as compared to stiff ejectives), and the burst is not as intense as in stiff ejectives. (Kingston 2005)

All of the features discussed above are summarized in Table 1.

Table 1 This table shows how stiff and slack ejectives vary cross-linguistically. Based on Wright et al. (2002).

	Stiff	Slack	
VOT	Long	Short	Lindau (1984), Kingston (2005)
Burst Amplitude	Intense	Normal	Kingston (1985, 2005)
f0	High	Low	Kingston (1985, 2005)
Voice Quality	Modal or Tense	Creaky	Lindau (1984), Kingston (2005)
Rise Time (Intensity)	Fast	Slow	Lindau (1984), Kingston (2005)

Kingston (1985) was preceded by work by Lindau (1984). In her work Lindau discusses many of the same phonetic parameters of stiff and slack ejectives. Although Lindau does not posit any terminology or dichotomy as proposed by Kingston, her results do show that there are different types of ejectives. She discusses the individual aspects: VOT and aperiodicity of the vowel. Multiple researchers (Wright et al. (2002), Witsuwit'en; Kingston (1985), Tigrinya; Lindau (1984), Navajo and Hausa; Ingram & Rigsby (1987) Giksan) have used this typology or parts of the typology to study and describe ejectives in various languages.

Some researchers find that the ejectives in the languages of study fit the typology better than other ejectives. Lindau (1984) finds great inter-speaker variation in Hausa, a language that has been described as having slack ejectives. Four of the twelve speakers realize the velar ejective as a voiceless unaspirated velar and some realize it as a voiced velar. All Navajo speakers, however, realize the velar ejective as a velar ejective. Giksan ejectives (Ingram & Rigsby 1987) also display inter-speaker variation. This may, however, be due to language change as the two speakers in the study are mother and son.

Regardless, the ejectives produced by each speaker do not typify either the slack or the stiff ejectives. Giksan ejectives are more similar to slack ejectives than stiff ejectives. Sahaptin, the language most closely related to Nez Perce, has been described as having stiff ejectives (Grossblatt 1997). In a study of one speaker, Grossblatt finds that Sahaptin ejectives demonstrate long VOT, raised f0, and quick vowel onset (67). These are features that tend to group with stiff ejectives. He also points out, however, that there is a lot of variation. Kingston (1985) found in a study with three people, that Tigrinya displays stiff ejectives but there is also variation, especially in f0. Wright et al. (2002) also finds great inter-speaker variation in Witsuwit'en. In addition they question the use of a strict binary distinction (the ejective is either stiff or the ejective is slack) to describe ejectives.

Wright et al. (2002) are not the only researchers to discuss the fact that their data do not fit the typology well. Grossblatt (1999) also discusses the great variation in his data. The variation in data, seen in all the previously mentioned studies, is found both between speakers and within speakers. All of the researchers previously mentioned state that their data shows variation, however, only Wright et al. and Grossblatt question the stiff/slack typology. Grossblatt suggests that stiff and slack may be "best viewed as arbitrary complexes of phonetic characteristics, and not as sets of necessarily co-occurring features" (1999: 68). He then concludes that the there would be no true stiff or slack ejectives, just ejectives that exemplify more or less of the features of a stiff or a slack ejective. Wright et al. (2002) suggests a three dimensional continuum. The three dimensions would be longitudinal tension (cricothyroid muscle and vocalis), medial compression (interarytenoid, lateral cricoarytenoid, and lateralis), and larynx raising. Ejectives would fall along this continuum rather than using just the dichotomous stiff/slack distinction. This three dimensional system would account for the fact that people perceive ejectives as stiff or slack (Wright et al. 2002), but they are produced with a more complex underlying system. In addition it would be a useful tool for describing ejectives, however, it would also be difficult to measure and study as it would require more equipment than just an audio recorder, which is not feasible for all field recording situations.

1.2 Previous Research on Nez Perce Ejectives

Wright et al. (2002) suggest in their study that Nez Perce has stiff ejectives based on Aoki's (1970) study, however this must be viewed as a preliminary classification based on the limited information available in Aoki (1970). Aoki discusses the duration of silence after the release (about 0.1 seconds) and he states that the f0 of the following vowel is lowered. The long period of silence after the release is indicative of a stiff ejective, but the lowered f0 is indicative of a slack ejective. Based on these two factors no conclusion can be drawn about the typology of Nez Perce ejectives.

In their sketch grammar of Sahaptin, the most closely related language to Nez Perce, Rigsby and Rude (1996) describe Sahaptin ejectives as "relatively [stiff] as compared with Nez Perce. […] On the whole, the glottalized obstruents are strongly articulated and easily heard as compared with the more [slack] pronunciation of cognates among the Nez-Perce-speaking Cayuse around Pendleton, Oregon" (671). Their

description leads one to believe Nez Perce does not have stiff ejectives but instead slack ejectives. As describing the differences between Nez Perce and Sahaptin was not the purpose of their paper they do not provide the acoustic data necessary to determine if Nez Perce does indeed have slack ejectives.

Phinney (1934) mentions ejectives and glottal stops in the introduction to his book *Nez Perce Texts*. He writes that "the glottalized sounds are not acoustically severe" (xi). This implies that Nez Perce ejectives may be slack. Phinney's comments may have been in comparison to Sahaptin. Both Grossblat (1999) and Rigsby and Rude (1996) state that Sahaptin ejectives are stiff.

The current paper examines Nez Perce ejectives using the features outlined in Table 1 to determine how they fit into the stiff or slack typology. The results will also be used to discuss the use of a binary stiff/slack distinction or the use of a more fine-grained description of ejectives.

2. Method

The research and recordings for this paper were conducted in Lewiston and Lapwai, Idaho in the summer of 2009. The word list used for this study was composed using Aoki's Nez Perce Dictionary (1994) and with the help of native speakers of Nez Perce. Three elders were recorded in quiet rooms using a Zoom H4n recorder with an AKG C555L head-mounted microphone with AKG MPA VL adapter. All three elders are women who are identified as FS1, FS2, and FS3 (FS=Female Speaker) ages 68, 73, and 75. All three speakers were used for every acoustic analysis except for jitter.

Words chosen to be recorded were those that exemplified each obstruent (ejective and aspirated) and vowel (all vowels, both regular and long length) combination ([p, p', t̪, t̪', ts, ts', k, k', q, q'], [i, æ, a, o, u]). Almost all combinations recorded were in stressed positions, however, to obtain as many combinations as possible some unstressed exemplars were used. All obstruent-vowel combinations were recorded in word-initial and word-medial positions. The word-initial and word-medial combinations were paired to form the within-subjects variables.

The word list, consisting of 172 words, was read in five parts, with a break in between each section. Before recording the word list each elder read over the list. Any unfamiliar words were removed from the list.

Following the methods of Wright et al. (2002) f0, jitter, and intensity were measured twice using thirty millisecond windows at 30 milliseconds into the vowel and at the vowel peak. The beginning of the vowel was measured at the first significant zero crossing.[3]

These recordings were recorded at 44.1 kHz 16 Bit. Praat was used to analyze all recordings. Statistical analysis was conducted using the statistics package PASW. Two-way repeated measures ANOVAs were used with an alpha level of 0.05. The independent variables were the location of the token, word-initial or word-medial. The dependent variables were: voice onset time, burst amplitude, rise time, f0 and jitter.

All data was checked for heteroscedasticity, or unequal variances, in accordance with the assumptions of the analysis of variance (ANOVA) approach. If any of the variances of the group were more than double the other variances O'Brian's R was used

to check if the data was indeed heteroscedastic. If it was heteroscedastic then the data was corrected using the Welch method.[4] Unless otherwise stated in the below analysis the data was not heteroscedastic. As it is uncommon to correct for heteroscedasticity in linguistics analyses, the uncorrected results for all heteroscedatic variables are provided in Appendix 1 for comparison.

3. Results

This section presents the results for each of the three speakers organized by VOT, burst amplitude, rise time (intensity), f0, and voice quality (jitter).

3.1 VOT

As can be seen in Figure 1 all three speakers show a significant difference between ejectives and plain obstruents for VOT. All speakers show that the ejective has a longer VOT than the plain obstruent. [FS1: $F(1,61)=15078.69$, $p=.005$; FS2: $F(1,50)=376.17$, $p=.033$; FS3: $F(1,56)=391.40$, $p<.001$] Data points that are more than three inter quartile ranges from mean are considered outliers. The outliers were discarded because there is a clear mean, few outliers, and previous research (Aoki 1970), which provided a baseline.

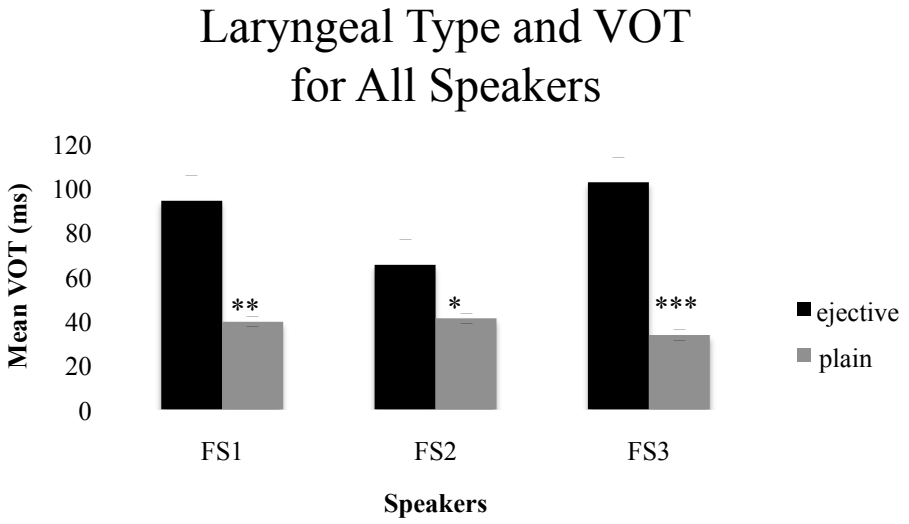

Figure 1 This figure shows the mean VOT for both ejectives and plain obstruents, collapsed across environment (word-initial and word-medial), for all three speakers. For FS1 the mean VOT for ejectives is 93.94ms and for plain obstruents is 39.39ms. For FS2 the mean VOT for ejectives is 65.07ms and for plain obstruents is 40.96ms. For FS3 the mean VOT for ejectives is 102.06ms and for plain obstruents is 33.43ms. Error bars show standard error.

The significantly longer VOT for the ejective, seen above, is indicative of a stiff ejective. This was demonstrated by all three speakers.

3.2 Burst Amplitude

The results for burst amplitude are indicative of slack ejectives for all three speakers, however, only the data, corrected of unequal variances, for FS1 and FS3 are statistically significant. [FS1: F''(1,59.0)=4.50, p=.038; FS3: F''(1,49.2)=18.95, p<.001] (For uncorrected results see Appendix 1.) The data for FS2 is not significant, however, these data followed the same pattern as FS1 and FS3.[5] [FS2: F(1,50)=2.33, p=.396] This data is detailed in Figure 2 following.

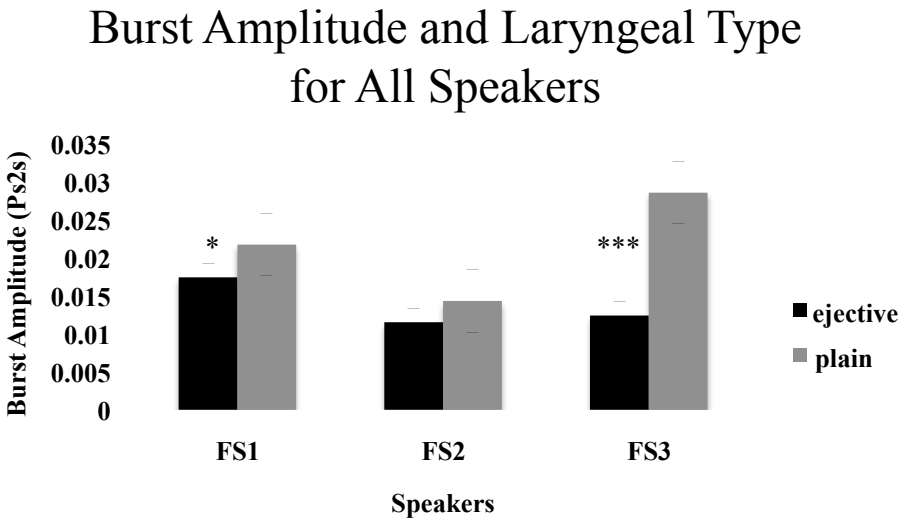

Figure 2 This figure shows the mean burst amplitude for both ejectives and plain obstruents, collapsed across environment (word-initial and word-medial), for all three speakers. For FS1 the mean burst amplitude for ejectives is 0.017Pa2s and for plain obstruents is 0.0217Pa2s. For FS2 the mean burst amplitude for ejectives is 0.011Pa2s and for plain obstruents is 0.014Pa2s. The results for these data are not significant, however, they follow the pattern of the other speakers. For FS3 the mean burst amplitude for ejectives is 0.012Pa2s and for plain obstruents is 0.029Pa2s. Error bars show standard error.

For slack ejectives the burst amplitude will be normal, or the same as the plain obstruents. FS2 demonstrated a burst amplitude for ejectives (mean=0.011Pa2s) very similar to the burst amplitude for plain obstruents (mean=0.014Pa2s). FS1 and FS3 displayed burst amplitudes that were significantly lower than those of the plain obstruents. This is indicative of slack ejectives.

3.3 Rise Time

The results for the three speakers are very different for rise time. The dependent variable is not significant for FS1; however, there is a significant interaction in the environment. (This is a difference between the word-initial and the word-medial environments.) This interaction was decomposed and the word-medial position for FS1 shows significant results. FS1 and FS3 pattern together and FS2 shows different results. FS1 and FS3 both show significant results only in the word-medial position. [FS1: F(1, 62)=183.17, p=.005; FS3: F(1, 59)=16.73, p=.015] As can be seen in Figure 3 and Figure 4 the intensity in the plain obstruents is rising faster than the intensity in the ejectives.

This is indicative of slack ejectives. FS2 does not show any significant results word initially or word medially or collapsed across those environments. [FS2: $F(1,50)=9.69$, $p=.198$] Figure 5 shows that the intensity is rising faster in ejectives than in plain obstruents for FS2. These non-significant results are indicative of a stiff ejective.

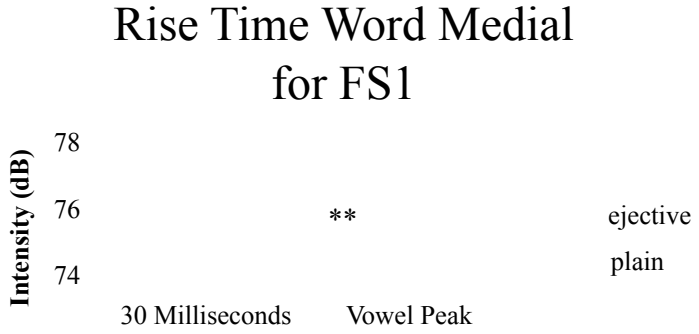

Figure 3 This figure shows the rise time or change in intensity for word-medial tokens for FS1. The horizontal axis shows the measurement locations: 30 milliseconds and at the vowel peak.

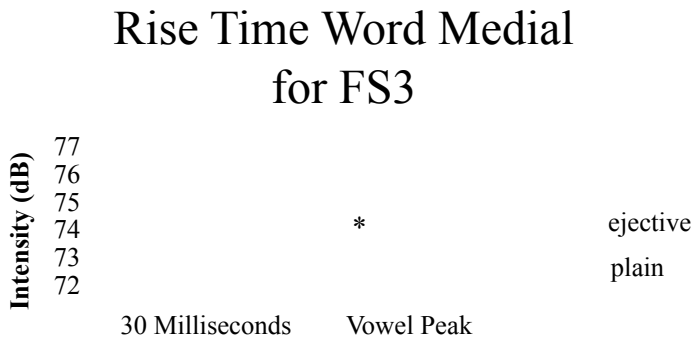

Figure 4 This figure shows the rise time or change in intensity for word-medial tokens for FS3. The horizontal axis shows the measurement locations: 30 milliseconds and at the vowel peak.

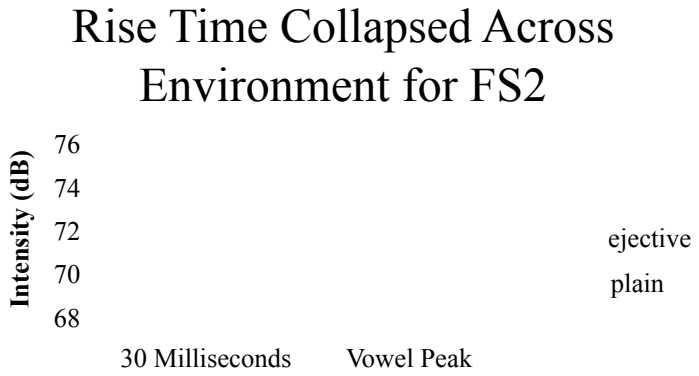

Figure 5 This figure shows the rise time or change in intensity for FS2 collapsed across environment (word-initial and word-medial). The horizontal axis shows the measurement locations: 30 milliseconds and at the vowel peak.

FS1 and FS3 both showed significant results with the intensity in the plain obstruent rising faster than that of the ejective. FS2, however, showed the intensity rising faster for the ejective than the plain obstruent indicating a stiff ejective, though these results were not significant.

3.4 Fundamental Frequency

Again FS1 and FS3 pattern together. The data for FS3 is significant (Figure 6), showing that the f0 of the vowel following the ejective is lower than the f0 following the plain obstruent. [FS3: $F(1,59)=27.28$, $p=.006$] FS1 patterns with FS3 and also shows that the f0 following an ejective is lower, word medially,[6] than the f0 following a plain obstruent (Figure 7). [FS1: $F(1,62)=51.28$, $p=.019$] These results point to a slack ejective. The results for FS2 (Figure 8) are not significant. The f0 following ejectives is, however, slightly lower than that of the f0 following the plain obstruents. This follows the pattern for slack ejectives, even though the results are not significant.

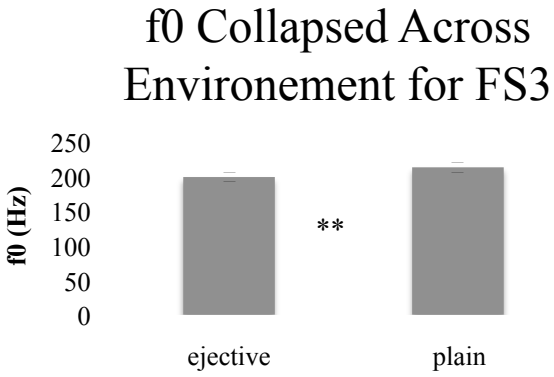

Figure 6 This figure shows the mean f0 collapsed across environment (word-initial and word-medial) for ejectives (mean=198.27Hz) and plain obstruents (mean=212.28Hz) for FS3. Error bars show standard error.

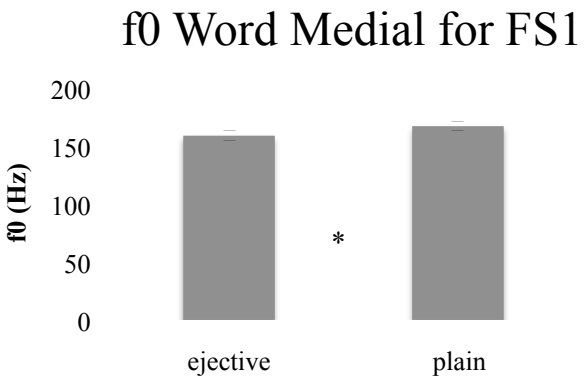

Figure 7 This figure shows the mean f0 for word-medial ejectives (mean=158.96Hz) and plain obstruents (mean=167.18Hz) for FS1. Error bars show standard error.

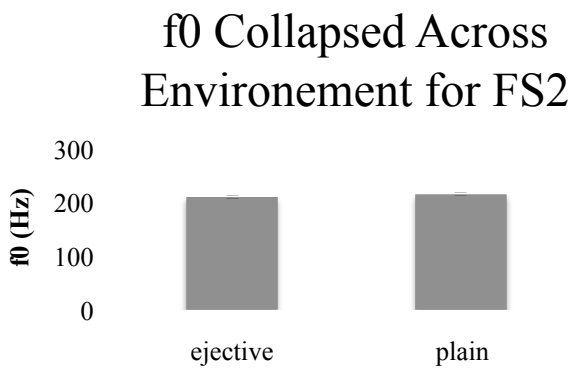

Figure 8 This figure shows the mean f0 for ejectives (mean=208.87Hz) and plain obstruents (mean=213.93Hz) for FS2. These results are not significant. Error bars show standard error.

The above results, both significant and not significant, follow the pattern for slack ejectives, with the f0 lower for ejectives.

3.5 Jitter

As was discussed in Section 1.1, jitter measurements require sustained periods of voicing. One of the participants, speaker FS2, age 75, typically dropped out of modal phonation when transitioning from a consonant of any kind to a vowel. These voice drop-outs could last for up to half the vowel. Data from FS2 will therefore be omitted from jitter analysis. As shown in Figure 9 these figures show that the ejectives for FS1 and FS3 both have more jitter than the plain obstruents.

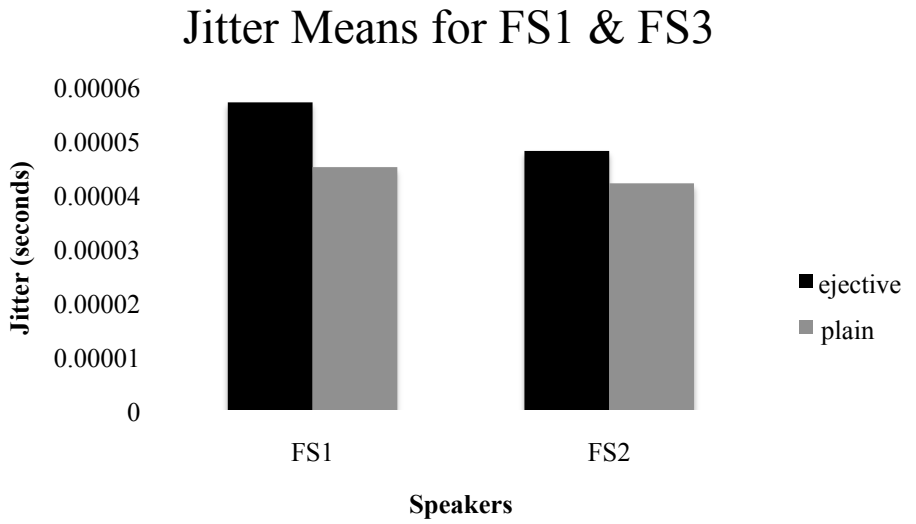

Figure 9 This figure shows the means for jitter for FS1 and FS3. For FS1 the mean for jitter for ejectives is 0.000057 seconds and for plain obstruents is 0.000045 seconds. For FS3 the mean for jitter for ejectives is 0.000048 seconds and for plain obstruents is 0.000042 seconds.

The descriptive statistics in these charts show that the data would be representative of slack ejectives because of the greater jitter in the vowels following the ejectives.

4. Discussion

The data examined in this study show that Nez Perce is a language with ejectives that demonstrate more features of slack ejectives than stiff ejectives. These results are summarized in Table 2.

Table 2 This table summarizes the features discussed in the results section. Bolded cells with * indicate $p<0.05$, ** indicate $p<0.01$, and *** indicate $p<0.001$. Cells with parenthesis indicate results that are only significant word medially. Jitter is italicized because the results in that row are based on descriptive statistics only.

	FS1	FS2	FS3
VOT	**Stiff****	**Stiff***	**Stiff*****
Burst Amplitude	**Slack***	**Slack**	**Slack*****
f0	**(Slack)***	Slack	**Slack****
Rise Time	**(Slack)****	Stiff	**(Slack)***
Voice Quality (jitter)	*Slack*	*N/A*	*Slack*

The speakers show mixed attributes of stiff and slack ejectives. It is therefore curious that these ejectives, as determined by an informal study of colleagues, are predominantly perceived as slack. This may indicate that the burst amplitudes of the ejectives, which are much lower than the plain obstruents, may override the stiff VOT and cause the ejectives to be heard as slack. All speakers display statistically significant stiff VOT. In contrast all speakers display slack burst amplitude. FS1 and FS3 show a burst amplitude for ejectives that is statistically shorter than the burst amplitude for plain obstruents. It is important to note that slack ejectives will show a burst amplitude that is normal (Kingston 1985, 2005) meaning the ejective burst amplitude will be same as the burst amplitude of plain obstruents, such as is shown by FS2. This is probably why these ejectives, despite their stiff VOT are heard as slack.

Rise time and f0 are both significant only in the word-medial position for FS1 and rise time is only significant word medially for FS3. These features are significant word medially because Nez Perce is a polysynthetic language (Aoki 1965), which would make the word-medial position a more natural position for the speakers, as polysynthetic languages have longer words. The f0 for FS2 and FS3 for ejectives is lower than for plain obstruents, however, it is only significant for FS3. FS2 deviates from the other speakers, though the statistics are not significant. The descriptives on jitter also show that ejectives for FS1 and FS3 are slack.

The above results add valuable data to the description of ejectives. As mentioned in the introduction, Kingston (1985, 2005) suggests a stiff/slack distinction to describe ejectives. Other researchers have used this dichotomy to describe ejectives in various languages. Grossblatt (1999) and Wright et al. (2002) question the use of a dichotomy both discussing the inter- and intra-speaker variation. The issue at hand is that ejectives are perceived as stiff or slack, however, they are produced with greater variation. Wright et al. (2002) propose a three dimensional continuum, however, the three dimensions

(longitudinal tension (cricothyroid muscle and vocalis), medial compression (interarytenoid, lateral cricoarytenoid, and lateralis), and larynx raising) would be difficult to measure. Grossblatt (1999) writes "[stiff] and [slack] are perhaps best viewed as arbitrary complexes of phonetic characteristics, and not as sets of necessarily co-occurring features. […] Technically then, there are no [stiff] or [slack] ejectives. There are only ejectives which tend to exhibit more or fewer characteristics thought of as [stiff] or [slack]" (68). Grossblatt is correct in saying that stiff and slack are a "complex of phonetic characteristics", however, these characteristics could occur such that there could be a "truly" stiff or slack ejective.

Results of this study underscore the idea that acoustic descriptions for ejectives should recognize all of the features examined above (VOT, burst amplitude, f0, voice quality, and rise time) as they are all integral to understanding and describing ejectives. In keeping with this suggestion, I present Table 3 as an effective method to describe ejectives.

Table 3 This table is a remplate for ejective description generalized from Table 1 and Table 2.

	Speaker 1	Speaker 2
VOT	Stiff or Slack	Stiff or Slack
Burst Amplitude	Stiff or Slack	Stiff or Slack
f0	Stiff or Slack	Stiff or Slack
Voice Quality	Stiff or Slack	Stiff or Slack
Rise Time (Intensity)	Stiff or Slack	Stiff or Slack

This instrument would allow for a detailed description for each feature from Kingston (1985, 2005). After examining a language's ejectives for each feature listed in Table 1 to determine if the features represent stiff or slack ejectives, those results can be placed in a table such as Table 3. Rather than trying to collapse all of these individual results (VOT, burst amplitude, f0, voice quality, and rise time) all features are listed separately. This allows for a clearer understanding of the structure of the ejective. This will also allow for more fine-grained cross-language comparisons. Using this description will provide more phonetic information, especially due to the inter- and intra-speaker variation.

5. Conclusion

This paper discussed the ejectives of three speakers of Nez Perce using the research of Kingston (1985, 2005) to study the different features of ejectives (VOT, burst amplitude, f0, voice quality, and rise time). All three speakers were found to exhibit more features of slack ejectives than stiff ejectives. As none of the speakers showed all the attributes of either a slack or a stiff ejective, Table 3 was presented as a method to phonetically describe ejectives. This table allows the ejectives to be described by their individual features rather than a summary of the features. If an ejective shows more features of a slack ejective, but also displays some stiff features, as in the Nez Perce case, it does not have to be labeled as a slack ejective but can be described by all its individual features.

Notes

[1] Fast and slow refer to the slope of the intensity, which is taken at 30 milliseconds into the vowel and at the vowel peak. The greater the slope the faster the rise time.
[2] The term normal is used in Kingston (1985, 2005). I understand it to mean that the burst amplitude is the same as the burst amplitude of a plain obstruent.
[3] One of the speakers, FS2, often devoiced the first part of vowels. This part of the vowel did not belong in the VOT and was therefore measured with the vowel.
[4] Howell (2010) discusses that one basic assumption of an ANOVA is homogeneity of variance or that each population in an ANOVA has the same variance (320-321). When this is not the case it can affect the results of a study, however, not correcting for heteroscedasticity does not invalidate the results of the study, it "protect[s] the analysis of variance on the means" (336). This may seem contradictory because "in practice […] the analysis of variance is a robust statistical procedure, and the assumptions frequently can be violated with relatively minor effects" (336). In other words, results that have been corrected for heteroschedasticity are more reliable.
[5] Slack burst amplitude will be normal or the same as the burst amplitude of the plain obstruents. Therefore is it not an issue that FS2 does not show a significant difference between the ejective and the plain obstruent burst amplitudes. She is also following the pattern of FS1 and FS3 because the mean for the ejective burst amplitude is lower than the mean for the burst amplitude of the plain obstruents.
[6] The between subjects variable is not significant, however, there is a significant interaction in the environment. (A difference between the word-initial and the word-medial environments.) When this interaction is decomposed, the word-medial position for FS1 shows significant results.

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Appendix 1

Uncorrected Burst Amplitude FS1: $F(1,62)=1.17$, $p=.475$
Uncorrected Burst Amplitude FS3: $F(1,57)=285.00$, $p<.000$

Assimilatory Processes in Chuxnabán Mixe[1]

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1. Introduction

This paper examines obstruent voicing, sonorant devoicing, and nasal place assimilation which are common to Mesoamerica and regarded as defining traits of this linguistic area (Campbell et al. 1986). In Chuxnabán Mixe, a Mexican indigenous language, these processes show irregular patterns that can only partially be explained by the phonological environment or the morphological structure of a word. For obstruent voicing and sonorant devoicing, two phonological rules based on the environment at both edges, i.e. preceding and following the affected segment, account for all examples in most instances. However, a phonetic analysis reveals that these processes are gradual often with partial voicing or devoicing, in addition to showing token variation. Similarly, an irregular pattern is observed in nasal place assimilation which generally occurs in morpheme-final position, but not always. While similar patterns have been described for a number of other Mixean languages (Bickford 1985; Crawford 1963; Dieterman 2008; Ruiz De Bravo Ahuja 1980; Romero-Méndez 2008; Schoenhals and Schoenhals 1982; Van Haitsma and Van Haitsma 1976; Wichmann 1995), there are no phonological studies explaining these assimilatory processes nor the observed irregularities. This work posits that phonological rules based on distinctive features (Chomsky and Halle 1968) can not fully account for the observed patterns in Chuxnabán Mixe and in other Mixean languages. Rather, it is argued that the irregularities represent sound change in progress, as also noted for the related Sayula Popoluca (Rhodes 2004). Ongoing sound change often remains unnoticed since shifts represent phonetic adjustments only noticeable as a cumulative effect over an extended period of time. I propose that in Chuxnabán Mixe certain assimilatory processes are still in a state of change and not yet complete. This phenomenon nicely illustrates the dinamicity of language.

Chuxnabán Mixe is a language of the Mixe-Zoquean family. It is spoken by nine hundred people in Chuxnabán, a small Mexican village. The Mixean territory is located in the north-eastern part of the southern Mexican state of Oaxaca. It is composed of two hundred and ninety communities and divided into nineteen municipalities (Torres Cisneros 1997), as shown in Figure 1. Each community speaks a different variety of Mixean, some of which are mutually unintelligible. In many cases it has yet to be determined whether a particular variety represents a distinct language or a dialect, as the documentation of Mixean languages is limited. While some linguists (INEA 1994, 1997a, 1997b, 1997c) divide Mixean in four main languages: Lowland Mixe, Midland Mixe, and Northern and Southern Highland Mixe, more recently the Ethnologue lists ten Mixean languages divided into three larger branches: Eastern Mixe with six languages and Veracruz Mixe and Western Mixe with two languages each (Lewis 2009). Chuxnabán Mixe has been identified by its speakers as Midland Mixe and corresponds

to Quetzaltepec Mixe in the Ethnologue entry. Speakers of Chuxnabán Mixe indicate that they understand Quetzaltepec Mixe and communicate with members of that community in Mixean, rather than in Spanish. Communication with Mixean speakers from more distant communities occurs in Spanish to ensure mutual comprehension.

There are only a few published grammars and dictionaries of the many Mixean varieties (De la Grasserie 1898; Hoogshagen and Hoogshagen 1997; Ruiz de Bravo Ahuja 1980; Romero-Méndez 2008; Schoenhals and Schoenhals 1982; Van Haitsma 1976); so far no grammar has been published of Chuxnabán Mixe. The data for this research were collected during two field trips in 2006 and in 2008 and during weekly sessions with a native speaker living in Los Angeles. The data consists of wordlists, narratives, and some elicited verb forms and sentences. The recordings were made on either a Mini-Disc recorder or a Solid State Edirol recorder with a head-mounted Shure microphone. Sound files were examined using Sound Forge and Praat software. Male and female speakers were recorded ranging from seventeen to eighty years of age. The examples in this paper are represented using an official orthography which was established in collaboration with community members in 2008.

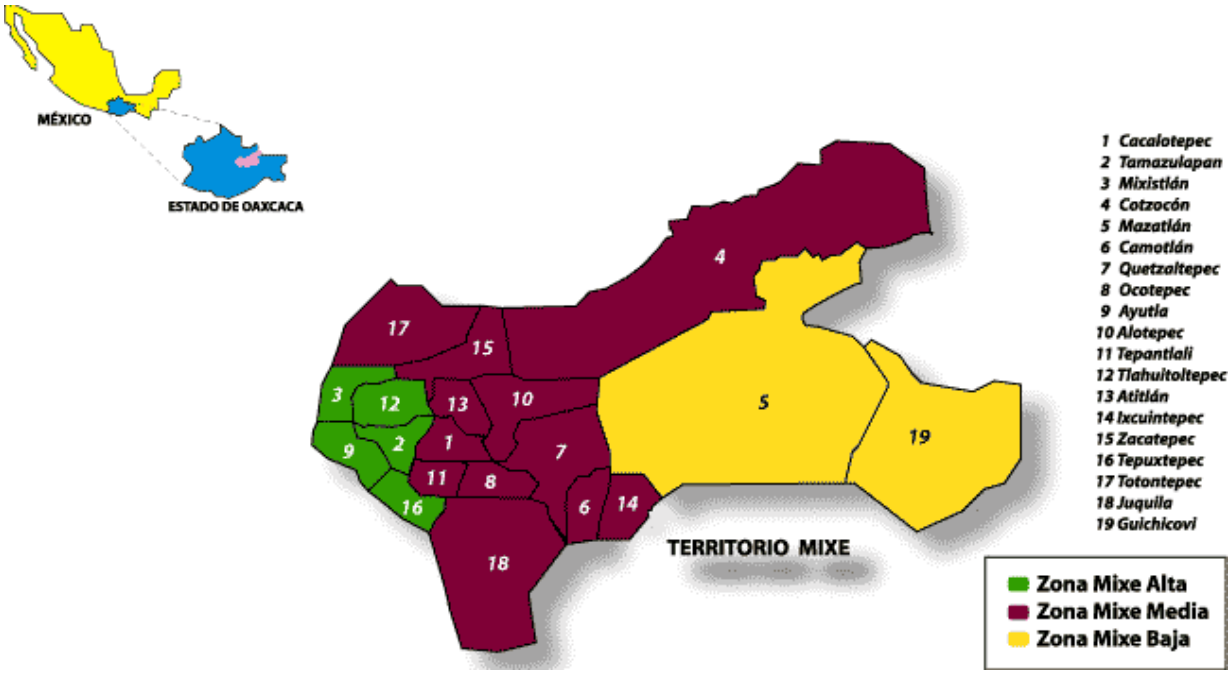

Figure 1: The Mixean Territory
Source: http://www.redindigena.net/ser/pueblomixe/mapa.html

The following sections describe the Chuxnabán Mixe phoneme inventory, obstruent voicing and sonorant devoicing patterns, and nasal place assimilation.

2. Chuxnabán Mixe Phoneme Inventory

The Mixean languages have a relatively simple consonant system that varies little from language to language. In Chuxnabán Mixe, there are eleven consonantal phonemes: seven obstruents /p, t, k, ʔ, x, h, ts/ and four sonorants /n, m, w, y/, in addition to eight phonemes /b, d, g, f, s, ɾ, r, l/ occurring in Spanish loans. The consonants are summarized in Table 1. Corresponding symbols in the practical orthography, if different from the symbols used in the International Phonetic Alphabet (IPA), are included in angled brackets. Phonemes from Spanish loans are in parentheses.

	Bilabial	Alveolar	Postalveolar	Palatal	Velar	Glottal
Plosives	p/(b)	t/(d)			k/(g)	ʔ <’>
Nasals	m	n				
Fricatives	(f)	(s)	ʃ <x>			h <j>
Affricates		ts	(tʃ <ch>)			
Rhotic		(ɾ)/(r)				
Lateral		(l)				
Glides	w			j <y>		

Table 1. Chuxnabán Mixe Consonant Inventory with Phonemes from Spanish Loans

All consonants can also be palatalized. Palatalization acts as a suprasegmental process affecting consonants and adjacent vowels (Dieterman 2008). It can be either phoneme-induced or morpheme-induced. One of the affricates, /ch/ [tʃ], generally results from morpheme-induced palatalization and is often not treated as a separate phoneme in descriptions of other Mixean varieties. It has been included in the phoneme chart here for two reasons: (1) while morpheme-induced suprasegmental palatalization of other consonants manifests by having an onglide and an offglide, this is not always the case for /ch/ and (2) in Chuxnabán Mixe /ch/ cannot be traced back to phoneme- or morpheme-induced palatalization in all instances.

While the consonant system is fairly simple with almost no variation among the different Mixean languages, these languages vary greatly in their complex vowel systems (Suslak 2003). For instance, Totontepec Mixe has nine phonemic vowels (Schoenhals and Schoenhals 1982), but only six are reported for Coatlán Mixe (Hoogshagen and Hoogshagen 1959, 1997) and for San José El Paraíso Mixe (Van Haitsma and Van Haitsma 1976), the same as for Chuxnabán Mixe. All Mixean languages, including Chuxnabán Mixe, show a phonemic vowel length distinction and a phonemic phonation contrast between plain, aspirated, and creaky (glottalized and interrupted) vowels. This results in the following syllable nuclei: V, VV, VʔV, VVH, Vʔ, with the latter two having a laryngeal segment in the final portion of the vowel

blocking obstruent voicing of a following segment, as will be discussed in the next section. Moreover, a typologically rare three-way phonemic vowel length contrast has been noted for two Mixean varieties: Coatlán Mixe (Hoogshagen 1959) and San José El Paraíso Mixe (Van Haitsma 1976). Such as constrast has not been confirmed for Chuxnabán Mixe (Jany 2006, 2007). Table 2 summarizes the vowel qualities found in Chuxnabán Mixe. Corresponding symbols used in the orthography, if different from the IPA symbols, are included in angled brackets.

i	(ʏ <ü>)	ɨ <ë>	u
e	(ø <ö>)		o
	(æ <ä>)	a	

Table 2. Chuxnabán Mixe Vowel Inventory

Three of the vowel qualities, [æ, ø, ʏ], generally do not show a phonemic contrast since they stem from suprasegmental palatalization or from interdialectal borrowing. Two of these vowels, [ø] and [ʏ], always occur in palatalized environments, mostly in stem alternations of verbs. The third marginal vowel [æ] shows some variation between speakers and tokens of the same word. For example, some instances of *maajtsk* 'two' have pronunciations closer to [a], while others are pronounced with [æ], even by the same speaker. As a result, these marginal three vowels are included in parentheses in Table 2.

As mentioned above, palatalization in Chuxnabán Mixe, as in other Mixean languages (Dieterman 2008; Hoogshagen and Hoogshagen 1997; Romero-Méndez 2008; Schoenhals and Schoenhals 1982; Van Haitsma and Van Haitsma 1976), is a suprasegmental process affecting not only the palatalized consonant, but adjacent vowels as well. This is perceived as an onglide and an offglide. Furthermore, it is manifested by a change in the formant structure of adjacent vowels lowering F1 and raising F2. The latter indicates fronting. One exception is the palatalized palatal glide /y/, because it does not undergo any changes with morpheme-induced palatalization (Dieterman 2008; Jany 2006). Suprasegmental palatalization is either phoneme-induced or morpheme-induced. Phoneme-induced palatalization occurs in compounding, as in the following examples.

(1) Phoneme-induced Palatalization in Compounding

(a)	*teky* 'leg'	+	*tu'uk* 'one	->	*tekychu'uk* 'one-legged'
(b)	*kachy* 'rib'	+	*paajk* 'bone'	->	*kachypyaajk* 'rib bone'
(c)	*tëy* 'truth'	+	*kaapxp* 'to speak'	->	*tëykyaapxp* 'to tell the truth'

Morpheme-induced palatalization occurs with the 3rd person possessive prefix *y-*, as shown in the following examples.

(2) Morpheme-induced Palatalization with Possessive Prefix *y-*

(a)	*y-*	+	*noky* 'paper'	-> *nyöky* 'his/her paper'
(b)	*y-*	+	*tëëjk* 'house'	-> *chëëjk* 'his/her house'

The phoneme /y/ is clearly distinct from morpheme-induced palatalization. This is apparent because it does not palatalize the person prefixes *n-* and *m-*. However, the third person prefix *y-* palatalizes a following root-initial nasal. This is illustrated in the following examples.

(3) Phoneme /y/

n- '1st person' + *yä'än* 'tongue' -> *nyä'än* 'my tongue' [njæˀæn]

(4) Morpheme /y/

y- '3rd person' + *niixuy* 'shirt' -> *nyiixuy* 'his shirt' [ɲiːˈzu̯j]

In addition, the two processes are different phonetically as one can also cause voicing of the following segment, but the other can't. This will be discussed in the following section.

3. Voicing and Devoicing Patterns

In Chuxnabán Mixe all obstruent phonemes are voiceless, while all sonorant phonemes are voiced. However, obstruents have voiced allophones and sonorants have voiceless allophones. The conditioning factors for these allophones are discussed below.

3.1 Obstruent Voicing

Obstruent voicing occurs after nasals and glides, except word-finally, and intervocalically, except after aspirated and glottalized vowels. This is shown in the examples below.

(5) Obstruent Voicing before/after Nasals & Glides Word-medially

(a)	*chowpëch*	[ˈtʃowbɨtʃ]	'expensive'
(b)	*tëygyaapxp*	[tɨjˈgjaːpu̯p]	'to tell the truth'
(c)	*ankëëxp*	[aŋˈgɨːu̯p]	'above'

(d)	*puuypyaajk*	[puːjˈbʲaːʰk]	‘femur’
(e)	*poopniij*	[poːbˈniːʰ]	‘white chili’
(f)	*atsëmtsu’uch*	[adzɨmˈdzuʔutʃ]	‘pork meat’

(6) Obstruent Voicing after Nasals Word-initially

(a)	*nxax*	[ˈnz̬aʂ]	‘my fish’
(b)	*ntëëjk*	[ndɨːʰk]	‘my house’

(7) Obstruent Voicing in Intervocalic Position

(a)	*axux*	[aˈz̬uʂ]	‘garlic’
(b)	*pojënë*	[ˈpoɲɨnɨ]	‘fast’
(c)	*wa’akoo’ëp*	[waʔaˈgoːʔɨp]	‘to stop walking’

Voicing does not occur word-finally and after glottalized or aspirated vowel nuclei. Moreover, obstruent clusters and geminates are not voiced. This is illustrated below.

(8) No Obstruent Voicing Word-finally

(a)	*maank*	[maːŋkʰ]	‘son’

(9) No Obstruent Voicing after Glottalized or Aspirated Vowel Nuclei

(a)	*jyüüka’të*	[hjɯːgˈaʔtɨ]	‘they lived’
(b)	*naajkëmëch*	[ˈnaːʰkɨmɨtʃ]	‘we descend’

(10) No Obstruent Voicing in Consonant Clusters or Geminates

(a)	*tuktuujk*	[tukʰˈtuːʰkʰ]	‘eight’
(b)	*jappëk*	[ˈhapːɨkʰ]	‘there’

Voicing in compound words depends on the phonological structure of the compound rather than on the phonological structure of the words of which it is composed. This becomes apparent in compounds with vowel-initial words. In Chuxnabán Mixe, as in other Mixean languages, vowel-initial words generally add an initial glottal stop to avoid onsetless syllables. It is obligatorily inserted in compounding where two adjacent vowels would occur otherwise, and when a prefix vowel-final is added to a vowel-initial word. However, the glottal stop is omitted in compounds which would result in one of the following sequences (1) C + Glottal or (2) Glottal + C. Therefore, word-final obstruents which become word-medial in compounding are voiced between vowels and before or after nasals or glides, unless they occur in a consonant cluster with obstruents. This is shown below.

(11) Obstruent Voicing in Compounds

(a)	*xook* 'wet'	+	*nik* 'shadow'	-> *xooknik*	[ʂ:gˈnik]	'humid'
(b)	*pa'ak* 'sweet'	+	*'uujts* 'herb'	-> *pa'akuujts*	[paˀagˈuːʰts]	'sweet herb'

In *pa'akuujts* 'sweet herb' the initial glottal stop does no longer occur in *'uujts* 'herb' when it is the second word in a compound. As a result, the previous obstruent, in this case /k/, is voiced.

The voicing pattern in Chuxnabán Mixe can be explained with one phonological rule. Voiceless obstruents are voiced if they occur between two voiced segments:

[-sonorant] [-voice] -> [+voice] / [+voice] ____ [+voice]

Word-edges, aspirated vowels VVH, and glottalized vowels Vˀ are regarded as voiceless environments, while interrupted vowels act as a voiced segment. This can be explained with the laryngeal timing of breathiness and glottalization in these vowel nuclei. In breathy and in glottalized vowels breathiness or creakiness occurs in the last portion of the vowel, hence creating a voiceless environment on the right edge of the nucleus, while in interrupted vowels VˀV creakiness occurs in the middle portion of the vowel leaving a voiced environment on the right edge of the nucleus.

Palatalized consonants are affected by and trigger voicing of adjacent segments in the same way as non-palatalized consonants, i.e. only voiced consonants can cause voicing. However, in Chuxnabán Mixe there are two different palatalization processes, phoneme-induced palatalization and morpheme-induced palatalization. These behave differently and have different phonetic outcomes. Phoneme-induced palatalization occurs in compounds word-medially. If a word ending in the palatal glide precedes another word in a compound, the first segment of the second word is palatalized and voiced, as in the following example.

(12) Obstruent Voicing in Phoneme-induced Palatalization

(a)	*puuypyaajk*	'femur'	-> [puːjˈbjaːʰk]
(b)	*je'eykyëëxp*	's/he sent'	-> [heˀejˈgjɨːʂp̃]
(c)	*tëygyaapxp*	'to tell the truth'	-> [tɨjˈgjaːpʂp]
(d)	*monypyu'uts*	'fair yellow'	-> [moɲˈbjuˀuts]

This can be explained by the fact that word-medial palatalization creates an onglide and an offglide. However, if the palatalized consonant is an affricate, which does not trigger an onglide, no voicing occurs, as shown below.

(13) No Obstruent Voicing in Phoneme-induced Palatalization

(a) *kachypyaajk* 'rib' -> [katʃʲpjaːʰk]

Moreover, if the palatalization process results in a new affricate, no voicing occurs.

(14) No Obstruent Voicing in Phoneme-induced Palatalization

(a) *teky* 'leg' + *tu'uk* 'one' -> *tekychu'uk* 'one-legged' -> [tejkʲˈtʃuˀukʰ]

Phonetically, this process is different from morpheme-induced palatalization which does never cause voicing at word-edges.

(15) No Obstruent Voicing in Morpheme-induced Palatalization

(a) *y-* + *pak* - -> *pyak* 'his dove' -> [pʲakʰ]

The lack of voicing in morpheme-induced palatalization can be explained by metathesis #yCV -> #CyV, hence leaving a voiceless environment to the left.

In addition, clitics do not cause voicing of obstruents when these occur in a voiced environment, as in the following example.

(16) No Obstruent Voicing with Clitics

(a) *kachy* 'basket' + = *ën* Locative -> *kachën* 'in the basket' -> [ˈkatʃɨn]
(b) *nepyny* 'blood' + =*ochy* 'a lot of' -> *nepynyöchy*'a lot of blood' -> [neˈpʲɲøtʃ]

While the above described processes apply to most instances, there are several irregular patterns observed, as well as partial voicing. This will be discussed in Section 3.3 together with the irregularities found in the sonorant devoicing processes described below.

3.2 Sonorant Devoicing

Sonorant phonemes are voiced in Chuxnabán Mixe, but they devoice word-finally in clusters and word-initially before obstruents. This is shown in the following examples.

(17) Sonorant Devoicing Word-finally and Word-initially

(a) *kaajpn* 'village' -> [kaːʰpn̥]
(b) *a'chmp* 'custard apple' -> [a̰tʃm̥p̰]
(c) *njot* 'my stomach' -> [n̥hotʰ]

The same voicing assimilation rules apply as with obstruent voicing: word-edges are regarded as voiceless environments, and devoicing occurs between two voiceless segments. The following three rules best describe sonorant devoicing:

1. [+son, -syllabic] -> [-voice] / [-voice] ____ [-voice]
2. [+son, -syllabic] -> [-voice] / [-voice] ____ #
3. [+son, -syllabic] -> [-voice] / # __ [-voice, + cont, - strid]

Glides do not occur in a voiceless environment; therefore they are never devoiced. Palatalized and non-palatalized nasals are equally affected by the devoicing rules, as in the example below.

(18) Sonorant Devoicing with Palatalized Nasals

(a) *pixyny* 'cotton' -> [piʃɲ̊]

Sonorant devoicing does not occur in consonant clusters resulting from compounding, as in the following example.

(19) No Sonorant Devoicing in Compounding

(a) *kaajpn* 'village' + *kopk* 'summit'-> *kaajpnkopk* 'capital -> [kaːʰpnkopk]

Moreover, while the vowels of clitics do not cause voicing, they prevent final devoicing.

(19) No Sonorant Devoicing with Certain Clitics (same as example 16)

(a) *kachy* 'basket' + = *ën* 'in' -> *kachën* 'in the basket' -> ['katʃɨn]
(b) *nepyny* 'blood' + =*ochy* 'a lot of' -> *nepynyöchy*'a lot of blood' -> [neˈpʲɲøtʃ]

No examples were found where laryngeal timing is essential in the devoicing process. The same as with obstruent voicing, there is some token variation, and partial devoicing can be observed. These irregularities are discussed below.

3.3 Irregular Patterns in Voicing and Devoicing

Two phonological rules could account for most voicing and devoicing patterns observed in Chuxnabán Mixe: (1) voiceless obstruents are voiced if they occur between two voiced segments and (2) voiced non-syllabic sonorants are devoiced if they occur between two voiceless segments. Word-edges, aspirated vowels, and glottalized vowels are regarded as voiceless environments, while interrupted vowels act as voiced

segments. In fact, the two processes could be explained using one simple rule whereby consonants voice or devoice depending on their environment at both edges:

C -> [α voice] / [α voice] ____ [α voice]

However, this rule poses problems in strings of three or more consonants which occur mostly in compounding. Certain words may suggest rule ordering (i.e. voicing occurs before devoicing), but the reverse order (devoicing before voicing) may apply in other instances. This is shown in the following example.

(20) Rule Ordering: Voicing before Devoicing

(a) *poxm* 'spider' + *ta'aky* 'to spin' -> *poxmta'aky* 'spiderweb' -> [poʂmˈdaˀajkʲ]

Hence, voicing seems to be only progressive and not regressive, and there is no devoicing in word-medial position. Moreover, there is some token and speaker variation. The following two examples have been observed with and without obstruent voicing and sonorant devoicing respectively.

(21) Token Variation

(a) *kaajpnkopk* 'capital -> [kaːʰpnkopk]/[kaːʰpngopk]
(b) *njot* 'my stomach' -> [nhotʰ]/[nn̥otʰ]

This variation could also be triggered by careful speech whereby assimilation takes place in fast-paced or regular speech, but not in careful speech. In addition to speaker and token variation, an acoustic study reveals partial voicing and devoicing, thus obscuring these patterns even further. Partial voicing is illustrated in the spectrograms in Figures 2 and 3.

Other researchers have noticed similar irregular patterns for other Mixean varieties (Bickford 1985; Crawford 1963; Dieterman 2008; Ruiz De Bravo Ahuja 1980; Schoenhals and Schoenhals 1982; Van Haitsma and Van Haitsma 1976; Wichmann 1995). Van Haitsma (1976) mentions occasional word-final voicing of obstruents after long and interrupted vowels, in certain word-final clusters, and in cases where stem-final /w/ is dropped before /p/. Word-final voicing has not been observed in Chuxnabán Mixe.

The above described irregularities point to a sound change in progress where this type of variation would be expected. Furthermore, partial voicing and devoicing confirms the idea of a gradual change.

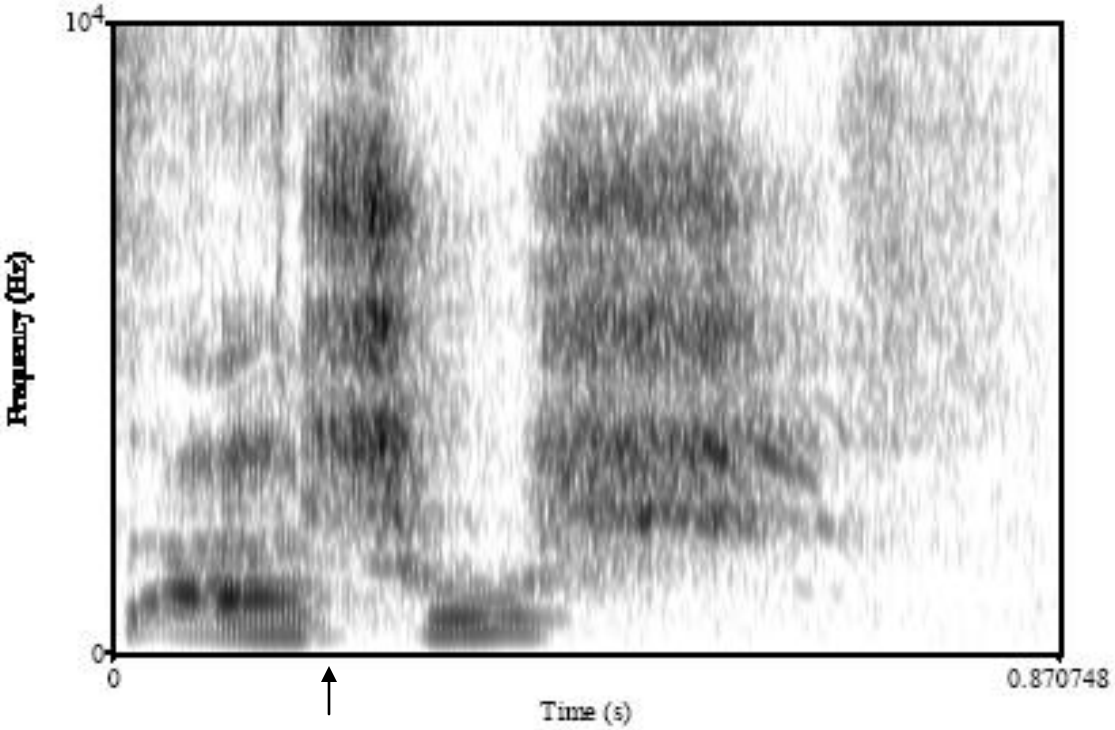

Figure 2: Partial voicing in *axux* 'garlic'

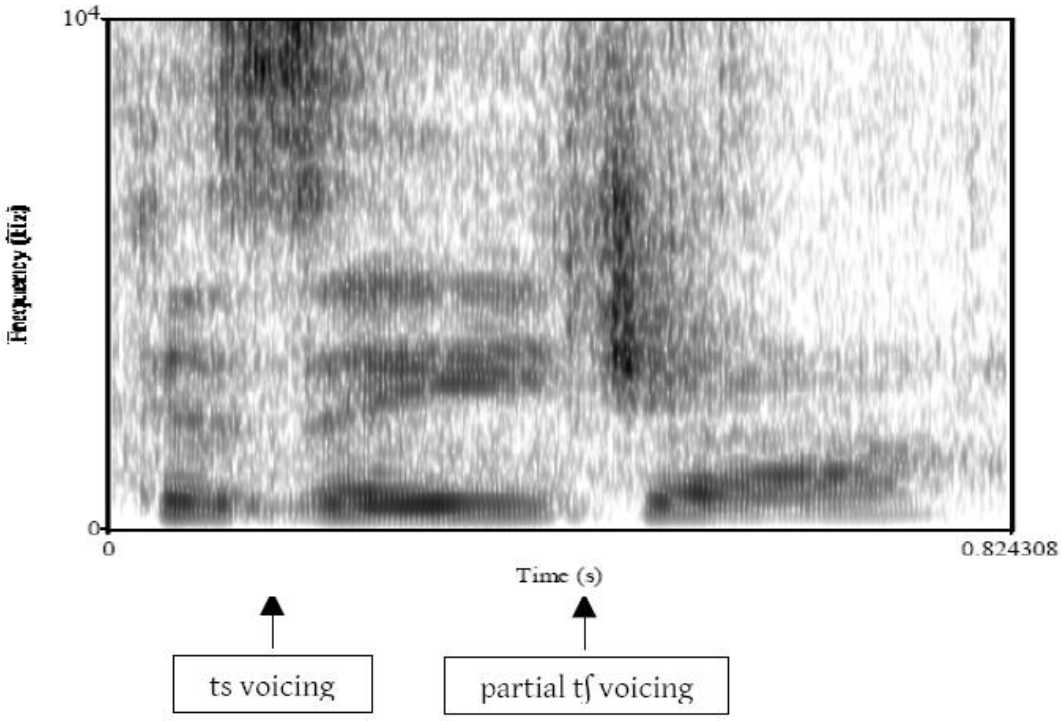

Figure 3: Partial voicing in *këtseychaa* 'chicken egg'

4. Nasal Place Assimilation

Nasal place assimilation has also been reported for a number of Mixean languages (Crawford 1963; Dieterman 2008; Schoenhals and Schoenhals 1982; Van Haitsma and Van Haitsma 1976). Van Haitsma and Van Haitsma (1976) states that nasal place assimilation occurs in words other than verbs, and that there is some speaker variation. Similarly, in Chuxnabán Mixe nasal place assimilation shows irregular patterns, including token and speaker variation. For example, the morpheme-final alveolar nasal /n/ sometimes assimilates to the following stop /p, t, k/ in place of articulation. This can be summarized as follows:

/n/ = [n] /____ /t/
/n/ = [m]/____/p/
/n/ = [ŋ]/____/k/

or:

n -> [α place] / ____ [-sonorant, α place]

The following examples illustrate this process.

(22) Nasal Place Assimilation

(a) *tun* 'to work', but *tun + =pë* -> *tumpë* 'worker'
(b) *miin* 'to come', but *miin + -p* -> *miimp* 'I come'
(c) *wiin* 'eye', but *wiin + ki'ix* -> *wiinki'ix* 'dark circles around eyes'
-> [wiːŋˈgiˀiʂ]

Generally, this process only occurs in morpheme-final position, therefore preserving the contrast found in the person prefixes *n-* '1st person' and *m-* '2nd person'. However, occasionally nasal place assimilation is also noted in this position, as in the following example.

(23) Nasal Place Assimilation Word-initially

(a) *npa'ak* 'my sweet' [mbaˀak].

Following Dieterman (2008), the alveolar nasal could be regarded as an archiphoneme in morpheme-final position, always assimilating in place of articulation to the following segment. Dieterman (2008) shows for the related Isthmus Mixe that nasal place assimilation only occurs in morpheme-final position, preserving the contrast found in the person markers *n-* and *m-* word-initially. Generally, the same occurs in Chuxnabán Mixe, but there is some variation as shown in example (23). The following examples illustrate how Dieterman's findings also apply to Chuxnabán Mixe.

(24) No Nasal Place Assimilation Word-initially

(a) *n-* '1st person' + *pak* 'pigeon' -> *npak* 'my pigeon' [nbak]
(b) *m-* '2nd person' + *tëts* 'tooth' -> *mtëts* 'your tooth' [mdɨts]

The fact that occasionally nasal place assimilation is also noted in this position points to a sound change in progress, the same as with voicing and devoicing. Moreover, nasal place assimilation does not occur with the bilabial nasal /m/ in morpheme-final position, as shown below.

(25) No Nasal Place Assimilation Morpheme-finally with /m/

(a) *poxm* 'spider' + *ta'aky* 'to spin' -> *poxmta'aky* 'spiderweb' [poʂmˈdaˀajkʲ]
(b) *atsëm* 'pig' + *tsu'uch* 'meat' -> *atsëmtsu'uch* 'pork meat' [adzɨmdzuˀutʃ]
(c) *tsa'am* 'plaintain' + *kepy* 'tree' -> *tsa'amkepy* 'plaintain part' [tsaˀamˈgepʲ]

5. Summary and Conclusions

Obstruent voicing, sonorant devoicing, and nasal place assimilation are common to Mesoamerica and regarded as defining traits of this linguistic area (Campbell et al. 1986). The same as in Chuxnabán Mixe, they occur in other Mixean languages. This paper has demonstrated that phonological rules alone can not explain these assimilatory processes given the irregular patterns and given the speaker and token variation. Rather, these irregularities indicate a sound change in progress where variation is expected. Sound change can be phonetically and lexically gradual. Lexical irregularities occur in token and speaker variation. Phonetic irregularities manifest in partial voicing or devoicing. Chuxnabán Mixe exhibits thus both, lexically and phonetically gradual sound change. A closer look reveals that phonemically relevant places, such as the person prefixes, are more resistant to the assimilation processes. Similar observation have been reported for the related Sayula Popoluca (Rhodes 2004). In Sayula, Rhodes notes that obstruent voicing is stress-sensitive; this has not been observed for Chuxnabán Mixe. Only sound changes that are complete can show regular patterns; the system present in Chuxnabán Mixe is clearly dynamic.

This work intends to advance the study of Mixean languages manifesting similar patterns and to lay the ground for future phonological analyses of this and other Mesoamerican languages. Further studies are needed to fully understand these assimilatory processes and what influences their variation. For example, more affixes and clitics need to be studied and the factors impacting full versus partial voicing or devoicing need to be analyzed. Furthermore, an exemplar model could be applied examining the paths of change by analyzing the frequency of occurrence of the observed patterns. Moreover, an optimality theory approach ranking the identified constraints may shed some further light on these processes.

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The Role of Homophony Avoidance in Morphology: A Case Study from Mixtec*

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1. Introduction

The Yucunany dialect of Mixtepec Mixtec exhibits suppletive allomorphy in the person-marking (subject/possessor) clitics that seems on its surface to be driven by avoidance of homophony. However, the notion of homophony avoidance in phonology/sound change (both in synchronic grammars and in general) is controversial (see, e.g., Lass 1980, Gessner & Hansson 2004, Blevins & Wedel 2009, Mondon 2009), and by extension this invites skepticism of claims of homophony avoidance in morphology. Extending previous reanalyses of homophony avoidance in sound change allows for an explanatory account of the allomorphy in Yucunany (and, potentially, similar morphological changes in other languages) without reference to a homophony avoidance mechanism in the synchronic grammar.

2. Yucunany Mixtepec Mixtec

Yucunany Mixtepec Mixtec (henceforth 'Yucunany' or YMM) is a Mixtec variety spoken in and around San Juan Mixtepec. Previous studies include Pike and Ibach 1978 (on the closely related San Juan Mixtepec Mixtec dialect), Paster and Beam de Azcona 2004a,b (from which the data for this paper are taken), and Paster 2005.

The person markers of YMM are summarized in table 1 below, with the forms of particular interest shown in bold. In this table, 'L' stands for a low tone (to be discussed).

Table 1: Yucunany person markers

Person	Number	Pol/Fam	M/F	Incl/Excl	Form
1	sg				**yù ~ L**
	pl			incl	gó
				excl	weè
2	sg	polite			ní
		familiar			gú ~ ú
	pl	polite			weèní
		familiar			weèyú
3	sg	polite	masc		raà
			fem		í
		familiar			**à ~ ì** ~ ñaà
	pl	polite	masc		weèrà
			fem/mixed		weènà
		familiar			wiì

These forms are used to indicate both subjects and possessors, and they occur after the relevant verb or noun. An adjective may intervene between the possessed noun and the person markers, suggesting that these are best treated as enclitics, although Pike & Ibach (1978) treated them as suffixes. The affix/clitic distinction is not crucial for the present purposes, but see Paster and Beam de Azcona 2004a for further discussion.

The first instance of apparent homophony avoidance that we will consider in YMM is in the first person singular marking. 1sg is marked by *yù* when the stem has final L tone, and a L tone elsewhere. The L tone allomorph is realized at the end of the stem, creating a falling tone (note: underlining indicates nasalization; data are from Paster and Beam de Azcona 2004a: 73).[1]

(1)	a.	nàmá	'soap'	nàmá**à**	'my soap'	
		kwîîí	'narrow/thin'	kwîîî	'I am narrow/thin'	
		vílú	'cat'	vílú**ù**	'my cat'	
		tìinà ncháá	'blue dog'	tìinà ncháá**à**	'my blue dog'	
		tzàáku	'corral'	tzàáku**ù**	'my corral'	
		yùúti	'sand'	yùúti**ì**	'my sand'	
		sì'i	'leg'	sì'i**ì**	'my leg'	
		kwà'a	'man's sister'	kwà'a**à**	'my sister'	
	b.	sòkò	'shoulder'	sòkò **yù**	'my shoulder'	*sòkò
		tutù	'paper'	tutù **yù**	'my paper'	*tutù
		chá'à	'short'	chá'à **yù**	'I am short'	*chá'à
		ve'e nchá'ì	'black house'	ve'e nchá'ì **yù**	'my black house'	*ve'e nchá'ì

Notice that if all stems including those in (1b) took the L tone allomorph, then the 1sg form of underlyingly L-final stems would be homophonous with the plain form. For example, the noun *sòkò* 'shoulder' has as its 1sg possessed form *sòkò yù* 'my shoulder'; the form **sòkò* (with a L tone vacuously realized on the stem-final syllable) cannot be used with the meaning 'my shoulder'.

A second example is found in the third person singular familiar forms, which are marked by *à* when the stem-final vowel is [i], and *ì* elsewhere (except *ñaà* with some specific lexical items, especially C-final Spanish loanwords) (data are from Paster and Beam de Azcona 2004a: 74).

(2)	a.	sàmá	'clothing'	sàm**îî**	'his clothing'	
		vàá'a	'bad'	vàá'**ì**	'it is bad'	
		tá'a	'relative'	tá'**ì**	'his relative'	
		nda'á	'hand'	nda'**îî**	'her hand'	
		ma tzá'nu	'grandmother'	ma tzá'n**ì**	'her grandmother'	
		kù'ù	'woman's sister'	kù'**ì**	'her sister'	
	b.	sì'i	'leg'	sì'**aà**	'his leg'	*sì'**ì**
		kachìí	'cotton'	kachì**áà**	'his cotton'	*kachì**îî**
		tzí'ì	'be dying'	tzí'**à**	'she is dying'	*tzí'**ì**

The *ì* of the 3sg 'overwrites' the vowel of the stem-final syllable, rather than occuring after it. Thus, in examples such as *tá'ì* 'his relative', the 3sg familiar form has the same number of syllables (and with the same length) as in the plain form *tá'a* 'relative'. For

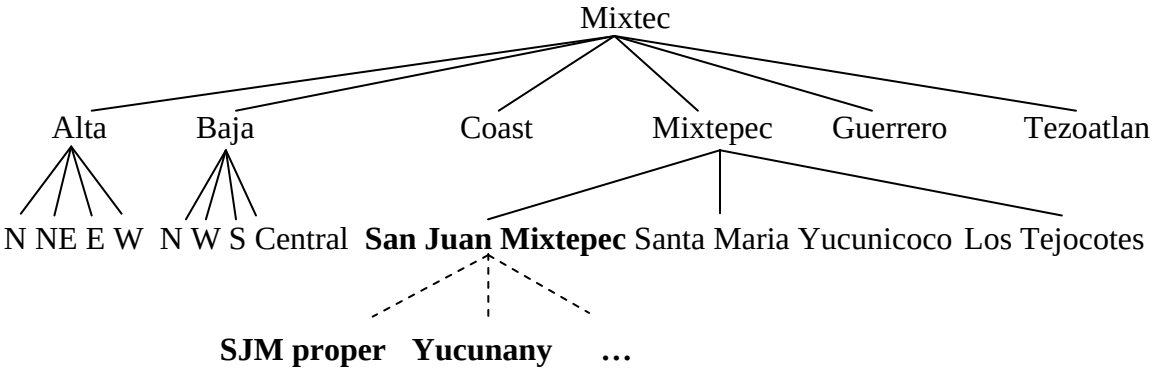
this reason, adding the *ì* marker to a stem that already ends in /ì/ would result in homophony between the plain and possessed forms. An example is the verb *tzí'ì* 'be dying', whose 3sg familiar form is *tzí'à* rather than **tzí'ì*. Notice, however, that this applies only to forms whose stem ends in a L-toned /i/; the plain form of stems with final /i/ or /í/ would still be distinct from their 3sg form if they took the *ì* allomorph. For example, the noun *sì'i* 'leg', which ends in a mid-toned /i/, would be phonetically distinct from a form with the *ì* marker, which would be **sì'ì*, and yet the *ì* marker is not used to mark the 3sg familiar form (the correct form is sì'aà 'his leg'). Hence, we can see already that homophony in and of itself will not suffice to explain the observed allomorphy in every case.

3. Mixtec pronouns

Before analyzing the YMM person markers in question, I will turn to some data from other Mixtec varieties to provide some background for the claims about the historical development of person marking in YMM that will be made later in the paper. The varieties to be discussed include some (e.g., San Juan Mixtepec Mixtec) that are closely related to YMM, as well as others that are more distantly related but for which there exist thorough, accessible descriptions.

Figure 1 shows a rough internal classification of Mixtec, inferred and embellished from Josserand 1983: 470. Note that this is not necessarily a universally agreed-upon classification; among other possible differences, some researchers may put Mixtepec Mixtec and Baja Mixtec together in a subgroup to the exclusion of the other four.

Figure 1: Mixtec internal classification



We will first consider the person marking system of San Juan Mixtepec Mixtec proper, as described by Pike & Ibach 1978. The system is summarized in table 2 below.

Table 2: San Juan Mixtepec person markers

Person	Number	Pol/Fam	M/F	Incl/Excl	Form
1	sg	polite			**yù**
		familiar			**L**
	pl			incl	kwé
				excl	kó ~ ó
2	sg	polite			ní
		familiar			kú ~ ú
	pl	polite			kwèmeéní (no bound form)
		familiar			koyú
3	sg	polite	masc		rà
			fem		ñá
		familiar	masc		**à ~ ì**
			fem		**á ~ í**
			inanimate		ñà
	pl	unspecified			nà
		familiar	masc		koyì
			fem		koyí

The morphemes of particular interest are bolded in the table. Notice that where Yucunany has phonologically distributed allomorphs *yù* and L for 1sg, SJM has these two markers as 1sg polite and 1sg familiar, respectively. In addition, SJM uses both *a* and *i* for 3sg familiar, but their tone patterns distinguish between masculine and feminine, with L tone indicating masculine and H tone indicating feminine. More will be said about these forms later in the paper.

We move next to Ayutla Mixtec, a member of the southern branch of the Baja group. Table 3 summarizes the person markers of Ayutla Mixtec (taken from Pankratz and Pike 1967: 298).

Table 3: Ayutla person markers

Person	Number	M/F	Incl/Excl	Form
1	sg			**ì**
	pl		incl	èʔ
			excl	(?)
2	sg			ùʔ
	pl			(?)
3	sg	masc		rà
		fem		**àʔ**
	pl			**ñà**

Some morphemes of interest are shown in bold. As can be seen in the table, in Ayutla, the 1sg marker is *ì*. This could be etymologically related to the L allomorph of the 1sg in YMM, or to the *ì* allomorph of the 3sg familiar (or to neither). The 3sg feminine marker in Ayutla is *àʔ*, which may relate to the *à* allomorph of the 3sg familiar in YMM. And finally the 3pl marker *ñà* may be related to the *ñaà* allomorph of the 3sg familiar in YMM.

The next language we will consider is Jicaltepec Mixtec, which belongs to the Coast Mixtec group. The person markers of Jicaltepec Mixtec are summarized in table 4 (based on Bradley 1970: 25, 45, 49-50).

Table 4: Jicaltepec person markers

Person	**Number**	**M/F**	**Incl/Excl**	**Form**
1	sg			**í** ~ é
	pl		incl	yòò (free form)
			excl	dúʔú (free form)
2	sg			ú ~ ó
	pl			dí
3	sg	masc		rá
		fem		**ña**
	pl			ñí

In Jicaltepec Mixtec, the 1sg has an allomorph *í*, which may be related etymologically to the YMM 3sg familiar marker *ì*. The 3sg feminine marker *ña* is also likely related to the YMM 3sg familiar allomorph *ñaà*.

The person marking system of Chalcatongo Mixtec, a member of the central branch of the Alta Mixtec group, is summarized in table 5 (Macaulay 1996: 139).

Table 5: Chalcatongo person markers

Person	**Number**	**Pol/Fam**	**M/F**	**Form**
1	sg	polite		na
		familiar		rí
	pl			žó
2		polite		ní
		familiar		ro
3		familiar	masc	ðe
			fem	**ña**
		polite		to

In this language, the only good candidate for a person marker relating to the YMM markers we are looking at is the 3rd person familiar feminine marker *ña*, which likely relates to the YMM 3sg familiar *ñaà* allomorph.

Having seen some person markers in other varieties of Mixtec that may be historically related to those found in modern YMM, in section 4 we will consider a possible scenario for the historical origin of the patterns observed in YMM.

4. The origin of 'homophony avoidance' in Yucunany

In this section I present a hypothesis for how the apparent homophony avoidance observed in YMM, discussed in section 2, may have originated in the historical development of the language. Crucially, I will show how these patterns may have originated without any specific reference to homophony (or to the avoidance thereof).

Recall from section 3 that in SJM (Pike and Ibach 1978), *yù* marks 1sg polite, while a final L tone marks 1sg familiar. Recall also that YMM has a polite vs. familiar distinction in the 2sg and 3sg, but not in the 1sg. These facts taken together suggest that at an earlier stage, YMM (or its predecessor) also had a polite-familiar distinction in the 1sg, which was later lost.

Unlike in Yucunany, in SJM there are many examples of L-final roots that take a final L tone marker (of the 1sg familiar), since SJM does not exhibit the phonologically conditioned allomorphy found in Yucunany. This means that in SJM there are some forms where the 1sg familiar is homophonous with the plain form of the root, as seen in (3) (examples are from Pike and Ibach 1978: 281).

(3)

	šišì	'aunt'	šišì	'my aunt'
	tívì	'is blowing'	tívì	'I am blowing'

Based on this fact about SJM, below is a proposed history of the Yucunany 1sg allomorphy.

I begin with the hypothesis that with respect to 1sg marking, SJM proper reflects the pattern that was found in Proto-Mixtepec Mixtec, shown in (4).

(4) *Proto-Mixtepec Mixtec* (attested in SJM proper)

Root type	Plain form	1sg familiar	1sg polite
final L	**final L**	**final L**	yù
final M	final M	final L	yù
final H	final H	final L	yù

Notice that at this stage, as in SJM proper, the plain and familiar forms are homophonous for 1sg polite forms of L-final roots.

At the next stage, which I term 'Early Yucunany Mixtepec Mixtec', the semantic distinction between polite and familiar in the 1sg has been lost. At this stage, both forms of the 1sg marker still exist in free variation. This is shown in (5).

(5) *Early Yucunany Mixtepec Mixtec*

Root type	Plain form	1sg
final L	**final L**	**final L** ~ yù
final M	final M	final L ~ yù
final H	final H	final L ~ yù

At this stage, each type of stem has two possible 1sg forms, but L-final stems have only one form that is not homophonous with the stem itself. This is important because in some contexts where a L-final root is marked with a redundant final L tone, the intended 1sg form may be mistaken for a plain form if the 1sg meaning is not of critical relevance in the discourse. Blevins & Wedel's (2009) 'Lexical Character Displacement' proposal makes use of this notion in accounting for the failure of sound change to apply where it creates homophony between words in lexical competition. Assuming that the L and *yù* allomorphs are used by speakers with equal frequency, the majority of underlyingly L-final stems that are understood by the listener to be 1sg forms will have the *yù* allomorph rather than the floating L tone. Since it is used more frequently than the floating L tone, the *yù* allomorph ultimately 'wins out', becoming the only 1sg marker to be used with L-final roots, as in the 'Intermediate Yucunany Mixtepec Mixtec' stage schematized in (6).

(6) *Intermediate Yucunany Mixtepec Mixtec*

Root type	Plain form	1sg
final L	final L	yù
final M	final M	final L ~ yù
final H	final H	final L ~ yù

At this intermediate stage, one possible development is for the 1sg of M- and H-final roots to be marked only by *yù*, by analogy with L-final roots. Instead, in modern Yucunany, M- and H-final roots converge on the floating L tone as the marker of 1sg, as schematized in (7).

(7) *Modern Yucunany Mixtepec Mixtec*

Root type	Plain form	1sg
final L	final L	yù
final M	final M	final L
final H	final H	final L

A possible explanation for this last development is that speakers picked up the discrepancy between the existence of the L-final 1sg forms for M- and H-final roots on the one hand, vs. the lack of L-final 1sg forms for L-final roots on the other hand. This could have led to the generalization that *yù* is used with L-final roots while the floating L tone is used with M- and H-final roots.

The point of the above demonstration is that the pattern of tone-conditioned suppletive allomorphy could have emerged in Yucunany Mixtepec Mixtec without necessarily being *driven* by homophony avoidance. This explanation accommodates the fact that Mixtepec Mixtec probably did exhibit homophony between 1sg and plain forms of L-final roots, and that SJM still does (or did, in 1978).

We now move to a discussion of the 3sg familiar. First, suppose that the pre-Proto-Mixtepec Mixtec 3sg person marking system was as shown in table 6 (i.e., just like modern SJM proper but without the 3sg familiar allomorphy).

Table 6: Pre-Proto-Mixtepec Mixtec 3sg markers

			masc	*rà
		polite	fem	*ñá
			masc	*à
			fem	*í
3	sg	familiar	inanimate	*ñà

Then the relevant changes between pre-Proto-Mixtepec Mixtec and Proto-Mixtepec Mixtec would be as shown in table 7 (in bold).

Table 7: Changes from pre-Proto-Mixtepec to Proto-Mixtepec 3sg markers

			masc	*rà
		polite	fem	*ñá
			masc	*à + **ì**
			fem	*í + **á**
3	sg	familiar	inanimate	*ñà

At the stage of pre-Proto-Mixtepec Mixtec, the plain and 3sg familiar forms would have been as shown in (8). The forms in (8a) have underlying final vowels that are neither *a* nor *i*, so there is no risk of homophony with either the masculine or feminine 3sg familiar forms. In (8b), however, the roots have final *i* or *a*, so there is the possibility of homophony, particularly in the bolded examples.

(8) *Pre-Proto-Mixtepec Mixtec plain vs. 3sg familiar forms*

		Plain	3sg familiar	
a.	'shoulder'	sòkò	sòkà (masc.)	sòkí (fem.)
	'cat'	vílú	vílà (masc.)	vílí (fem.)
	'house'	ve'e	ve'à (masc.)	ve'í (fem.)
b.	'bird'	**saà**	**saà** (masc.)	saìí (fem.)[2]
	'hat'	**xîìní**	xîìnà (masc.)	**xîìní** (fem.)
	'salsa'	nchá'á	nchá'áà (masc.)	nchá'í (fem.)
	'black'	nchá'ì	nchá'à (masc.)	nchá'í (fem.)

A possible context for the introduction of *ì* and *á* allmorphs in Mixtepec Mixtec would be one where the gender of a possessor was unknown or not particularly relevant. These could be mistaken for plain forms, contrasting only with a single (animate) 3sg form. Most nouns would have had separate masculine vs. feminine 3sg familiar forms, both distinct from the plain form in (8a). But on the basis of words like 'bird' and 'hat', a possible generalization is that the 3sg of *i*-final roots is formed with *a*, while the 3sg of *a*-final roots is formed with *i*.[3]

Given the system in table 7 for Proto-Mixtepec Mixtec, the relevant changes giving rise to modern YMM would be as shown in table 8.

Table 8: Changes from Proto-Mixtepec to Yucunany 3sg pronouns

			masc	*rà > raà
		polite	fem	***ñá > Ø**
				*à ~ *ì
		familiar		***í ~ *á > Ø**
3	sg	familiar	**masc/fem/inan**	*ñà > ñaà

In Yucunany, the masculine/feminine/inanimate distinction is lost in the 3sg familiar. As these categories collapse, the *á* allomorph is lost entirely, the *í* allomorph is reinterpreted as 3sg feminine polite, and the *ñà* allomorph, now *ñaà*, becomes restricted to occurring with a small number of lexical items.

In this scenario, the change from Proto-Mixtec to Mixtepec Mixtec would have introduced the *i ~ a* allomorphy in the 3sg and this would not have been driven by homophony avoidance, but by 'listener error' in parsing forms that were already homophonous with other forms in the same paradigm.

5. Conclusion: homophony avoidance in morphology as an emergent phenomenon

The objection to homophony avoidance as an inhibitor of regular sound change is based largely on the Neogrammarian view that sound change is regular and blind. Homophony avoidance as a driver of morphological change does not encounter this problem directly, but there are at least three *a priori* reasons to reject homophony avoidance as a mechanism in morphological change.

First, it is teleological; knowledge of language (including morphology) is thought to be unconscious and therefore ought not be subject to the 'desire' of a speaker to avoid homophony. Second, avoidance of homophony requires the speaker to compare the potential pronunciation of a word with the hypothetical pronunciation of other words, which would necessitate an immense amount of redundant lexical storage and computation. Finally, phonologically driven morphological homophony avoidance effects would likely be analyzed using the same anti-homophony mechanisms that have been proposed for phonology, e.g., Crosswhite's (1999) ANTI-IDENT constraint, so if they are successfully argued against as phonological constraints then they should not play a role in morphology either.

Blevins & Wedel (2009) describe how 'competition' between two similar words may inhibit a regular sound change. If the change pushes words A and B closer together phonetically, and if A and B are confusable in some contexts, then some tokens of A that approach the phonetic target for B may be misattributed to the B category. Tokens of A that clearly differ from B will always be 'counted' as tokens of category A. Over time, this will naturally cause A and B to diverge.

This is essentially identical to Mondon's (2009) model of homophony avoidance in sound change, based on Labov's (1994) Facultative Theory. The idea is that some

tokens of a word A that is undergoing a sound change will be misunderstood as tokens of word B, if the completed sound change would make A homophonous with B. As a result, learners conclude that the sound change does not apply in those environments where the misunderstandings most frequently occur. This same mechanism may apply in morphology, as described above – in this case driving a change, rather than inhibiting a change. Future research will show whether this is a widespread phenomenon and whether other such cases can be explained the same way.

Notes

[*] Many thanks to the participants in Pam Munro's American Indian Seminar at UCLA for helpful comments on an earlier version of this paper, and to the audience at WAIL for discussion after the talk on which this paper is based.

[1] The practical orthography devised for this language does not reflect vowel length, in that it uses a vowel symbol for each element of a contour tone. Therefore, the 1sg forms using the L tone allomorph, while they appear based on the transcriptions to also have a lengthened final vowel, do not get an additional full unit of vowel length added to the stem. They do undergo a small amount of phonetic lengthening relative to the vowel of the plain form of the stem, but the resulting vowel is still not as long as a true long vowel.

[2] Note, however, that our consultant reported that animals cannot be possessed, at least in his idiolect. Therefore, the 'bird' examples should only be considered representatives of possible types of examples, since they may not have been attested examples themselves.

[3] Admittedly this ignores tone, so it does not work perfectly for other words like 'salsa' or 'black'. However, we need not assume that the tones were the same in pre-Proto-Mixtepec Mixtec as they are in modern Yucunany. A full reconstruction of tone in earlier stages of the language is outside the scope of this paper.

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Hiaki pronominals and the typology of deficiency

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1. Introduction

This paper combines descriptive and theoretical goals in an investigation of pronominal forms in Hiaki. The descriptive goals include: documenting a full range of Hiaki pronominals in varied discourse contexts and beginning an investigation into contrasts in the fused pronominal postposition paradigms. For a theoretical perpective, we consider the Hiaki data in light of the typological predictions of Cardinaletti and Starke (1999), which motivates us to begin an investigation of the status of the strong/weak/clitic distinction in Hiaki pronominals, in particular, identification of the properties of apparent 'in-between' forms..

2. Background

Hiaki is a Uto-Aztecan language of the Tara-Cáhitic subfamily, spoken in Sonora, Mexico, and in Arizona. It is also called *Yaqui*, or *Yoeme,* in many published sources[i]. Although the language is still being acquired by some children in Sonora, where there are some few thousand speakers, in the US there are only sixty or fewer native speakers remaining, all of them older adults.

This work, undertaken in collaboration with Maria Florez Leyva, from Barrio Libre, Tucson, and Santos Leyva, from Potam Pueblo, Sonora, Mexico, is part of a larger project[ii] which has a threefold purpose: a) to develop a teaching grammar of Hiaki b) to provide access to a database of web-based resources, and c) to investigate the pronominal and clitic systems

Hiaki is a relatively well-documented language, and there are a number of sources which include some description of the pronominal systems, such as: Fernandez et al. (2004); Guerrero (2004); Jelinek et. al (1998); Dedrick and Casad (1999); Molina, Shaul et al. (1999); Escalante (1990); Lindenfield (1973); and Johnson (1964). However, while these sources almost all provide pronominal paradigms, including some exemplification, and usually include some discussion of the subject and/or object clitics, there are some considerable inconsistencies between the accounts. For example, Molina, Shaul et.al (1999:301) give only first person forms of subject clitics, asserting that there are no clitic forms of the other persons, which contradicts several other sources and our own findings. Furthermore, there is little discussion to be found of those pronominal forms which host postpositional suffixes, which is an area in need of considerably more attention.

3. Cardinaletti & Starke 1999 on clitic, weak and strong pronominals

Cardinaletti and Starke (1999) is a study of pronominal variation from a particular theoretical viewpoint.[iii] They identify three classes of pronominals in Romance and other languages, which they propose as crosslinguistic universals. These classes are *strong*, *weak*, and *clitic* forms, which are differentiated by morphological, distributional, semantic and prosodic contrasts. The classes stand in a phonological, structural and

featural subset relationship – each is systematically reduced with regard to the next. Strong pronouns are the most fully specified, and clitics the least.

The characteristics of *strong pronouns* as identified by C&S are the folowing: a) they are phonologically big and independent; b) third person strong pronouns can only have human (or animate) referents; c) they distribute like normal DPs, with no special syntactic licensing requirements – they can be coordinate, focused, dislocated, and occur independently, and d) they can appear without linguistic antecedents (for example, they can be established ostensively).

The two other pronoun types, which are both classed as 'deficient' with regard to the features of strong pronouns are *weak* and *clitic* forms, and the properties of these forms are derived from their structural deficiencies, which restrict their contexts of appearance.

Weak pronouns a) can be (but don't have to be) morphophonologically reduced with regard to strong pronouns; b) can allow nonhuman referents in the third person; and c) do not distribute like a normal DP – they cannot be coordinated, focused, or dislocated, they cannot occur independently, and they require a linguistic antecedent. They are not, however, positionally dependent as clitics are.

Clitic pronouns, like weak forms, a) are morphophonologically reduced with regard to less deficient pronouns; b) allow nonhuman referents; c) can't be coordinated, focused, dislocated, or occur independently, and require a linguistic antecedent. Additionally, d) they are positionally dependent, and can have 'special' syntactic requirements.

Table 1 below provides a summary of the relevant properties of the three classes of pronouns, according to Cardinaletti and Starke (1999), to which we may compare the results of our examination of Hiaki pronominal properties.

	Strong	**Weak**	**Clitic**
C&S Claim			
Morphophonologically reduced	-	-/+	+
Can have inanimate referent	-	+	+
Positionally dependent	-	-	+
Can be coordinated, focused, dislocated	+	-	-
Non-linguistic antecedents possible	+	-	-
Stand alone	+	-	-

Cardinaletti & Starke's account of this distribution of properties follows the Mirror Principle intuition that 'bigger' phonology reflects 'bigger' syntax (and conversely, that smaller phonology reflects smaller syntax). Thus, strong forms contain more functional projections, which allow more features to be checked. Deficient forms necessarily then have unchecked features, because they lack the DP-internal functional projections which would be able to check them, and this results in their dependent syntactic behaviour. Deficient forms must move to certain functional projections in their clause in order to check their unchecked features. Strong forms, in contrast, are headed by a 'nominal **C°**', which makes them independent extended projections, within which all uninterpretable

features can be checked and valued; this C° can have a prepositional-looking realization, e.g. *a* in Spanish.

The lack of referential features, which in strong forms are introduced in higher functional projections like D°, mean that deficient forms must have a linguistic antecedent. Strong forms can occur without a linguistic antecedent, since they have a D° head with referential features, but require a predicative 'range' in order to refer (like a regular DP); this is provided by the human cognitive default [+human/animate] feature, which accounts for the inability of strong forms to have inanimate referents.

Cardinalletti and Starke assert that these three classes of pronoun types stand in a mutually exclusive 'blocking' relation that follows from one notion of Economy, according to which the syntax must use the least syntactic structure possible. Hence, deficient forms must appear wherever syntactically possible (i.e. when the form can get its features checked in the matrix clause). Strong forms should only be able to be used in contexts where feature-checking of deficient forms would be impossible (e.g. when the pronoun finds itself within islands such as coordination structures, focus structures, or when no linguistic antecedent is available etc.).

For our purposes, the strength of Cardinaletti & Starke's proposal is that it provides a clear set of diagnostics for examination of the variation in Hiaki pronominal forms. It has led us to consider pronouns in a very broad range of syntactic and discourse contexts, which allows us to flesh out our knowledge of the Hiaki paradigms, discovering pronominal forms and uses which had not previously been documented. Our discoveries about Hiaki may then provide evidence either in support of, or opposition to, Cardinaletti and Starke's theoretical claims.

4. Hiaki Pronominal Paradigms

One of the most basic and uncontroversial of Cardinaletti & Starke's claims is that the more deficient the pronoun, the more morphophonologically reduced it is, frequently containing phonology which is a subset of that of the strong pronouns. The Hiaki nominative pronoun paradigm, shown in (1), illustrates that indeed, the subject clitic forms do generally appear to be fragments of their corresponding strong forms.

(1) Nominative

	Strong	Clitic	Other
1sg	*inepo*	*=ne*	*nee*
1pl	*itepo*	*=te*	*ite (tee?)*
2sg	*empo*	*=ee*	
2pl	*eme'e*	*='em*	
3sg	*a'apo*	∅	
3pl	*vempo*	*=(i)m*	

The nominative paradigm also has a third set of first person forms, which we have labeled here as 'other'. These also appear to be a morphological subset of the strong pronouns, and would seem to be candidates for Cardinaletti and Starke's 'weak' pronoun class. However, to remain theoretically neutral as to their classification for the moment, we shall refer to these forms as 'lesser nominatives'.

(2) Accusative

	Strong	Clitic	Other?
1sg	*nee*		
1pl	*itom*		
2sg	*enchi*		
2pl	*enchim*		
3sg	*apo'ik*	*aa=*	
3pl	*vempo'im*	*am=*	

The accusative paradigm shown in (2) is interestingly reduced, in that clitic forms appear only in the third person, and the third plural clitic form is not an obvious subset of its strong form counterpart. There are no 'lesser' forms here, in any person.

The paradigm in (3) shows the set of pronominal forms which occur as the complements of postpositions. Hiaki postpositions are affixal, so the forms in the first column always appear bound. They can appear freely with (almost) all postpositions. However, a subset of postpositions can also optionally affix to strong forms of third person pronouns, as indicated in the second column below.

(3) Complement of affixal postposition

	All Ps	Some Ps
1sg	*ne-*	
1pl	*ito-*	
2sg	*e-*	
2pl	*emo-*	
3sg	*a(e)-*	*apoi(k)-*
3pl	*ame-*	*vempoim-*

4.1 Examining the forms: a nominal complementizer?

One of the claims that Cardinaletti & Starke make is that strong pronouns contain an extra projection often headed by a preposition-like element, which they term a "nominal complementizer". Their example is the Italian dative, where the strong form is literally composed of the weak pronoun (*loro*) plus the morpheme '*a*' – *a loro*.

The *–po* syllable, which is evident in most of the strong nominative pronouns in (1), is homophonous with a common postposition *–po*, meaning 'at/in/for'. An example of *–po* as a postposition can be seen in (4) . In addition, *po* is sometimes seen introducing irrealis complement clauses as an apparent complementizer in certain (postposed) clauses in (5):

(4) Heidi Tucson-**po** woi mamni wasuktia-**po** ho'a-k
Heidi T-at two five year-at live-prf
"Heidi has lived in Tucson for ten years."

(5) Jason aapoik Hose-ta aa mahta-ii'aa koowi-m aa sua-ne-'e-**po** vetchi'ivo
Jason him.acc Jose-acc 3sg teach-want [pig-pl 3sg kill-irr-EV]$_{VP}$-at for
"Jason wants him to teach Jose to kill pigs"

5. Cardinaletti and Starke's claims: Nominative and Accusative paradigms

Next we turn to an examination of Cardinaletti & Starke's claims as they pertain to the nominative and accusative paradigms. For each claim, we give examples and discuss whether the claim is borne out or not in Hiaki.

5.1 Reference to non-human antecedents

C&S claim: Strong pronouns (including third person ones) cannot refer to nonhuman (or inanimate) entities; when referring to such entities, deficient forms must be used.[iv]

(6) *Nominative strong pronoun*

a. Mesa-po=**im** mane-k.
table-on=3plNOM sit.container-PRF

b. ***Vempo** mesa-po mane-k
3plS table-on sit.container-prf
"They were standing on the table." (bottles)

(7) *Accusative strong pronoun*

a. Nee mesa-po **aa=** mana-k.
1sgNOM table-on 3sgACC= put.container-PRF

b. *Nee mesa-po **aapoik** mana-k
1sgNOM table-on 3sgACC put.container- PRF
"I put it on the table."

In both the nominative and accusative, we see evidence that clitic forms must be used with inanimate third person referents (6a, 7a), and that strong forms are ungrammatical in these contexts (6b, 7b), which is consistent with Cardinaletti & Starke's claim. It may be worth noting, however, that although their phrasing suggests that deficient forms must be used for any *nonhuman* referent, in Hiaki, the relevant distinction is simply animacy, not humanness.

5.2 Distribution: Strong pronouns like full DPs, deficient pronouns not

5.2.1 Unmarked argument positions

C&S claim: Strong pronouns distribute like full DPs, but clitic pronouns appear in dependent positions. Weak pronouns are not expected to display positional dependency.

Hiaki has a basic unmarked constituent order of SOV, which is exemplified with full DPs in (8). As predicted, the strong pronouns behave like DPs and appear in the same SOV configuration (9).

(8) Maria uka uusi-ta ania
Maria the.ACC child-ACC help
"Maria is helping the child."

(9) Empo vempo'im ania
2sgNOM 3plACC help
"You help them!"

Clitics, however, are positionally dependent (again, this is unsurprising, since this dependence is one of the key characteristics of clitichood under any definition). Subject clitics in Hiaki typically appear in 2nd position, as shown in example (10) and (11), while the third person accusative clitics are procliticized to the verb (11).

(10) Vempo'im=**'e** ania
3sgACC=2plNOM help
"You help them"

(11) **Am=**ania='e
3plACC=help=2sgNOM
"You help them"

Those forms which we are calling 'lesser nominatives' seem to behave like strong pronouns in this regard, occurring initially in an SOV configuration and displaying no obvious dependencies.

(12) **Nee** Jason-ta mango-ta miika-k
1sgNOM Jason-ACC mango-ACC gave-PRF
"I made Jason a gift of the mango."

5.2.2 Coordination

C&S claim: Strong pronouns can be coordinated, deficient forms cannot.

Both strong and clitic Hiaki pronominals behave as Cardinaletti & Starke predict: strong pronouns are readily coordinated (13-14), whilst clitic forms in the same context may not be (15-16).

(13) *Strong nominative forms*
Speaker A: Haisa empo tuka tekipanoa-k?
Q 2sgNOM yesterday work-PRF
"Did you work yesterday?"
Speaker B: Heewi, Karmen intok **inepo** ofisina-po nau aane-n.
Yes, Carmen and 1sgNOM office-in together do-P.IMF
"Yes, Carmen and I were at the office together."

(14) *Strong accusative forms*
Speaker A: Haisa Karmen tuka tekipanoa-k?
Q Carmen yesterday work-PRF
"Did Carmen work yesterday?"
Speaker B: Heewi, ofisina-po=ne Peo-ta intok **apo'ik** vicha-k
Yes, office-at=1sgNOM Pete-ACC and 3sgACC see-PRF
"Yes, I saw Pete and her at the office."

(15) *Clitic nominative forms* (Cf. dialog in (13))
*Heewi, Karmen into**=ne** ofisina-po nau aane-n.
Yes, Carmen and=1sgNOM office-at together do-P.IMPF
"Yes, Carmen and I were at the office together."

(16) *Clitic accusative forms* (Cf. dialog in (14))

*Heewi,	ofisina-po=ne	Peo-ta	intok	**aa=**	vicha-k.
Yes,	office-in=1sgNOM	Pete-ACC	and	3sgACC=see-PRF	

"Yes, I saw Pete and her at the office."

The lesser nominative forms are also able to be coordinated, behaviour which is more like that of strong pronouns than deficient ones, providing a challenge for any attempt to fit these forms into Cardinaletti & Starke's 'weak' pronominal category.

(17) *Lesser nominative forms*

Tuuka	**nee**	into Alejandra nau	savu-tua-wa-k
Yesterday	1sgNOM	and Alexandra together	soap-CAUS-PASS-PRF

"Yesterday Alex and I got scolded"
(Literally: "…were caused to have soap.")

5.2.3 Focusing/modification

C&S claim: Strong pronouns can be focused with focus particles like *only, even*, like full DPs*;* deficient pronouns cannot.

Again we see Cardinaletti & Starke's predictions borne out for strong forms, which can be focused (18-19) and for clitics, which cannot (20).

(18) *Nominative strong form*

Inepo	huni'i	aa=hu'uneiya
1sgNOM	even	3sg=know

"Even I know it."

(19) *Accusative strong form*

Aapo	**vempo'im**	huni'i	oro	choki-ta	maka-k.
3sgNOM	3plACC	even	gold	star-ACC	give-PRF

"She gave even them a gold star."

(20) *Nominative clitic form*

*Huni'i**=ne**	aa= hu'uneiya
Even=1sgNOM	3sgACC=know

"Even I know it."

We have not yet attempted to elicit accusative clitic forms in this context. Again, however, the lesser nominative forms behave more like strong forms than deficient ones in being able to be focused in this way.

(21) *Lesser nominative forms*

a.

Nee	huni'i	aa= hu'uneiya
1sgNOM	even	3sgACC=know

"Even I know it."

b.

Ite	huni'i	aa= hu'uneiya
1plNOM	even	3sgACC=know

"Even we know it.

5.2.4 Dislocation and Doubling

C&S claim: If full DPs can be dislocated in the language, so can strong pronouns; deficient pronouns cannot.

There is evidence in Hiaki that nominative pronouns can be doubled (data in (22-23)from Guerrero (to appear)) – these might be considered examples of left-dislocation of a strong pronoun, which is then doubled by a coreferential second-position clitic:

(22) **Inepo** = ne kaa in haboli-ta apola-ik su'utoha-∅.
1sgNOM =1sgNOM NEG 1sgGEN grandfather-ACC alone-acc leave-PRES
'No, I cannot leave my grandfather alone.' (Buitimea 4: 63)

(23) **Itepo** into= te kaa aman kate.
1plNOM and=1plNOM NEG there go.PL
'And for us, we don't go there.' (Hilario: 7)

We can say little more about this at the moment; we currently do not have data on whether lesser nominative forms can also be dislocated/doubled in this way.

Full DPs, both nominative and accusative, can also be right-dislocated when they are topical; accusative DPs are always doubled with a clitic pronominal in main clause.

(24) (From the middle of a narrative entitled *Bunny and Skinny Coyote*)
Hiva **aa=** vaitatta'a tea uu Taavu uka Wo'i Wakila-ta
always 3sg ACC =fool.RED QUOT the bunny the.ACC coyote skinny-ACC
"Bunny kept fooling Skinny Coyote."

Again, we unfortunately have not yet collected data on whether strong pronouns can also be right-dislocated and doubled, although Cardinaletti & Starke's typology predicts that this should be possible.

5.2.5 Linguistic vs. ostensively identified antecedent

C&S claim: Deficient pronouns must refer to an antecedent established linguistically in the discourse, hence, they cannot be used ostensively or independently. In contrast, strong pronouns need not have a linguistic antecedent, and can be used ostensively.

(25) Speaker A: Havee veha huka lionok-ta nate-ne?
Who then the.acc prayer-acc start-fut
"Who will start the prayers?

Speaker B (pointing): Vempo.
3pl
Them.

In a context such as answering a question, as in (26), a pronoun may be used without an explicit linguistic antecedent established in the discourse. In Hiaki, as we see in (26b), a strong pronoun is predictably acceptable in this context, and may be used as the sole answer, unsupported by further linguistic structure. Interestingly, the lesser nominative form is not acceptable standing alone as a sole answer to a question, but it *is* acceptable without a linguistic antecedent, so long as it is placed within a clausal context (26c).

(26) a. *(Context)*
Speaker A: Havee-sa tahkaim nu'upa-vae?
Who-Q tortilla bring-INTEND
"Who is going to bring the tortillas?"

b. *Strong form*
Speaker B: Inepo.

c. *Lesser nominative*
Speaker B: *Nee.
Nee nu'upa-vae.
1sgNOM bring-INTEND

5.3 Blocking

C&S claim: Deficient pronouns should be used whenever possible; when it is possible to use a deficient form, the strong pronouns should be impossible/ill-formed.

Although many of Cardinaletti & Starke's predictions with respect to strong vs. clitic pronominals have been (more or less) borne out in the Hiaki data thus far, this particular claim is clearly not. Example (27) shows that an answer using either a clitic or a strong form is equally acceptable – there is no blocking effect present. The choice between clitic or strong form in this and similar constructions seems quite free; our consultants assert that the choice is driven by discourse/social context, with full forms feeling a little more 'formal' than reduced forms.

(27) a. *Context*
Speaker A: Haisa Anabel intok Irene Lunehtuk tekipanoa-k?
Q Anabel and Irene Monday work-PRF
"Did Anabel and Irene work on Monday?"

b. Speaker B: E'e, Maatehtuk**=im** tekipanoa-k
No, Tuesday=3plNOM work- PRF
or "No, they worked on Tuesday"

c. Speaker B: E'e, **vempo** Maatehtuk tekipanoa-k
No, 3plNOM Tuesday work- PRF

6. Pronouns with postpositions: Absence of strong/deficient contrast?

Hiaki marks DPs with affixal postpositions ((4) reproduced here as (28)).

(28) Heidi Tucson**-po** woi mamni wasuktia**-po** ho'a-k
Heidi T-at two five year-at live-prf
"Heidi has lived in Tucson for ten years."

As mentioned above, there is a special set of bound pronominal forms which appear with these affixal postpositions. Some postpositions can additionally be suffixed to strong third person forms; others are categorically ungrammatical with strong forms.

(29)	All Ps	Some Ps	(=(3) above)
1sg	*ne-*		
1pl	*ito-*		
2sg	*e-*		
2pl	*emo-*		
3sg	*a(e)-*	*apoi(k)-*	
3pl	*ame-*	*vempoim-*	

Therefore, with at least some postpositions we see a kind of strong/clitic contrast in the third person, and can test Cardinaletti & Starke's claims with regard to them.

6.1 Reference to non-human antecedents

The bound third person pronominal complements of postpositions, like regular clitic pronominals, can have either animate or inanimate referents (30), (31), (32); however, strong forms can only have animate referents (31), (32), which mirrors the predicted patterns that we saw in the nominative/accusative paradigms.

(30) Abwe, oovva-m **ae**-t mo-monto-wa hunakveha bwah-ne
well coal-PL 3sg -on RED-pile-PASS then cook-FUT
"Well, place the coals on it and then it will cook."

(31) a. **Ame-**naat aa=mana
3pl-beside 3sgACC-put

b. ***Vempoim**-naat aa=mana
3plACC-beside 3sgACC=put
"Put it beside them." (them=houses; it=ramada)

(32) a. **Ame**-naat yehte-k
3pl-beside sit-PRF

b. **Vempoim**-naat yehte-k.
3plACC-beside sit-PRF
"He sat beside them." (them = certain people)

6.2 Positional dependence

Only one pronominal+postposition form (so far) seems to exhibit any positional dependence. The form is *a-u*, '3sg-to', and its apparent dependence is variable. First, consider a non-dependent form like *a-mak*, '3sg-with'. Speaker B's possible responses in (33) show that *amak* exhibits no particular dependence on the verb, since positional adjuncts such as *aman* 'there' may intervene between the PP and the verb.

(33) Speaker A:
Haisa empo tuka ofisina-po Mercedes-ta-mak eteho-k?
Q 2sgNOM yesterday office-at Merceces-ACC-with speak-PRF
"Did you talk with Mercedes at the office yesterday?"

Speaker B:
Heewi, tuuka =ne aman **aa-mak** eteho-k.
Yes, yesterday=1sgNOM there 3sg-with speak-PRF
or
Heewi, tuuka =ne **aa-mak** aman eteho-k.
Yes, yesterday=1sgNOM 3sg-with there speak-PRF
"Yes, I talked with her there yesterday."

In the same context, *a-u* '3sg-to', is positionally restricted – *aman* may not intervene between the PP and the verb.

(34) a. Speaker A:
Haisa empo tuka ofisina-po Mercedes-ta-u nooka-k?
Q 2sgNOM yesterday office-at Merceces-ACC-u talk-PRF
"Did you talk to Mercedes at the office yesterday?"

b. Speaker B:
Heewi, tuuka =ne aman **a-u** nooka-k.
Yes, yesterday=1sgNOM there 3sg-to talk-PRF

c. *but <u>not</u>:*
*Heewi, tuuka =ne **a-u** aman nooka-k.
Yes, yesterday=1sgNOM 3sg-to there talk-PRF
"Yes, I talked with her there yesterday."

In author Harley's experience, *a-u* acts like a preverbal clitic, similar to accusative third person clitics. However, we have recently elicited some data which proves that this is not always the case. In (34) we see a direct object DP intervening between *a-u* and the verb.

(35) *Au* not always positionally dependent!
Tuuka =ne **a-u** aapa-ta toha-k
Yesterday=1sgNOM 3sg-to harp-ACC take-PRF
"I took him the harp yesterday"

6.3 Coordination

In general, all pronominal+postposition forms can be coordinated, although the postposition must be repeated in the other conjunct, suggesting that these are coordinated PPs, rather than coordinated pronouns. Even when it is available, the strong/clitic distinction is irrelevant in this context.

(36) Nee Jose-ta-mak into **apoi-mak** eteho-k
1sgNOM Joe-ACC-with and 3sgACC-with speak-PRF
or:
Nee Jose-ta-mak into **aa-mak** eteho-k.
1sgNOM Joe-ACC-with and 3sg-with speak-PRF
"I spoke with Joe and her."

Once again, only *a-u* exhibits failure to coordinate, and again, only variably; in the same contexts where it must appear preverbally, as in (34c) above, it cannot be coordinated

(36). When placed in the context in which it did not need to appear preverbally, in (35) above, however, *a-u* can indeed be coordinated (37):

(37) Nee Jose-ta-u into **apoik-u** eteho-k
1sgNOM Joe-ACC-to and 3sgACC-to speak-PRF
but not:
*Nee Jose-ta-u into **a-u** eteho-k
1sgNOM Joe-ACC-to and 3sg-to speak-PRF
"I spoke to Joe and him/her."

(38) *But!*
Tuuka =ne Jose-ta-u into a-u aapa-ta toha-k
Yesterday=1sgNOM Jose-ACC-to and 3sg-to harp-ACC take-PRF
"I took Joe and him the harp yesterday"

6.4 Focusing

Pronominal+postposition forms can be focused with focus particles, regardless of whether there is a strong/clitc contrast:

(39) (Nee chea kia vato'i) taa **ne-mak** huni'i eteho-k.
1sgNOM really just person but 1sg-with even speak- PRF.
("I'm just an ordinary person) but (he) spoke with even me!"

(40) …taa aapo **vempoime-u** ket noite-k
…but 3sgNOM 3plACC-to also visit-PRF
…taa aapo **ame-u** ket noite-k
…but 3sgNOM 3pl-to also visit-PRF
"…but she also visited them."

6.5 Doubling

Extraposed postpositional DPs are doubled by a pronominal+postposition form in the preverbal field, which parallels the behaviour seen with accusative DPs, which must also be doubled by clitics (see example (24) above).

(41) *(From a narrative:)*
Hunakveha inien **a-u** hia uu Wo'i Wakila **Tavu-ta-wi**
then this.way 3sg-to say the Coyote Skinny Bunny-ACC-to
"Then Skinny Coyote said to Bunny…"
(Lit: "Then he spoke to him this way, Skinny Coyote to Bunny:")

However, we have yet to test whether pronominal+postposition forms, either strong or clitic, can themselves dislocate, right or left

6.6 Preliminary Pronominal+Postposition speculations, puzzles

Thus far, with respect to most tests, the pronominal + postposition complex behaves like a strong form. Where there is a contrast between bound pronominals and full pronominals with a postposition, the only test which distinguishes them is the animate referent test.

The only apparently clitic-like Pron+P form is *a-u* '3sg-to', though its behavior is puzzlingly inconsistent.

There are a number of puzzles remaining to be tested for Pron+P combinations:

a. Can pronominal+postposition combinations alone serve as the answer to a question, ie, are they permissible with no linguistic antecedent?
b. Can first and second person weak or strong forms have a postposition attached? (Forms ending in *–po*: no. Weak forms?)
c. Is *a-u* a clitic, or independent word? Or are there homophonous forms?
d. Can other postpositional phrases (besides those with –u/-wi) be doubled?
e. Can strong pronouns with postpostions be extraposed (and doubled)?

Additional interesting questions arise pertaining to the case-marking of complements to postpositions. The postposition *–po* affixes to full DPs in their nominative (bare) form. Others, such as *–t, -u,* and *-mak* variably take full DPs in the accusative form (marked with the suffix *–ta,* see (40) above, e.g.). We do not yet have complete information about the case forms of the DP complements of the remaining Hiaki postpositions.

With regard to the bound pronominal complements of postpositions, the third person forms look like the (clitic) accusative pronouns with *–e* suffixed. However, since the accusative clitic paradigm is so reduced, there is not a lot of evidence available.

Strong pronominals with postpositions seem to vary—some are fully marked accusative (42b), some not. The pronominal is missing the accusative suffix *–k* in (42a), though this may be for phonotactic reasons. Again, further testing is needed to pin down the source of this varation.:

(42) a. Nee Jose-ta-mak into **apoi**-mak eteho-k (=(36) above)
1sgNOM Joe-ACC-with and 3sg.ACC[?-with speak-PRF

b. Nee Jose-ta-u into **apoik**-u eteho-k
1sgNOM Joe-ACC-to and 3sg.ACC-to speak-PRF
"I spoke with/to Joe and him."

This is similar to demonstratives when they occur with postpositions, which are sometimes overtly marked accusative (indicated with the suffix *–ka*), and sometimes not:

(43) a. **Hunuka**-naat =ne ho'ate-vae
That.ACC-beside=1sgNOM live-going.to
"I'm going to live beside that!"

b. **Hunua**-naat kitte='e
That-beside stand=2sgS
"Stand beside that!"

c. Merehilda **hunua**-mak hiapsa. **hunuka-mak*.
Merehila that-with cohabits.
"Merehilda lives with that one!"

d. Uu loktor **huna**-u noite-k.
The doctor that-to visit-PRF
"The doctor visited that one."

7. Conclusions

The variation in Hiaki pronominal forms is complex, and many questions still remain. The contrast between strong and clitic forms behaves largely as predicted by Cardinaletti & Starke's typology. However the forms which we have described as 'lesser nominatives' do not behave either like strong forms, or like Cardinaletti & Starke's 'weak' forms. Like weak forms, they are phonologically reduced, and cannot stand alone outside of a sentential context. However, like strong forms, they are not positionally dependent, they can be coordinated and focused, and they can occur without a linguistic antecedent.

Our findings so far are summarized in the table below:

	Strong	**"lesser nominative"**	**Clitic**
Morphophonologically reduced	-	+	+
Can have inanimate referent	-	n/a	+
Positionally dependent	-	-	+
Can be coordinated, focused, (dislocated)	+	+	-
Non-linguistic antecedents possible	+	+	-
Stand alone	+	-	-

7.1 Other pronominal distribution proposals

Finally, there are some other avenues of investigation that may be undertaken in order to shed further light on Hiaki pronominal distribution. For instance, Choi (2009) argues that 1st and 2nd person pronominal determiners form a paradigm with demonstrative forms. Strong pronouns in Hiaki can behave as pronominal determiners as seen in (44-45):

(44) **Eme'e** uusi-m hakun='em yeu-ean
2pl child-pl somewhere.else=2plS play-should
"You kids, you should play somewhere else."

(45) **Itepo** Hiaki-m si'imekuchi im Arizona-po tekipanoa-su-k.
1pl Hiaki-pl everywhere here Arizona-in work-comp-prf
"We Hiakis used to work all over Arizona."

If we conclude that strong pronouns are in fact demonstratives marked for person, that would explain the gap in the third person inanimate strong pronominal paradigm; the regular (third-person) demonstratives occupy that cell.

Wiltschko & Déchaine (2002) propose a different pronominal typology for free pronouns only, in which they demonstrate that languages vary as to whether pronominal forms can be predicates. Hiaki strong pronominals can definitely be predicates:

(46) Inepo **inepo**-tu-vae
1sg 1sg-BE-INTEND
"I'm just gonna be me!"

It is unclear, however, whether the behavior of strong pronominals as predicates is predicted in their approach to relate to the distribution of clitic or weak forms in the pronominal paradigm; we leave this as an open question here.

In short, much remains to be done to arrive at a full characterization of this complex and fascinating pattern of pronominal data in Hiaki. We hope, however, to have provided at least some basis for our preliminary conclusions, and established concrete directions for future work on the topic.

Notes

[i] *Hiaki*, which reflects the pronunciation and orthographic conventions used by the Pascua Yaqui tribe, is employed throughout this paper in accordance with the preferences of those Hiakis with whom we collaborate on this project.

[ii] Project funded by an NSF Linguistics grant with stimulus funds (American Recovery and Reinvestment Act), project BCS-0843898.

[iii] Other pronominal typologies, like that in Déchaine and Wiltschko (2002) or Harley and Ritter (2002), only consider free pronominal forms, and do not make claims about structural differences between free and clitic pronouns.

[iv] Of course, demonstratives could also be used instead.

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Tense and evidentiality in Sirionó and Yuki

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1. Introduction

In this paper, I will compare some temporal-evidential markers in two closely related Tupían languages spoken in Bolivia: Sirionó [ISO 639-3: srq] and Yuki (Yuqui) [ISO 639-3: yuq] representing somewhat unusual systems and also grammaticalization paths of a kind that have not been much discussed.

Sirionó and Yuki belong to the Tupí-Guaraní branch of the Tupían languages. They are usually regarded as forming a subgroup together with Guarayú and possibly with the extinct Jorá and Pauserna (e.g. Rodrigues (1984-85))[1]. Although Jensen (1999) treats Yuki as a dialect of Sirionó and Yuki and Sirionó are indeed quite closely related, the differences between them ï some of which will be discussed below -- are large enough to make it necessary to treat them as separate languages. Stearman (1984) mentions an estimate by Perry Priest to the effect that Sirionó and Yuki ñprobably diverged not more than 300 years agoò. However, there are significant differences at almost any point in the grammar. Thus, either there has been extremely fast language change or the estimate is much too low.

Sirionó is spoken by a few hundred people, most of whom live in the village of Ibiato/Eviato, and the more recent settlement of Pata de Aguila (Nguiray) in the department of Beni, about 60 kms from Trinidad, the departmental capital. Sirionó is a severely endangered language ï the younger generations are largely Spanish-dominant. Information sources for Sirionó are grammars and dictionaries by the missionary linguists Anselmo Schermair and Perry and Anne Priest (Schermair (1949, 1958), Priest & Priest (1967), Priest & Priest (1985)), and studies of written text materials (Schermair (1963), Priest & Priest (1980) and the New Testament translation), of transcribed video recordings done in connection with the documentary film *Let our Songs Live* by Mats Brolin & Anna Cnattingius (1994) and from Mats Brolinôs and my visit to Ibiato in 1999, and interviews with native speakers in 1999 and 2008.

Yuki is spoken in the village of Bia Rekuate, with 200 inhabitants, and located in the department of Cochabamba, close to the river Río Chimore. The only source for Yuki available to me is the grammar (including a vocabulary and fairly extensive texts) by Villafañe (2004), which also includes a vocabulary and fairly extensive texts[2]. Yuki appears to be more vital than Sirionó; according to Villafañe (2004: 7), preschool children are monolingual in Yuki.

2. General about tense, aspect and evidentiality in Sirionó and Yuki

Inflection plays a relatively limited role in the tense-aspect-evidentiality systems of Sirionó and Yuki and is not used at all in the marking of past time reference. Instead, a

system of particles, typically appearing in sentence-second and sentence-final position, are used. These particles tend to appear in fixed combinations, resulting in what synchronically looks like discontinuous markers which combine tense and evidentiality. In Villafañe (2004) these are referred to as ñinformational particlesò (ñpartículas informativasò or simply ñinformativasò) although most of them are complex expressions rather than particles.

Below, I will focus on the tense-evidentiality markings used when speaking of the past; before doing so I will briefly touch upon aspect and future time reference.

2.1 *Aspect in Sirionó*

The preferred interpretation of a Sirionó sentence with a dynamic verb is, like in many other languages as concerning a single completed event in the past:

(1)

Irachaë	nge	a-chose̓	ra.
pot	DIR.EVD	1SG-wash	CL

óI washed the pot.ô [Priest & Priest (1985)]

In other words, perfective aspect can be said to be unmarked in Sirionó. For on-going processes, that is, sentences that would be expressed by progressive aspect in other languages, several different kinds of markings are employed, either alone or in combination with each other. In the following example, an on-going action is marked by a copula *a-ɣ̈ko* followed by a reduplicated form of the verb *ia* ómendô and combined with two occurrences of the adverb *a* óhereô:

(2)

A	a-ɣ̈ko	se-ö̓ao	ia	a	a.
here	1SG-COP	1SG-clothes	mend	REDUP	here

óI am mending my clothes.ô [Priest & Priest (1985)]

A similar construction is used in the following sentence to speak of an activity extended over an indefinite period in the past:

(3)

Kiaa	ñi	nge	mbia	riki	uba	uba	ra.
forest	in	DIR.EVD	people	COP	move	REDUP	CL

óIn the forest, the people were moving around all the time.ô [corpus]

Generic meaning is sometimes indicated by the particle *kia*, combined with a simple form of the verb:

(4)

Mbae	tikuasu	u	kia	re?	Kiata	chö	e-u	kia	resë.
what	cow	eat	GEN	Q	grass	FOC	3-eat	GEN	evidently

ôWhat do cows eat? ï They eat grass.ô [elicited]

2.2 *Aspect in Yuki*

Villafañe (2004: 111) enumerates no less than 17 different kinds of aspectual markings in Yuki, but only a few of them can be said to pertain to aspect in a more restricted sense,

and sometimes the descriptions are too brief to make the semantics of the markers clear. Most notably, the suffix *-ta* is said to express both present progressive and immediate future Villafañe (2004: 113):

(5) A-so-ta che-riyoa-saa.
1SG-go-FUT 1SG-house-to
ôI am on my way to my house/I am going (to go) to my house.ô

To express habitual meaning, a variety of means are mentioned (Villafañe (2004: 111)); the translations are all in the past, which suggests that they really express habitual past. One construction involves the marker *kia*, apparently a cognate of the Sirionó particle in (4). Another marker is the particle *rague*, which is also said to be used for ñimperfect tenseò or ñincomplete actionò (ñel tiempo imperfecto o que una acción se encuentra incompleta en su ejecuciónò); curiously enough, however, the only example that is given is translated into Spanish using a perfective past verb. Judging from the texts, there is no systematic marking of the perfective/imperfective distinction in Yuki; sentences without any aspectual marking are common irrespective of whether the Spanish translation contains a perfective or imperfective verb form:

(6) Yaguayukia bia-ño-ke t-icha yagua j-ire.
tiger 3SG.kill man-FOC-PST SS-pull tiger ABS-skin
ôThe man killed the tiger and pulled the skin from itô

(7) Nai daie bia-ke o-ye-guroa kiuti-ra:
EVD people-PST 3SG-RFL-hunt before-EVD
ôIt is said that in the old days people hunted in this way:ô (Spanish: ñDicen que antes la people se casaba así:ò)

Villafañe (2004: 113) also mentions a ñresultativeò morpheme *-mana*, the definition of which sounds perhaps more like a perfect. For ñrepetitive actionò, she mentions reduplication of the verb and the suffix *-ji*.

2.3 *Future marking in Sirionó*

In the Sirionó tense-aspect-evidentiality system, the distinction that is both most clearly grammaticalized and has the clearest semantics is that between future and non-future. Basically, it can be said that future time reference is always marked grammatically in main clauses. The most general future marker is *ra*, occurring in sentence-second position and having the form *nda* after nasal vowels. Examples:

(8) Avión kuasu ye ra nande-bebe.
plane big in FUT 1PL.INCL-fly
ôWeôll go in a big plane.ô [corpus]

(9) Irao ra e-tea reae.
honey FUT 3-collect it_seems
ñIt seems that heös going to collect honey.ô[corpus]

If the second position in the sentence also is the final one, the future marker takes the form *rae*:

(10) Nde-rasi-te rae.
2SG-sick-INTS FUT
ñ[If you eat honey] youõll get sick.ô[Priest & Priest (1980)]

2.4 *Future marking in Yuki*

It has already been mentioned that the progressive marker *-ta* is also used to refer to the immediate future in Yuki (see (4)). For non-immediate future, free morphemes such as *tagore* and *jeta* are used (Villafañe (2004: 110)):

(11) Yiti tagore guã yichã.
child FUT 3PL.come tomorrow
ñThe children are coming tomorrowô

(12) Yichã ore-so jeta Bia Rekuate-saa.
tomorrow 1PL.EXCL-come FUT (name of village)-to
ñTomorrow we are going to Bia Rekuate.ô

If the speaker wants to express his/her own intentions, the normal way to do so in Sirionó is by using what is the clearest example in this language of an inflectional marker, *t-*, referred to in earlier descriptions as the ñintentional formò. In translations into Spanish, it tends to come out as ñvoy aé ò:

(13) Soo t-aru nande je.
meat INTENT-1SG-get we.INCL OBL
ñIõm going to get meat for us.ô[corpus]

In the overwhelming majority of cases, the intentional form is used with the first person singular. It does occur also at least in the second person, but does not then express the intentions of the second person subject, but rather the wishes of the speaker, making perhaps the label ñintentionalò slightly misleading:

(14) T-ere-teakukia u-re je.
INTENT-2SG-show we-EXCL OBL
ñI want you to show it to us.ô[Priest & Priest (1985: 523)]

A similar prefix exists also in Yuki, but it has another meaning: Villafañe (2004: 119) refers to it as ñoptativeò and says that it expresses ñel deseo y la exhortación del hablanteò, as in

(15) T-a-so de-rii.
OPT-1SG-go 2SG-with
ôLet me go with you!ô

3. Speaking of the past

3.1 *The building blocks*

As noted above, the markings used in speaking of the past are usually complex in both languages discussed here. I will first look at the particles that are used as building blocks in these markings and then proceed to the combinations.

The following morphemes are involved in the marking of past time reference and evidentiality in Sirionó and/or Yuki:

Ke is used both in Sirionó and Yuki. Yuki has a special form *ki* for the 1st person singular. In Sirionó ***ï*** *ke* is used as a suffix on nouns, as in *se-chuchua-ke* ómy former houseô. In Yuki, on the other hand, the corresponding nominal suffix has the form ***ï*** *gue*, and is thus distinct from the marker *ke*. As an independent marker of past tense in other contexts, *ke* is used only in Yuki, and as it appears, rather sparingly. In fact, no clear examples are found in the texts in Villafañe (2004) (and the ones provided in the grammar seem to be constructed), although we shall discuss some borderline cases below. In both languages, the normal position of *ke* in sentence-second position, alone or together with other particles.

Ra is also found both in Sirionó and Yuki, with the alternating forms *nda* (Sirionó) and *da* (Yuki). Its etymology is not clear. This is another morpheme that appears as an independent marker only in Yuki. Villafañe (2004: 188) classifies it as an ñinformative of certaintyò and glosses it as ñtestimonial de presente/pasado recienteò. She says that it expresses the speakerôs certainty of what he/she is saying based on participating or having participated in the related fac**ts**, which take place ñin the present or recent pastò. Villafañe gives two examples, the first of which would rather seem to refer to the immediate future, judging from the translation provided:

(16) A-kuasia-ta kiabusoa chi-rã o
1SG-get-FUT banana 1SG-NOMFUT and
e-moro-agõ dinero-rese-ra.
3s-vender-FINAL dinero-with-EVD
ódôm going to get some bananas to eat [lit. my future bananas] and to sell for money.ô(Spanish: ñVoy a recogeré ò)

(17) Che-kiato yeyu yese yibõ-da.
1SG-amigo (fish species) two catch-EVD
ôMy friend caught two fish.ô

An example from another section of the grammar (Villafañe (2004: 195)):

(18) Ha jisa-ño jo-i-ra.
this noche-FOC llover-3SG-EVD
ôIt rained last night.ô

She says that it is ñused with high frequencyò. It is not clear if this refers to the all uses of *-ra/-da* or only those cases where it is used independently. In the texts, there is only one additional occurrence of the last-mentioned kind:

(19) I-tõ-j-ire sayibo-na-bai chichena-da.
3SG-skull-ABS-skin 3SG-split-EMPH-and totally-EVD
ôIt [a tiger] split totally his [a manôs] scalp.ô (Villafañe (2004: 264))

In both languages, *ra/(n)da* consistently appears in sentence-final position (also when it occurs in combination with other markers). Sirionó sentence-final *ra/nda* should not be confused with the homophonous future marker, which always occurs in sentence-second position and is replaced by *rae* if this is the last position in the sentence.

Daie is found only in Yuki. Its etymology is unclear but it may be related to Sirionó *nda*, which is close in function. Villafañe (2004: 190, 275) presents it as appearing only in the combination *daieé ra*, but the texts contain some cases where *ra* is missing (see further below).

Nda, then, is limited to Sirionó, where is occurs only together with *ra*, to indicate second-hand information (see below). It consistently occurs in sentence-second position. It is always realized as *nda*, and is thus distinct from the future particle *ra/nda* which has this shape only after a nasal.

Ño, which is found in Yuki only, is not really a tense-evidentiality marker in itself, but occurs frequently in combination with the marker *ke*, as will be discussed below. Villafañe (2004: 166) characterizes *ño* as a focus marker, but judging from her examples, it rather has a quite wide range of functions. Yuki *ño* may be cognate with Sirionó *no* which Priest & Priest (1985: 56) translate as ótra vez; ya; entoncesô and Schermair (1958: 26) as ótambién; igualmente; además: yô. Something that speaks in favour of that is that both words occur in texts after *abe*, which in both Sirionó and Yuki means ólsoô, as in the following sentence (Villafañe (2004: 253) :

(20) Gu-kia abe ño-kiɛmba guraso.
3SG.RFL-son also FOC-man 3SG.raise
ôThe man raised his son also.ô

A and *nai* are both translated as ósíô by Villafañe (2004) and are said to form complex ñinformativesò, normally in sentence initial position.

3.2 *Speaking of the past in Sirionó*

In Sirionó sentences that refer to the past, we find two discontinuous markers that differ in a fairly clear way with respect to evidentiality, *keé ra* and *nda...ra*, where the first part is positioned after the first major constituent of the sentence and the second part is sentence-final. After a nasal vowel, *ke* takes the form *nge* and *ra* takes the form *nda*, but

the first element of *ndaé ra* always has the same form. Second-position *nda* can thus be both a future marker and a past marker, but it is normally disambiguated by the presence or absence of the final part of the past marker.

In most cases, *ndaé ra* signals a past event that the speaker has learnt about from someone else (second-hand information). It is the normal way of marking past time reference in traditional narratives:

(21) Nyasi nda oso itö kose ra.
moon INDIR.EVD 3.go spend_the_night before CL
óA long time ago the Moon went for a hunting-tour (lit. spend the night).ô [Priest & Priest (1980)]

Keé ra appears to be unmarked for evidentiality in the sense that it does not say anything definite about the source of information. Since *ndaé ra* is typically used for second-hand information, a central use of *keé ra* is to relate things that happened in the past which the speaker has first-hand knowledge of:

(22) Taita ke se-mbu-tiarö nda.
white_man DIR.EVD 1SG-CAU-grow CL
ôThe white man raised me.ô [corpus]

It may also be used for inferred events, as if one sees that the ground is wet and says:

(23) Nyaaki ke ra.
rain DIR.EVD CL
ôIt has been raining.ô[elic.]

Both Schermair and Priest & Priest speak of *keé ra* and *nda..ra* as past tense markers. But there are problems with such a labelling. To start with, *keé ra* and *ndaé ra* are used only in main declarative clauses, and are thus not found e.g. in subordinate clauses or questions.

(24) Ngasë mose ndia je,
arrive time (tree species) a

sobaiba iba nda ibate kiti ra.
raise_head REDUP INDIR.EVD up towards CL
óComing to the foot of the Genipa americana tree, they turned their heads to look upwardsô [Priest & Priest (1980)]

(25) Aba se-riirï ökia re?
quién 1SG-son matar Q
ôWho killed my son?ô[Priest & Priest (1980)]

Furthermore, the markers do not seem to be obligatory even in main declarative clauses referring to the past. In the following sentences which introduce a story no past marker is found:

(26) Tikise mbia kereko-ä cose.
machete people have-NEG before

Tikise-ä mbeẅ mbia kereko.
machete-NEG always people have

Se-rerecua mẅẅ ño tikise.
1SG-chief only only machete

Se-rerecua uno.
1SG-chief one

óMany years ago the people didnôt have machetes. They always lived without them. Only my chief had it. He was the only one.ô [Priest & Priest (1980)]

Conversely, sentences with *ke**é** ra* or *nda**é** ra* do not always refer to the past. For instance, the following sentences may well be about the present moment:

(27) Erẅẅeï-te ke ra.
cold-INTS DIR.EVD CL

ó It is cold.ô [elicited]

(28) Se-riirï nyeremo nge ra.
1SG-son two DIR.EVD CL

ó I have two sonsô [elicited]

The restriction on such uses of *ke**é** ra* or *nda**é** ra* appears to be that the statement concerns a state, rather than something dynamic.
The following sentence is thus understood to be about the past:

(29) Nyaaki ke ra.
rain DIR.EVD CL

ó It was raining.ô [elicited]

In (29-30), the tense-evidentiality markers thus seem to have lost their temporal meanings and acquired what seems to be a copula-like function. Given what has been said here, the labeling of the morphemes *ke*, *nda* and *ra* is problematic. The labels used here are DIR.EVD (direct evidential), INDIR.EVD (indirect evidential) and CL (closure).

Tupí-Guaraní languages are known for having temporal affixes not only on verbs but also on nouns. Temporal affixes on nouns are found also in Sirionó, although their use appears to be somewhat marginal. Examples would be *-ke* óformer, ex-ô as in *se-chuchua-ke* ómy former houseô and é . Such suffixes may be confused with the tense markers spoken of above, since the latter can also occur directly following a noun, as in

(30) Soo ke a-u ra.
carne DIR.EVD 1SG-eat CL
ôI ate meat.ô [corpus]

This is probably what led Firestone (1965) (and following him, Nordlinger & Sadler (2004)) to treat *ke* in examples such as (30) as a noun affix. As we have already seen, however, when *ke* is part of the ***ké ra*** marker, it follows whatever happens to be the first constituent of the sentence, and there is no basis for regarding it as part of noun morphology.

For Yuki, Villafañe (2004: 54) lists *-gue* for nominal recent past (ñpasado nominal recienteò), *-guague* for nominal remote past (ñpasado nominal lejanoò), and *-rã* for nominal future.

3.3 *Speaking of the past in Yuki*

Villafañe (2004: 190) divides the ñinformational particlesò in Yuki into three groups: (i) ñinformational particles of certaintyò; (ii) ñsecond hand informational particlesò; (iii) ñinformatives of conjecture or probabilityò. With regard to their composition, the bulk of the tense-evidentiality markings found in sentences with past time reference can be divided into two main groups: those containing the marker *daie* and those containing the marker *ke*.

In most cases, *daie* forms a discontinuous combination with sentence-final *ra*. According to Villafañe (2004: 190), ***daié ra*** is a ñsecond-hand informativeò that indicates the speaker bases him/herself on another personôs authority: ñel hablante repite lo que escuchó a otrosò. It is much used in narratives of remote past. The combination of the adverb *a* ósiô and *daie* is said to frequently occupy the first position in a sentence. However, in almost 20 per cent of the occurrences of *daie* in the texts, there is no *ra* in the sentence. Such cases are not mentioned by Villafañe, and it is hard to see if there is any semantic or pragmatic difference between them and the full marking.

The other group is the markings that contain *ke*. In her group of ñinformatives of certaintyò, Villafañe (2004: 188-189) includes the combination of *ke* with sentence final *ra*, and says that it indicates that the speaker ñexperienced the é ò ñvivió el acontecimiento que comunica al oyenteò. She gives two examples:

(31) Che-rasi ke-de-si-ra.
1SG-sick EVD-2PL-mother-EVD
ôYour mother told me: I am sick.ô

(32) Che-rasi ke-tãǫ-da.
1SG-sick EVD-1SG-mother-EVD
ôMy mother told me: I am sick.ô

However, there are no other examples of ***ké ra*** in the book, neither in the grammar or in the texts.

Most commonly, *ke* is preceded by the so-called focus particle *ño*. Villafañe (2004) does not attribute any special status to this combination, she only notes (p.167) that the collocation occurs (ñTambién se combina [el foco *ño*] con las marcas de pasado verbal precediéndo a dicha marca.ò)

In the texts there are 92 occurrences of the *ño* directly followed by *ke/ki*. There are only two other instances of *ke/ki* : in one case it follows closely upon an occurrence of *ño ke*. The total number of occurrences of *ño* in the texts is 103, in other words, there are only 11 cases of *ño* not followed by *ke/ki*. Undoubtedly there is a very high mutual attraction between *ño* and *ke/ki*. It seems likely that even if the basic function of *ño* is as a marker of focus, the focality element has been attenuated or eliminated. In particular, it should be noted that in about half the cases, *ño ke* is preceded by one of the adverbs *a* (42 occurrences) or *nai* (5 occurrences). These combinations are treated as a separate ñinformative particleò by Villafañe (2004), who says that they indicate that the speaker bases himself/herself on the authority of another person when making a judgment, and that they are is used in narratives about the recent past.

There are a number of problematic points with Villafañeôs treatment of *ke* and its combinations. Thus, as we have seen, she does not comment on the quasi-obligatoriness of *ño*. Further, there is an asymmetry in the way she handles *a* when it is followed by *daie* and when it is followed by *ño ke*: with *daie*, it is treated as an optional embellishment of the informative particle, with *ño ke*, it forms a combination with a separate semantics. Distributionally, however, it is hard to see any difference: *a* always occurs sentence-initially, but never (in the texts) text-initially, regardless of whether it combines with *daie* or *ño ke*. (*Nai* is text-initial in two cases.) Six texts contain *ño ke* in the first sentence, in three of those *a ño ke* is found later in the text. In the light of the distributional data, it would be natural to assume that the combination *a* + informative particle has a text-binding function and/or marks narrative progression. The latter possibility is compatible with the fact that most of the sentences that start with *a* are translated to Spanish with a perfective past.

The semantics of the different markers is also problematic. According to Villafañe, we would have:

> *(a) daieé ra:* second-hand information, often remote past narratives
> *ke:* past
> *keé ra*: first-hand past
> *nai/a ño ke:* second-hand information, recent past narratives

There is nothing in texts to contradict the characterization of *(a) daieé ra*, but *ke* and its combinations are again problematic. The three texts that contain *ño ke* in the first sentence and *a ño ke* further on all start with the adverb *kiuti* ôbefore, a long time agoô, indicating a remote rather than a recent past. *Kiuti* also combines with *daie* in other texts. Furthermore, at least one text starts out with five sentences marked with *daieé ra* and then continues the story for four sentences with *ño ke*. It thus seems dubious if there is any systematic difference in remoteness between *daieé ra* and *ño ke*.

4. Conclusions

Both languages illustrate the same kind of process ï the creation of complex discontinuous temporal-evidential markers from combinations of simple morphemes. The resulting systems look different, however, since the combinations that are grammaticalized partly differ: in Sirionó *ke**é** ra* and *nda**é** ra*, in Yuki *ke**é** ra*, *(a) daie**é** (ra)* and *(a) ño ke* ï see Figure 1 for an overview.

The languages also differ in that Yuki to some extent preserves the possibility of using the simple morphemes in isolation.

The semantics of the present-day markers is not entirely clear, and we do not have direct information about the prehistory of the systems. These factors make it difficult to trace developments in detail. It does appear, however, that much of the original content of the morphemes involved has gone lost in the process. In Sirionó, we see a differentiation of static and dynamic predications: assuming that the past tense meaning is the original one, which seems likely although not entirely certain, there has been a loss of that meaning component in the static cases.

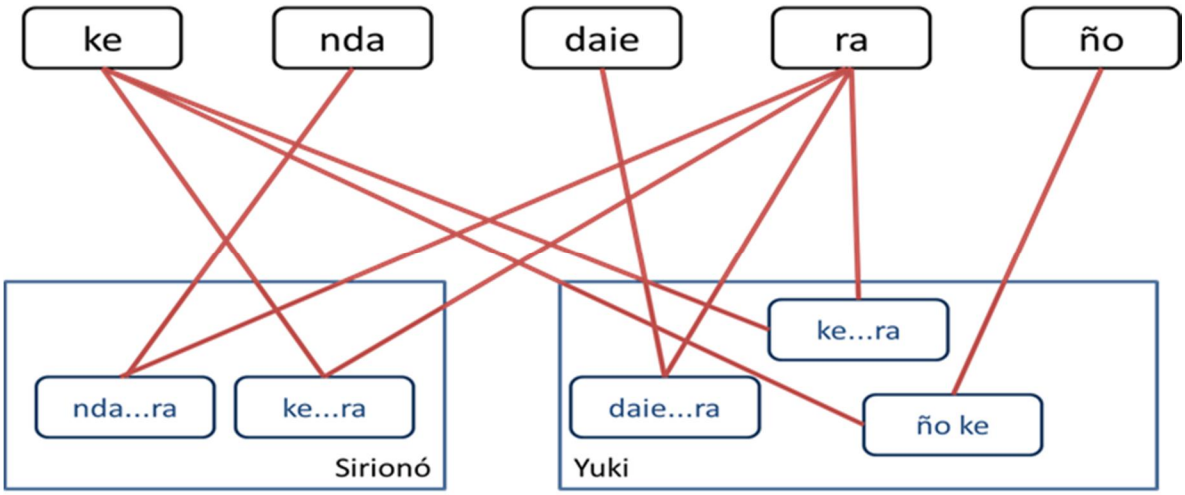

Figure 1. Simple and complex tense-evidentiality markers in Sirionó and Yuki

Abbreviations

1,2,3	1st, 2nd, 3rd person
ABS	absolute (=no possessor)
CAU	causative
CL	closing particle
COP	copula
DIR.EVD	direct evidential
EMPH	emphasis
EVD	evidential
EXCL	exclusive (1st person)
FINAL	goal
FOC	focus
FUT	future
GEN	generic
HAB	habitual
INCL	inclusive (1st person)
INDIR.EVD	indirect evidential
INTENT	intentional
INTS	intensifier
NEG	negation
NOMFUT	nominal future
OPT	optative
PL	plural
PST	past
Q	question marker
REDUP	reduplication
RFL	reflexive
SG	singular
SS	same subject

Notes

[1] The current edition of Ethnologue (Lewis (2009)) confusingly places Yuki and Jorá in a subgroup of Tupi-Guarani called ñGuarayu-Sirionó-Jora IIò and Sirionó and Guarayú in a group simply called ñSubgroup IIò.

[2] Villafañe mentions two unpublished works by the same author, one grammar and one dictionary (Garland (1990a, b)).

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Complement clause types in Northern Tepehuan: a continuum of semantic and syntactic complexity[i]

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1. Introduction

Clause union defined as the linkage of two verbs or events (Lehmann 1988; Cristófaro 2003; Givón 2001, 2009) has been studied within three different approaches. Traditionally, the phenomenon was described in terms of two discrete categories defined by a limited number of parameters, i.e. subordination and coordination (Lyons 1968). More recent studies have considered that clause union pertains to less rigid classifications and examples of this are the tripartite (Van Valin 2005) or the continuum perspectives (Lehmann 1988; Givón 2001, 2009). The former classifies clause union into coordination, co-subordination, and subordination while the latter observes the phenomenon in terms of a set of combinable features that yield a variety of clause union types in a continuum. In this approach, these clauses can be placed according to their level of syntactic (Lehmann 1988) or semantic-syntactic integration (Givón 2001, 2009) in one of the extreme points (the less or more integrated constructions) or in between. The richness of this perspective is found in all the intermediate constructions that are located between the extreme points.

Givón (2009:86) claims that the different varieties of linguistic expressions in clause union are due to the use of some morphosyntactic mechanisms or devices. These mechanisms are: (i) coreference vs. non-coreference between arguments; (ii) the presence of a group of grammatical relations or two, i.e. an integrated single set vs. two distinct sets; (iii) the adjacency of the two verbs; (iv) the presence or absence of finite verb morphology; (v) the presence or absence of a subordinator; and (vi) intonational contours (joint vs. separate). When these devices are combined together, they yield varying degrees of clause union which reflect the semantic integration of the events. At this point, the author mentions that the relation between language structure and language function is usually stated in terms of iconic motivation (Haiman, 1985:11) and within the phenomenon of clause union, the basic principle underlying the aforementioned is: "The stronger is the *semantic bond* between the two events, the more extensive will be the *syntactic integration* of the two clauses into a single though complex clause."

Givón's perspective of clause union (2009:81-3) is rather diachronic and he argues that the synchronic typology, in these cases the different varieties of clauses, can only be understood from the diachronic processes that the clauses have undergone. According to him, the common denominator to all types of clause union is grammaticalization,[ii] thus giving rise to morphologically complex verbs. At this stage, the verb becomes an affix on the second verb and shows a more integrated construction which is placed in one of the extremes of a continuum.

The use of the mechanisms or devices for clause union as well as the semantic-syntactic integration have been analyzed in different linguistic expressions such as coordinate clauses, relative clauses, serial verbs, adverbial clauses and complement clauses. The last ones will be the focus of this paper.

Complement constructions defined as expressions that function as arguments of other clauses (Givón 2001; Noonan 2007) have received considerable attention because of the variability of structural codification as well as for their semantic-syntactic interrelationship. The variety of structures in complement clauses occurs because of the presence or absence of the mechanisms or devices that code clause union and this is motivated by the semantics of the two events to be linked (Givón, 2009:86). The correlation of both factors allows talking

about a continuum of semantic and syntactic integration in complement clauses where the different types of clauses are placed. Thus, this paper describes and examines the mechanisms or devices for clause union and the semantic dimension correlated to these mechanisms in object complement clauses in Northern Tepehuan.

In Northern Tepehuan it has been found that there are at least four types of complement clauses. All of them can be placed in a continuum of semantic-syntactic complexity which shows the different morphosyntactic features reflecting the semantic nuances of the events. The language also shows some grammaticalization processes of the complement-taking verbs which prevent the language from being placed in the clearly defined scale of complement-taking verbs proposed by Givón (2001:40).

2. Grammatical aspects of Northern Tepehuan

Northern Tepehuan, a language pertaining to the Tepiman branch of the Uto-aztecan family (Dakin 2004), is spoken by approximately 6,800 people in the southern area of Chihuahua, Mexico.[iii] There are currently three recognized dialects which are located in the regions of Nabogame, El Venadito, and Baborigame. The dialect from the latter region is described in this paper.

Northern Tepehuan is characterized typologically as an agglutinative and head-marking language with a nominative-accusative case system. The language lacks morphological case markers in nouns; however, its nominative-accusative nature is manifested through two sets of pronouns, one for subjects and the other for non-subjects as shown in Table 1.

Table 1. Northern Tepehuan pronominal system

Person	Subject pronouns	Non-subject pronouns	Pronominal clitics	Reflexive pronouns	Possesive pronouns	Pronouns in pospositions
1SG	aan~~i~~	gin~giñ-	=ñ~~i~~ =na	gin-	gin-~giñ-	giñ-
2SG	aapi	g~~i~~-	=pi	gi-	gi-	gi-
3SG	~~i~~gai	Ø	Ø	gi-	- ḍi	Ø
1PL	aat~~i~~m~~i~~~ aat~~i~~n~~i~~	gi~~ř~~-	=i~~ř~~ =t~~i~~n~~i~~	gi~~ř~~-	gi~~ř~~-	gi~~ř~~-
2PL	aapimu	gin-	=pimu	gin-	gin-	gin-
3PL	~~i~~gai	Ø	Ø	gin-	-ḍi	Ø
Non-specific	_____	ga-	_____	____	-ga (objects & animals)	_____

The use of this set of pronouns is illustrated in the examples below. The subject of an intransitive clause as well as an agent of a transitive clause is coded by independent subject pronouns as the subject *aapimu* '2PL.SBJ' in (1a) and the agent *~~i~~gai* '3SG.SBJ' in (1b). The patient, however, takes a non-subject pronoun that is prefixed to the verb, like *gi~~ř~~-* '1PL.NSBJ' in example (1b). In the case of ditransitive clauses, the recipient is marked by non-subject prefixes as patients in transitive clauses which indicate that the language has a primary object system also. This is exemplified in (1b) and (1c) where the non-subject *gi~~ř~~-* '1PL.NSBJ' marks

a recipient argument in the latter while in the former the same non-subject pronoun is used to mark a patient.

(1) a. **aapimu** kokoso[iv]
2PL.SBJ[v] RDP.CONT.sleep.PRS
'You sleep.'

b. **ɨgai** **gɨř**-gigɨ
3SG.SBJ 1PL.NSBJ-RDP.CONT.hit.PFV
'He hit us.'

c. ɨgai **gɨř**-ootoši tuminši
3SG.SBJ 1PL.NSBJ-send.PFV money
'He sent us money.'

The non-subject pronoun prefixes are also found in a relationship of possession as illustrated in examples (2a-c) with *giñ-* '1SG.NSBJ', *gɨ-* '2SG.NSBJ', and *gɨř-* '1PL.NSBJ'. On the other hand, for the expression of the 3SG or 3PL possession, the suffix *–ḍɨ* is attached to the noun phrase as in (2c).

The suffix *–ga* 'ALIENABLE' that appears in examples (2b) and (2c) expresses possession only for objects or animals.

(2) a. **giñ-ɨ**ka
1SG.NSBJ-hand
'my hand'

b. **gɨ-**soi-**ga** gogoši
2SG.NSBJ-DOM-AL dog
'your dog'

c. **gɨř**-asaře-**ga**
1PL.NSBJ-basket-AL
'our basket'

d. moo-**ḍɨ**
head-3SG.POS
'his head'

Similarly, the non-subject pronouns are used to indicate a reflexive action. In the examples in (3), two clauses of this type are exemplified. As can be observed, the non-subject pronoun *gɨ-* '2SG.NSBJ' codifies the reflexive action for the 2SG and 3SG. The same occurs with *gɨn-* '2PL.NSBJ' for 2PL and 3PL respectively.

(3) a. aapi **gɨ-**nɨid[y]i nɨi-d[y]a-kařo-na
2SG.SBJ 2SG.NSBJ –look.at.PRS look.at-APPL-INSTR-LOC
'You look at yourself in the mirror.'

b. ɨgai **gɨ-**nɨid[y]i nɨi-d[y]a-kařo-na
3SG.SBJ 2SG.NSBJ-look.at.PRS look.at-APPL-INSTR-LOC
'He looks at himself in the mirror.'

2.1 Constituent order

A simple clause in Northern Tepehuan is normally constituted by a verb and a nominal phrase or pronoun. In the intransitive clauses, the unmarked or preferred word order is SV as in (4a), while in a transitive clause it is AVP as in (4b). However, word order may be relatively free depending on the context.

		S	**V**
(4)	a.	Guana	suaka-i
		John	cry-PRS
		'John cries'	

		A	**V**	**P**
	b.	Mařia	guikoma	yoošikai
		Mary	cut.PFV	flower.PL
		'Mary cut flowers'		

3. Some remarks on complement constructions

Most theories that examine complement clauses pay close attention to their syntactic properties because of the variety of structural codifications that give rise to the different complement types. Languages may have a greater or lesser number of complement types. For example, in Irish, it is known that there are only two complement types, the nominalized clause and the complement clause introduced by a subordinator. Other languages present more variety like Lango (a Nilotic language) which has four types: indicative, paratactic, infinitive, and subjunctive complement clause.[vi] In both languages, the complement types can be determined by the presence or absence of the mechanisms mentioned above (Givón, 2009:86).

The syntactic codifications in complement clauses have also been studied with regard to their semantic aspects. However, there is less agreement in linguistic studies about the semantic relationship between the main predicate and the complement clause. Some authors (Dixon 2006; Noonan 2007) classify the complement-taking verbs based on their meaning and the type of complement clause they take without explaining the semantic and syntactic correlation. Others place them into semantic scales based on the main predicate meaning (Haiman 1985; Givón 1980, 2001, 2009). These scales allow explaining the type of correlation between the complement-taking verbs and the type of complement clause in terms of their syntactic and semantic relationship.

According to Givón (2009), the phenomenon of complementation shows a systematic isomorphism between the semantics of the event and the syntax of the clauses. The semantic relation between the main predicate and its complement determines some syntactic features of the complement clause such as the use of the morphosyntactic mechanisms or devices: the reference of the subject, time, aspect or mood, etc. For him (2001: 40), the complement-taking verbs fall into three types: modality verbs ('want', 'begin', 'finish', 'try', etc.), manipulative verbs ('make', 'tell', 'order', etc.) and perception-cognition-utterance verbs ('see', 'know', 'think', 'say', etc.) (PCU henceforth). Modality and manipulative verbs run in parallel showing roughly the same semantic and syntactic relationship since they are the verbs with stronger semantic bonds; while the PCU verbs show less semantic bonds. This parallel behavior reflects a profoundly scalar phenomenon in which the transition from manipulative verbs and modality verbs to PCU verbs can be observed in the languages.

The latter types of complement-taking verbs are explored regarding the different complement types that arise in Northern Tepehuan and will be described below.

3.1 Complement clause types in Northern Tepehuan

In Northern Tepehuan, it has been observed that there are at least four types of complement clauses: morphologically complex verb, serial verb type, non-finite complement clause, and finite complement clause.

a. Morphologically complex verb. This construction is characterized by the following features: (i) the causative verb *-tuɖa* occurs suffixed to the verb of the complement clause, thus forming a verbal complex; (ii) there is no subordinator; (iii) the verbal complex falls into the same intonational contour; (iv) there is one group of arguments, i.e. the causer and the causee; (v) the verbal complex presents the TAM markers. This type of complement occurs with intransitive and transitive verbs as in examples in (5).

(5) a. aaniɨ ø-aši-**tuɖa-**i
1SG.SBJ 3SG.NSBJ-laugh-CAUS-PRS
'I make him laugh.'

b. Tiřiɨsa giñ-kuitiskiɨ-**tuɖa**-i go gogoši
Teresa 1SG.NSBJ-kick-CAUS-PRS DET dog
'Teresa makes me kick the dog.'

Semantically, the event is codifying an implicative causative (Givón, 2001:40) where the manipulator has control and a direct, physical contact with the manipulee. This is reflected also by the marking of the manipulee as a non-subject pronoun prefix in (5b) with *giñ-* '1SG.NSBJ' and (5c) with *giɨ-* '2SG.NSBJ', thus, indicating a non-volitional participant. As both participants are acting at the same time, the clause has only one TAM marker which is reflected with the suffix *i-* 'PRS' in the verbal complex.

Another example of morphologically complex verb that is found in the language is the one formed by the PCU verb *ɨlidʸi~ɨlidʸa* 'to think' and the verb of the complement clause. In this case, the former is generally found in a non-reduced form and in a second position, which means that the verb is starting to grammaticalize into a suffix. This construction occurs when the verb has the modal meaning 'to want' with intransitive and transitive verbs as illustrated in examples in (6).

(6) a. aaniɨ ugia-**ñiɨlidʸi** taškali
1SG.SUJ eat-think.PRS tortilla
'I want to eat tortilla.'

b. ga-ata-ɖui-ña-n**iɨli**-ña=na
NSP.OBJ-ata-do-POT-think-POT=1SG
'I would like to work.'

As it can be observed, the verbal complex requires only one participant encoded by independent pronouns or pronominal clitics, and one TAM marking which shows that the events occur at the same time.

b. Serial verb type. This type of construction presents the following features: (i) there is no subordinator and the verbs are adjacent to each other; (ii) they have the same intonational contour; and (iii) one of the verbs is marked with TAM. Generally, serial verb types present one argument which is coreferential to the participant of the complement verb; however, there are some complement-taking verbs in a serial verb type construction that takes two different arguments. In those cases, one of the two arguments is coreferential with one

participant of the complement verb (see examples in (14) and (15)). Two kinds of serial verb types have been found in Northern Tepehuan:

- *Auxiliary verbs.* The complement-taking verb behaves as an auxiliary since it can not take arguments and independent TAM marking. These properties have been associated with auxiliary verbs (Ramat 1987; Heine 1993). In this paper, an auxiliary verb is understood as one that cannot be used in an independent way as a predicative nucleus or verb with lexical characteristics and occurs in a fixed order with respect to the verb that is TAM marked (Heine, 1993: 23-4). In Northern Tepehuan the order that the two verbs present is [auxiliary verb + main or lexical verb], however, in one particular verb is [main or lexical verb + auxiliary verb].[vii]

The complement-taking verbs that act as auxiliary verbs are the modal *naato* 'finish' and *gɨaaga* 'to start', the PCU verb *maatɨ* 'to know', and *ɨlidʸi~ɨlidʸa* 'to think'. The verb *maatɨ* 'to know' as well as the verb *ɨlidʸi~ɨlidʸa* 'to think' have lost their lexical meaning but have gained a modal one. Examples are illustrated in (7) and (8).

(7) a. Guana **maatɨ** [mɨmɨřa-i] kabami
John know RDP.CONT.run-PRS fast
'John knows how to run fast.'

b. aapi **maatɨ** [baga-i] ɖɨɖɨbiřai
2SG.SBJ know to.water-PRS RDP.PL.land
'You know how to water the land.'

(8) [imi-mu] **ɨlian** aanɨ
go-FUT.PROB think 1SG.SBJ
'I think that I will run.'

Examples with the modal verb *naato* 'to finish' and *gɨaaga* 'to start' are shown in (9) where the coreference of the participant with the one from the complement verb can be observed as well as the auxiliary nature of the complement-taking verb.

(9) a. Mařia **naato** [oha] sekundaria
Mary finish study.PFV high.school
'Mary finished studying high school.'

b. **gin-aaga** mɨ=nɨ bɨs-kiamuko
1SG.NSUJ-start run.PFV=1SG every-morning-TEMP
'I started to run every morning.'

The analysis of the auxiliary verbs in the language is attested by the coexistence of their lexical form in the synchronic path, showing two different stages of grammaticalization processes (Heine, 1993:50).

(10) mi=**maati**=nɨ [iš=Guana dʸibia-gi]
NEG=know.PRS=1SG SBR=John come-IRR
'I don't know if John will come.'

(11) **ɨlidʸa**=na [ši=Guana ga-ata-guai tanai]
think.PRS=1SG SBR=John NSP.OBJ-ata-do.PRS here

'I think that John work here.'

(12) aanɨ biɨskɨřɨ **nanatoi** gin-talea-ga
1SG.SBJ always RDP.HAB.finish.PRS 1SG.NSBJ-homework-AL
'I always finish my homework'

-Non-auxiliary verbs. In these clauses, the complement-taking verb is marked with TAM and the second verb is codified in a non-finite form with the suffix *-řa* (sometimes a nominalized verb with the suffix *–gai*). Some of the complement-taking verbs like the manipulative *tɨhai* 'to order' and the PCU *ɨlidʸi~ɨlidʸa* 'to think' (in transitive verbs) can take two participants, the agent and the patient. In the case of the verb *tɨhai* 'to order', the patient acts as the agent of the second verb as in the examples in (13).

(13) a. gubuɖa-kɨɖɨ gin-**tɨhai** [nɨi-dʸa-gai]
force-with 1SG.NSBJ-order.PFV sing-APPL-NMLZ
'They forced me to sing.'

b. aanɨ **tɨhai** Guana [baso-piga-řa]
1SG.SBJ order.PFV John weed-PRIV-NF
'I forced John to weed.'

c. Aguštiña **tɨhai** go aali [bai ñiñia-řa baki]
Agustina order.PFV DET RDP.PL.child well clean-NF house
'Agustina forced the children to clean the house.'

The verb *ɨlidʸi~ɨlidʸa* 'to think' is polysemic in the sense that it also functions as the modality verb 'to want'. When this occurs and there is a transitive verb in the clause, two participants appear: the agent and the patient of the action. The agent is codified in both verbs with the 1SG clitics. See example (14).

(14) gɨgɨbia=ñɨ [**ɨlidʸa**=na] Piyuřo
RDP.CONT.hit=1SG think.PRS=1SG Peter
'I want to hit Peter.'

Another type of PCU verb that the serial verb type construction has is the verb *mai* 'to learn' which has a coreferent argument with the participant of the complement clause. See example (15).

(15) a. aanɨ **mai** [daiba-řa kabayo]
1SG.SBJ learn.PFV ride-NF horse
'I learned to ride a horse.'

b. Piyuřo **matia** [baso-ma-ɖa-řa]
Peter learn.FUT weed-ma-TR-NF
'Peter will learn to weed.'

Semantically, the serial verb type constructions, i.e. the auxiliary and the non-auxiliary verbs, present implicative modals which reflect the termination of an event such as *naato* 'to finish' or *gɨaaga* 'to start', as well as non-implicative modals like the PCU verbs which denote the meaning of possibility as *ɨlidʸi~ɨlidʸa* 'to think' in (8), and the meaning of ability as *maatɨ* 'to know' in (7). Other verbs that are codified with this type of construction are the manipulative *tɨhai* 'to order' and the PCU *mai* 'to learn'.

In all the cases, a co-temporal event is encoded since only one of the verbs bear the TAM marking. In the manipulative verbs, the agent has control over the situation although it does not have a completely direct and physical contact with the patient.

All these constructions show integrated events; nonetheless, it is less in comparison with the morphologically complex verbs.

c. *Non-finite clauses.* The non-finite clauses are characterized by the following features: (i) the subordinator *iš=~ši=* combine the two clauses; (ii) both clauses fall into the same intonational contour; (iii) the verb within the complement clause is codified in a non-finite form with the suffix *-ř̃a* (sometimes the verb is nominalized with the suffix *–gai*), and (iv) there can be coreferent arguments or not between the main clause and the complement clause. Verbs with the characteristics above are manipulatives such as *tɨhai* 'to order' and *idʸui* 'to make'; modal verbs such as *baiga* 'can' and the PCU *ɨlidʸi~ɨlidʸa* 'to think', *agihi* 'to say/tell', *tɨgidʸo* 'to forget', and *guaguidia* 'to believe'.

In manipulative constructions, as in examples (16) and (17), the patient of the main clause is coreferent with the agent of the complement clause. When there is a pronoun acting as a patient, it is codified with a non-subject pronoun as in example (16) with *gɨ-* '2SG.NSBJ'. There is no direct physical contact between the agent and the patient of the clause. However, there is certain degree of control from the agent and this is reflected in the non-finite codification of the complement clause (*-ña* 'POT' and *–gi* 'IRR'). On the other hand, the two events are less co-temporal in that the second event, that is, the complement clause, could have happened later in time as a consequence of an action and not necessarily at the same time in which the event of the main clause is expressed.

(16) aanɨ gɨ-**tɨhai** [iš=kɨ-ɖui-ña=pi go kuřařai]
1SG.SBJ 2SG.NSBJ-order.PFV SBR=well-do-POT=2SG DET fence
'I ordered you to fix the fence.'

(17) aanɨ **idʸui** [ši=Guana ga-tuɖia-gi]
1SG.SBJ do.PFV SBR=John NSP.OBJ-dance-IRR
'I made John dance.'

Modality verbs such as *baiga* 'can' and the PCU verb *ɨlidʸi~ɨlidʸa* with the modal meaning 'to want' in examples (18), (19), and (20) generally have coreferent arguments in which the dative or agent participant of the main clause is the one that does the action in the complement clause.

(18) **baiga**=tɨnɨ [iš=imia-gi ɖai ɖaɖia-gi ɨmo tasai-rɨ]
can=1PL SBR=go-IRR CONJ come.back-IRR one day-LOC
'We are able to go and come back in the same day.'

(19) Guana **baiga** [iš=mɨlia-gi baika ora]
John can SBR=run-IRR three hour
'John can run for three hours.'

(20) ip=**ɨlid^{y}a**=tɨnɨ [iš=ɨki ga-ugia-gi]
ip=think.PRS=1PL SBR=early NSP.OBJ-eat-IRR
'We want to eat early.'

In the case when one participant desires another to do something, the participant who does the action in the complement clause is coreferent with the patient of the main clause as in example (21). In the same way as the verbs in the complement clause described above, there is an irrealis suffix *–gi.*

(21) aapi p=**ɨlɨd^{y}i** [iš=aanɨ imia-gi]
2SG.SBJ p=want.PRS SBR=1SG.SBJ go-IRR
'You want me to go.'

Modality verbs as the illustrated above show less co-temporal events because when a wish or ability from a participant is communicated, the desired event is more likely to be in the realm of possibility as it can or cannot occur in the future.

Finally, in PCU verbs reflecting a mental state or verbal act of utterance such as *agihi* 'to say/tell', *tɨgid^{y}o* 'to remember', and *guaguidian* 'to believe', there are no coreference restrictions. In (22), the two events are less co-temporal since the action of coming *d^{y}ibia* is not necessarily happening at the time of the verbal act of telling *agihi*. In the case of (23) and (24), the second event remains in the possibility of happening or not which is reflected by the non-finite form of the verb in the complement clause.

(22) aanɨ **agihi** gɨ-tatali [iš=d^{y}ibia go šoro-ko]
1SG.SBJ tell.PFV 2SG.NSBJ-uncle SBR=come.NF DET tomorrow-TEMP
'I told your uncle to come tomorrow.'

(23) Piyuřo **tɨgid^{y}o** [ši=šoro-ko imia-gai Batopilɨ-řɨ]
Peter remember.PFV SBR=tomorrow-TEMP go-NMLZ Batopilas-LOC
'Peter remembered that tomorrow he will go to Batopilas.'

(24) **guaguidia**=na [iš=Guana gɨgɨbia Piyuřo]
believe.PRS=1SG SBR=John RDP.hit.NF Peter
'I believe that John hit Peter.'

d. Finite clause. This type of clauses are characterized by the following features: (i) the subordinator *iš=~ši=* combine the two clauses; (ii) both clauses fall into the same intonational contour; (iii) the verb in the complement clause is codified in a finite form; (iv) The clauses can have coreferent arguments or not. Verbs with these structures are manipulative verbs such as *tɨhai* 'to order' and *id^{y}ui* 'to make' as in (25) and (26). Both clauses show a non-implicative action where the patient has more control over the situation and is not affected directly by the agent. Both verbs in the clause bear the TAM marking thus showing events that are less co-temporal.

(25) Guana gɨ-**tɨhai** [iš=guikoma=pi basoi]
John 2SG.NSBJ-order.PFV SBR=cut.PFV =2SG weed
'John ordered you to cut the weed.'

(26) Guana **id^{y}ui** [iš=muaa=na Piyuřo]
John make.PFV SBR=kill.PFV=1SG Peter
'John made me kill Peter.'

The PCU verb *ɨlid^{y}i~ɨlid^{y}a* 'to think' with the modal meaning 'to want' also presents two events with its own TAM marking. Examples are illustrated in (27) and (28).

(27) ip=**ɨlɨd^{y}a**=na [iš=guikoma-i=pi muyi kuagi]
ip=think.PRS=1SG SBR=cut-PRS=2SG a.lot wood
'I want you to cut a lot of wood.'

(28) ip=**ɨlid^{y}a**=na [iš=aapi ga-oha-i Pařaře-na]
IP=think.PRS=1SG SBR=2SG NSP.OBJ-study-PRS Parral-LOC
'I want you to study at Parral.'

Other PCU verbs as *maatɨ* 'to know', *mai* 'to learn', *nɨid^{y}i* 'to see', *kaɨ* 'to hear', *agihi* 'to say', and *tigid^{y}o* 'to forget' show two events that are less co-temporal also. Examples are illustrated in (29), (30) and (31).

(29) Guana **maatɨ** [iš=Mařia hi Pařaře-na]
John know.PRS SBR=Mary leave.PFV Parral-LOC
'John knows that Mary went to Parral.'

(30) Guana **mai** [iš=mamabiyi kokosɨ-i tasɨ-ři]
John learn.PFV SBR=RDP.PL.bear RDP.CONT.sleep-PRS sun-in
'John learned that bears sleep all day long.'

(31) aapi **nɨid^{y}i** aiyi [iš=Guana ga-iši]
2SG.SBJ see.PFV when SBR=John NSP.OBJ-steal.PFV
'You saw when John stole it.'

4. Continuum of semantic and syntactic complexity

The four types of object complement clauses in Northern Tepehuan described above can be placed into a semantic-syntactic continuum where the most integrated clauses are situated at the right end while the less integrated ones at the opposite end. In this paper, the morphologically complex verbs with the causative suffix *–tuḍa* and the verb *ɨlid^{y}i~ɨlid^{y}a* 'to think' are considered to be the most integrated clauses while the finite complement clauses are the less integrated ones. In between the two ends, the serial verb type as well as the non-finite complement clauses can be located.

As far as the complement-taking verbs are concerned, it can be observed that the manipulative, modality and PCU verbs in Northern Tepehuan present different types of complements which have different degrees of integration. The manipulative verbs, for example, have shown to have a morphologically complex verb as well as serial verb type, non-finite and finite complement clauses. The same can be observed with modality verbs

which have serial verb type and non-finite complements. Finally, the PCU verbs present morphologically complex verb, serial verb type as well as non-finite and finite complements.

In most of the cases, it can be said that the variety of complement types presented in each type of verb is due to semantic nuances of the events reflected in the syntax of the language. However, some grammaticalization processes present in some complement-taking verbs have originated more integrated structures. Those are the cases of the PCU verbs *maatɨ* 'to know' and *ɨlidʸi~ɨlidʸa* 'to think' where the former shows an auxiliary verb construction with a modality value and the latter, a morphologically complex verb and auxiliary verbs also.

The behavior of these verbs as well as the semantic nuances of the events make the language difficult to fall into Givón's systematic scale of complement-taking verbs (2001:40) presented in section 3. Instead, the different complement clauses can be placed more or less accurately into Lehmann's continuum of syntactic level for clause union (1988:189-92). This continuum refers to the level of the subordinate clause with respect to the main clause which in this paper is conceived as the level of the complement clause with respect to the main clause or complement-taking verb.

Similarly to Givón (2001), the guiding idea of this *continuum* is that the lower the level, the more tightly the subordinate clause is integrated into the main clause syntactically. Between these two extremes (i.e. between the morpheme and the paragraph), there is a multiplicity of syntactic levels. This continuum is shown in Figure 1 below.

SENTENCE ◄——————————————————————————► WORD

subordinate clause is				*complex predicate formation*		
outside	**at margin**	**inside**	**inside**	verb	auxiliary	verbal
main	of main	main	VP	serialization	periphrasis	derivation
clause	clause	clause				

Figure 1. The continuum of the syntactic level

Although in this paper the terms verbal derivation and auxiliary periphrasis are not used since it is believed that the term morphologically complex verb captures better the notion of complexity and the diachronic processes, and avoids the baggage of the term 'auxiliary periphrasis' as it is used within the Indo-European tradition, the complement clauses from Northern Tepehuan can be placed in this type of continuum. This is illustrated in Figure 2 where the object complement clauses as well as the different complement-taking verbs that present each type of complement are shown.

SENTENCE ◄——————————————————————————► WORD

		SERIAL VERB TYPE		
FINITE CLAUSE	NON-FINITE	NON-AUXILIARY	AUXILIARY	MOPHOLLOGICALLY COMPLEX VERBS
PCU: *maatɨ*	**PCU**: *mai*	**PCU** : *mai*	**PCU**: *maatɨ*	**MPT**:-*tuɖa* 'CAUS'
ɨlidʸi~ɨlidʸa	*ɨlidʸi~ɨlidʸa*	*ɨlidʸi~ɨlidʸa*	*ɨlidʸi~ɨlidʸa*	**PCU**: *ɨlidʸi~ɨlidʸa*
mai	*agihi*		**MODALITY**: *naato*	
nɨɨdʸi	*tɨgidʸo*		*gɨaaga*	
kaɨ	**MPT**: *idʸui*:	**MPT**: *tɨhai*		
guaguidia	*tɨhai*			
MPT *:idʸui*	**MODALITY**: *baiga*			
tɨhai				
OUTSIDE MAIN CLAUSE				

Figure 2. Northern Tepehuan continuum of semantic and syntactic complexity.

On the other hand, the idea of a continuum is attested also by the presence of linguistic expressions which show a morphologically complex verb with the causative *-tuḍa* in an analytic clause with the manipulative verb *id^{y}ui* 'to make'. These types of clauses show cases in which there are different degrees of integration within a single clause. Generally, they occur with non-human participants such as *kabayo* 'horse' and *ḍuki* 'rain'. See examples (32) and (33).

(32) go kɨɨli **id^{y}ui** [iš=gašubɨ-**tuḍa**=pi go kabayo]
DET man make.PFV SBR=brush-CAUS=2SG DET horse
'The man made us brush the horse.'

(33) go maatɨ-kami **id^{y}ui** [iš=Diosai otos-**tuḍa** ḍuki]
DET know-NMLZ make.PFV SBR=God send-CAUS rain
'The witch doctor made God send rain.'

Another instance that demonstrate different degrees of integration within the same clause are the ones formed by a serial verb type clause with a morphologically complex verb. This linguistic expression is composed by the manipulative verb *tianɨi* 'to force' which acts as a non-auxiliary serial verb type but at the same time creates a morphologically complex verb with the causative suffix *-tuḍa.* An example of this is shown in (34).

(34) aanɨ gɨn-**t^{y}anɨi-tuḍa-**i **oha-řa**
1SG.SUJ 2PL.NSUJ-force-CAUS-PRS write-NF
'I force you to write a letter.'

5. Final remarks

This paper has described the object complement clauses in Northern Tepehuan, a Uto-aztecan language from the Tepiman branch. The data have shown that there are at least four complement types: morphologically complex verbs, serial verb type, non-finite complements and finite complements. The different complement types were determined by the presence or absence of the mechanisms for clause union (Givón, 2009:86), which also helped to observe the different degrees of semantic and syntactic integration of the events.

The four complement types have revealed that they can be placed in a continuum of semantic and syntactic complexity where the most integrated clauses are situated at the right end while the less integrated ones at the opposite end. The morphologically complex verbs with the causative suffix *–tuḍa* or the verb *ɨlid^{y}i~ɨlid^{y}a* 'to think' are the most integrated clauses while the finite complement clauses are the less integrated ones. In between the two ends, the serial verb type -auxiliary and non-auxiliary verbs- as well as the non-finite complement clauses can be located. The richness of this perspective can be observed in all the intermediate constructions that are located between the extreme points in the language since they show different degrees of integration due to semantic nuances of the events as well as some processes of grammaticalization. This is the case of the PCU verbs *maatɨ* 'to know' and *ɨlid^{y}i~ɨlid^{y}a* 'to think' which have been grammaticalized into modality verbs, thus acting as auxiliary verbs. Also, in the case of the latter, it forms morphologically complex verbs which indicate that the verb is starting to grammaticalize into a suffix.

Other interesting types of clauses that can be found in between the two extreme points are the ones that combine a morphologically complex verb and an analytic construction with a subordinator as well as a serial verb type and a morphologically complex verb.

The latter two factors, the semantic nuances of the events as well as the grammaticalization processes, prevent the language from falling neatly into Givón's (2001:40) systematic scale of complement-taking verbs presented in section 3. Instead, the different object complement types can be placed more or less accurately into Lehmann's continuum of syntactic level for clause union (1988:189-92).

Notes

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[ii] The definition adopted in this paper is: Grammaticalization is defined as the subset of linguistic changes through which a lexical item that reports or describes things, actions or qualities, in certain uses becomes a grammatical item (Hopper & Traugott, 2003:2-4).

[iii] These data were taken from II Conteo de Población y Vivienda 2005 del INEGI (Instituto Nacional de Estadística, Geografía e Informática)

[iv] ř=multiple retroflex; š= postalveolar fricative; ɖ= alveolar retroflex

[v] Abbreviations: 1= first person; 2=second person; 3= third person; AL= alienable; APPL= applicative; CAUS= causative; CONJ= conjunction; CONT= continuative; DET= determiner; DOM=domestic animal; FUT= future; HAB= habitual; INSTR= instrumental; IRR= irrealis; LOC= locative; NEG= negative; NF= non-finite; NMLZ= nominalizer; NSP.OBJ= non-specific object; NSBJ=non-subject ; OBJ= object; PL= plural; PFV= perfective; POS= possessive; POT= potential; PROB= probable: PRS= present; PRV=privative; RDP= reduplication; SBR= subordinator; SG= singular; SBJ= subject; TEMP=temporal; TR= transitive.

[vi] The examples of the complement types of these languages can be observed in Noonan (2007: 54).

[vii] See Estrada & Ramos (2010) for a more detailed analysis of auxiliary verbs in Northern Tepehuan and Lowland Pima. See Estrada (2007) for an analysis of auxiliary verbs in Lowland Pima.

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Categorical Restrictions of Positional Verbs in Teotitlán del Valle Zapotec

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1 Introduction

This paper presents a preliminary descriptive analysis of Teotitlán del Valle Zapotec[1] (hereafter TdVZ) positional verbs and proposes that TdVZ positional verb restrictions can be typologically categorized into three groups. Previous studies of Zapotec positional verbs recognize two categories. The TdVZ verbs under discussion are: *zu^{1}u^{2}b* (sit), *zu^{2}u^{1}* (stand), *zub* (be on, lie; literally, mount), *naga'a* (lie), *rii* (piled, crowded together), *nall* (hang), and *zèèbih* (float).

Zapotec is an Oto-manguean language and is spoken throughout the state of Oaxaca, México. Its basic word order is VSO. The TdVZ variant is spoken in Teotitlán del Valle, a village located approximately 15 miles (24 kilometers) east of Oaxaca City in the foothills of the Sierra Juárez Mountains.

According to the Instituto Nacional de Estadística Geografía y Informática (INEGI) census report in 2005, Teotitlán del Valle has a population of approximately 5,600, about two-thirds of which speak "some indigenous language." TdVZ is considered endangered. A majority of children no longer learn Zapotec as a first language and Spanish is generally enforced in the public school system. However, the community has demonstrated interest in language revitalization efforts and documentation of the language is in progress.[2]

Similar to other varieties of Zapotec, TdVZ requires a speaker to select one of several non-copular positional verbs when describing the location of an object. Verb selection is based on the postural orientation and sometimes the shape of an *object* and/or its relationship to a *surface*. Talmy (2000) defines these as Figure and Ground, respectively:

> The Figure is a moving or conceptually movable entity whose path, site, orientation is conceived as a variable, the particular value of which is the relevant issue. The Ground is a reference entity, one that has a stationary setting relative to a reference frame, with respect to which the Figure's path, site, or orientation is characterized (p. 312).

In accordance with previous discussions on Zapotec positional verbs (Brugman and Macaulay 1986; Lillehaugen 2006a; Lillehaugen & Munro 2006; Galant 2006, forthcoming; Operstein 2002), the terms *Figure* and *Ground* will be employed throughout this paper, as well.

Animate Figures in TdVZ generally require positional verbs in line with the canonical concepts of "sitting," "standing," "lying," etc. However, this is not always the case with inanimate Figures. For example, in TdVZ, a tall, vertically oriented object such as a tree is not necessarily always described as "standing" in TdVZ.

In San Juan Yaee Zapotec (SJYZ) and San Andrés Yaá Zapotec (SAYZ), Galant (forthcoming; 2006, respectively) notes that stative positional verbs can be typologically categorized into two groups: verbs "that are associated with a Figure's posture" (2006: 3), for example, "lying," "standing," "sitting," and "hanging" (p. 3), and those that are not (forthcoming: 22; 2006: 3). Similarly, Operstein (2002) distinguishes between two types of positional verbs in Zaniza Zapotec (ZZ), the first of which focuses on "the object whose location is being described *(=figure),*" (pp. 60-1, Operstein's italics), specifically, "the position and, to some extent, the shape of the object" (p. 61), while the second category is primarily concerned with "the object in relation to which the location is being described *(=ground)"* (pp. 60-1, Operstein's italics), or how the Figure "relates to the supporting surface" (p. 62). In TdVZ, the variables of these two categories are not necessarily mutually exclusive.[3]

Several cases appear in TdVZ in which both the Figure's posture and its relationship to the Ground account for why one particular positional verb is chosen over another. For example, the TdVZ verb *zu^{1}u^{2}b* (sit) requires that if a particular inanimate Figure has a vertically oriented stature (focus on Figure's posture), then the Figure's base must be situated in a surface (focus on Ground).[4] If both of these conditions are not met, then a different positional verb must be used. In other cases, specific verbs appear to restrict *either* the Figure's physical orientation/shape or form, *or* the Figure-Ground relationship.

The present analysis for TdVZ positional verbs recognizes three separate categorical restrictions as opposed to two. They are defined as follows:[5]

1) Positional verbs with restrictions on **the Figure's posture/shape** and **Figure-Ground relationship**
2) Positional verbs with restrictions on **the Figure's posture/shape**
3) Positional verbs with restrictions on **the Figure-Ground relationship**

This paper will present a comparative analysis of the TdVZ positional verbs included in Table 1 below. This is a partial list of TdVZ positional verbs. The data elucidate how each of these verbs meets the criteria of one of the three categories above.

Table 1: TdVZ positional verbs covered in this discussion[6]

Positional verb categories	**TdVZ positional verb**	**Basic meaning**
Restrictions on Figure's posture/shape *and* Figure-Ground relationship (§3.1)	*zu^{1}u^{2}b*	sit
	zu^{2}u^{1}	stand
	zub	be on, lie (lit. mount)
Restrictions on Figure's posture/shape (§3.2)	*naga'a*	lie
	rii	piled; crowded together
Restrictions on Figure-Ground relationship (§3.3)	*nall*	hang
	zèèbih	float

2 Methodology

The data were elicited over the course of three weeks in Teotitlán del Valle from one consultant, Serafin Matias Gutierrez, a native speaker of TdVZ. A majority of the constructions were collected by means of Bowerman and Pederson's (1993) *Topological Relations Pictures* (indicated by "BP" in the data set). The series consists of approximately sixty scenarios depicting objects in varying relational positions (e.g., a cat sitting under a table, a boat floating on water, etc.). In other cases, the consultant described tangible items in prearranged locations or positions—for example, a water bottle lying on the ground—or he described the location of objects in our immediate surroundings. In a majority of cases, upon presentation of a locative scenario, I asked Mr. Gutierrez, "Where is the…?" usually utilizing the simple interrogative Zapotec question format "*Kon*…" followed by either the Spanish or English word for the Figure (e.g., *Kon arbol,* "Where is the tree?"), for which Mr. Gutierrez would then provide the Zapotec equivalent (*Kon yaj).* He would then supply an answer (*Yax zu^{1}u^{2}b kie daing*, "The tree is (sits) on top of the mountain."). Finally, other constructions arose spontaneously (i.e., without question prompts or without staged locative scenarios).

3 The Data: TdVZ positional verbs

In this section, the series of examples first demonstrate how one verb is lexically defined and, secondly, how it semantically differs from other positional verbs. These semantic distinctions are based on animacy/inanimacy, posture, shape/form, and/or a Figure's relationship to its surroundings. Finally, the data exemplify how a given positional verb adheres to the conditions stated in one of three categories; positional verbs with restrictions on 1) *the Figure's posture/shape and the Figure-Ground relationship,* 2) *the Figure's posture/shape,* or 3) *the Figure-Ground relationship*.

3.1 *Restrictions on the Figure's posture/shape and Figure-Ground relationship*

The verbs discussed in this section restrict the Figure's physical orientation, shape or form in certain cases, as well as its relationship to the Ground. The group consists of *zu^{1}u^{2}b* (sit), *zu^{2}u^{1}* (stand), and *zub* (be on, lie; literally, mount).

3.1.1 **Zu^{1}u^{2}b** *sit*

Zu^{1}u^{2}b occurs with both inanimate and animate Figures. When used with animate Figures, it adheres to the canonical notions of sitting.

(1) Nguuxe'eng=ree **zu^{1}u^{2}b**-ang loo zhi-axzhili-ang.[7]
girl=PROX[8] NEUT.sit-3SG face/on[9] POSS-chair-3SG
The girl is sitting in her chair.

(2) Zhi^{1}i^{2}t **zu^{1}u^{2}b** loo la'adid. (BP)[10]
cat NEUT.sit face/on rug
The cat is sitting on the rug.

In terms of inanimate objects, *zu^{1}u^{2}b* appeared with Figures which have considerable height or are longer than they are wide and must be vertically oriented relative to the Ground.[11] Examples (3)-(5) below are cases in which the Figures are vertically oriented in their natural states. If the Figures in (3)-(5) are not in their natural vertical postures, then a different positional verb is required (cf. §3.1.3 and §3.2.1). The data sample also strongly suggests that an inanimate Figure's roots or base must be located in the earth or another surface in order for it to occur with *zu^{1}u^{2}b*, indicating a further restriction on the Figure-Ground relationship, as exemplified in the examples below:

(3) Yu'u **zu^{1}u^{2}b** loo liu. (BP)
house NEUT.sit face/on ground
The house is sitting on the ground (with its foundation in the earth).

(4) Yaj **zu^{1}u^{2}b** kue'e yu'u-dau. (BP)
tree NEUT.sit side/beside house-holy
The tree is sitting beside the church (with its roots in the earth).

(5) Daing **zu^{1}u^{2}b** rè'è kud zèèbih zaa. (BP)
mountain NEUT.sit over.there where NEUT.float cloud
The mountain sits under the cloud.

In (3)-(5) above, the house, tree and mountain are Figures which, in their natural states, have a clear vertical orientation (i.e., all objects have an obvious right-side-up) and bases which are located in the Ground; houses stand erect with their roofs on top and typically with their foundations in the soil, trees generally grow vertically with their roots in the earth, and mountains, similarly, project upward from the terrestrial ground in which their bases are established. In all cases, the Figures must be described as "sitting." If either their posture or location in the Ground is altered, then a different verb must be used. (cf. §3.1.2 and §3.1.3).

The Figures in (6) and (7) below exhibit a direct relational configuration between the Figures' postures and their Grounds. *Relative to their respective Ground surfaces*, the Figures are in vertical positions, while their bases are located in Ground.

(6) X-keh'ehz-ang **zu^{1}u^{2}b** ru'u-ang. (BP)
POSS-cigarette-3SG NEUT.sit mouth-3SG
The cigarette is in his mouth.

(7) **Zu^{1}u^{2}b** getxih loo nia.[12]
NEUT.sit thorn face/on hand
I have a thorn in (the palm) of my hand.[13]

In (6), the surface of the man's face plays the role of Ground, *not* the surface of the earth as in (3)-(5). In relation to the man's face, the cigarette stands vertically (i.e., the cigarette's posture in relation to the earth's surface is irrelevant). Regardless of which

direction the man is facing—whether he is looking upwards towards the sky, down towards the earth, sideways or straight ahead—the cigarette would maintain a vertical (i.e., perpendicular) orientation relative to the surface of the man's face. This meets the restriction that the Figure (the cigarette) stands in a vertical orientation in relation to its Ground (the man's face). This example also meets the second restriction for this verb—that the Figure's base is located in the Ground. In this case, the man's lips envelope the end of the cigarette. Similarly, the thorn in (7) holds a vertical posture in relation to its Ground—the surface of the palm of a hand—regardless of the hand's directionality, while the thorn's tip is pierced into the hand's surface.

3.1.2 **Zu²u¹** *stand*

In cases where *zu²u¹* occurs with pedate animates, the Figures assume the canonical "standing" posture as in (8) and (9) below.

(8) Nguuxe'eng=ree **zu²u¹** kue'e yaj-zhi¹i²lih. (BP)
girl=PROX NEUT.stand side/beside chair
The girl is standing beside the chair.

(9) **Zu²u¹** bekuh loo mezh.
NEUT.stand dog face/on table
The dog is standing on the table.

Zu²u¹ also occurs with inanimate Figures which have metaphorical legs/feet as with the table in (10), shown standing on its four legs.

(10) La'a mezh **zu²u¹** kut zèèbih xitxa'a. (BP)
(?)[14] table NEUT.stand where NEUT.float light
The table is (standing) where the light is.

Zu²u¹ places a further restriction on inanimate Figures like those in (11) and (12) below in that they must be vertically oriented, as with *zu¹u²b* (sit) in (3) and (4) (§3.1.1). If the Figure is not vertical, then a different verb must be used (cf. (25) and (26), §3.2.1). In direct contrast to *zu¹u²b,* however, the inanimate Figure's base or metaphorical foot *cannot* be located in the Ground (i.e., the Figure and Ground must be distinctly separate from one another). If this condition is not met, then *zu²u¹* is judged infelicitous.

(11) Yu'u de huget **zu²u¹** loo liu.
house of play NEUT.stand face/on ground
The toy-house is (standing) on the ground.

(12) Yaj **zu²u¹** kue'e yuu-dau.
arbol NEUT.stand side/beside house-holy
The tree is (standing) beside the church (in a pot).[15]

When compared to (3) and (4), examples (11) and (12) demonstrate the differing semantic restrictions of *zu*^{1}*u*^{2}*b* (§3.1.1) and *zu*^{2}*u*^{1}. The toy-house in (11) and potted tree in (12) have foundations which are distinctly separate from the Ground (i.e., the Ground does not envelope the Figures' bases to any degree). In contrast, the foundations of the house and tree in (3) and (4) above are embedded in the earth. This suggests that *zu*^{1}*u*^{2}*b* requires an inanimate structure's base to be in the Ground, whereas *zu*^{2}*u*^{1} requires that it not be.[16]

3.1.3 **Zub** *be on, lie (lit. mount)*

In most cases, Mr. Gutierrez translated *zub* into Spanish as *estar en* (to be on). However, he also stated that the closest literal translation into Spanish would be *montar* (to mount) (e.g., a person or object mounting an elevated surface structure). In accordance with this translation, *zub* does not permit a Figure of any type—animate or inanimate—to have direct contact with the terrestrial ground.[17]

Zub appeared on one occasion with an animate Figure, therefore no solid conclusions can be determined or exemplified at this time regarding restrictions of animacy. Additionally, *zub* occurred with a snake—a non-pedate animate. This Figure cannot be viewed as exemplary of how animates of varying forms (e.g., quadrupeds, bipeds, etc.) might behave with this verb.

(13) Bel **zub** kia trunk. (BP)
snake NEUT.is.on.(lit. mount) head/on.top trunk
The snake is (coiled up) on top of the tree stump.

However, a discussion with Mr. Gutierrez regarding (13) suggests that an animate Figure's form must be taken into consideration. If the coiled up snake in (13) grew legs, or if a dog, cat, or bird were in sitting position on top of the tree stump or on another elevated surface such as a chair, then *zu*^{1}*u*^{2}*b* (sit) must be used. Similarly, example (9) above (cf. §3.1.2) depicts a scenario in which a dog stands in vertical orientation on a surface elevated from the terrestrial ground; in this case, *zu*^{2}*u*^{1} is required, whereas *zub* would be judged inappropriate in this context.

Zub places different restrictions on inanimate Figures of varying forms. If the inanimate Figure has feet or legs, literally or by metaphorical extension, it must be horizontal, conforming in these cases to notions of "lying." This is the case with the house in (14) and the tree in (15) below. Because the foundations of both houses and trees are typically located in the earth, they are regarded as having a metaphorical foot. Such Figures must be in horizontal position. Non-pedate inanimate Figures (e.g., a book, a bar of soap, etc.) are construed differently as later examples will demonstrate. Additionally, inanimate Figures such as those in (14) and (15) below cannot have contact with the earth's surface, suggesting a restriction on the Figure-Ground relationship.

(14) Yu'u **zub** kia yu'u.
house NEUT.lie (lit. mount) head/on.top house
The house is (horizontal) on top of the house.

(15) Yaj **zub** kia yu'u.
tree NEUT.lie (lit. mount) head/on.top house
The tree is (horizontal) on top of the house.

Example (14) describes a hypothetical situation in which there is an earthquake, one house is uprooted from the ground and thrown on top of another house, landing in a horizontal posture on its side. Similarly, a storm may have uprooted the tree in (15) and caused it to land horizontally on top of the house's roof. In order to further confirm the postural restriction on *zub,* drawings were presented to Mr. Gutierrez in which the house and tree in (14) and (15) were standing erect. In both cases, Mr. Gutierrez said that the verb would need to change from *zub* to $zu^{2}u^{1}$ (stand). This supports the hypothesis that *zub* places a postural restriction on the Figure. Additionally, if the house and tree were lying horizontally but in direct contact with the earth, then *zub* can no longer be used, as examples (25) and (26) in the next section (§3.2.1) corroborate.

These restrictions also apply to deceased persons, which thus are inanimate:

(16) Lang **zub** loo ladih nii na-ga'a loo liu.
3SG NEUT.lie (lit. mount) face/on woven.rug that NEUT-lie face/on ground
S/he is (dead) on a tapestry, which is on the ground.

Again, in (16) above an inanimate pedate Figure is in a horizontal position, without direct contact with the terrestrial ground. If the person were alive and therefore animate, *zub* could not be used (cf. (22), §3.2.1.). Additionally, this usage is euphemistic. Using *zub* to describe the location of a person implicitly conveys that the person is deceased.[18]

Comparable to the Figures in (17)-(21), *zub* requires inanimate Figures such as books, pencils, bottles, etc. without a clear metaphorical leg or foot, to be located on an elevated surface. However, in these cases, the verb does not appear to restrict the shape, form or physical posture of Figures lacking metaphorical feet.

(17) Libr **zub** loo rrepis. (BP)
book NEUT.is.on.(lit. mounts) face/on shelf
The book is on the shelf.

(18) Lapih **zub** loo eskritorih. (BP)
pencil NEUT.is.on.(lit. mounts) face/on desk
The pencil is on the desk.

(19) Nis **zub** loo mezh.
water NEUT.is.on.(lit. mounts) face/on table
The (bottle of) water is on the table.

(20) La'adih **zub** loo mezh. (BP)
Tablecloth NEUT.is.on.(lit. mounts) face/on table
The tablecloth is on the table.

(21) La bixtilih **zub** loo nis.
(?)[19] soap NEUT.is.on.(lit. mounts) face/on water
The soap is on the (surface of the) water.

Examples (17)-(21) above demonstrate that the Figures can be tall, long, short, wide, or flat, where form and shape do not appear to play a role in determining whether *zub* can or cannot be used. Furthermore, when the posture of the book, pencil and water bottle in (17)-(19) respectively were altered, this was judged irrelevant. *Zub* is considered appropriate whether these Figures are upright, horizontal, upside-down, etc. This suggests *zub* restricts only the Figure's relationship to the Ground in such circumstances.

3.2 *Positional verbs with restrictions on the Figure's posture/shape*

This collection of verbs restricts a Figure's orientation, and in some cases, its shape and form. The Figure-Ground relationship is irrelevant in determining verb choice within this category. This verb group is comprised of *naga'a* (lie), and *rii* (piled, crowded together).

3.2.1 Naga'a (na-ga'a)[20] *lie*

Naga'a appeared with animate and inanimate Figures that are vertically oriented and generally taller than they are wide. These objects "lie" if they are in horizontal position. In some contexts, either *naga'a* or *zub* (be on, lie; lit. mount) can occur. *Naga'a* differs from *zub* (§3.1.3), however, in that it does not require the Figure to be elevated from the terrestrial ground, whereas z*ub* (§3.1.3) does.

(22) **Na-ga'a** zhana' loo lung.
NEUT-lie my.mother face/on bed
My mother is lying in bed.

(23) Os-e'eng ni ri-gid-ang **na-ga'a** loo x-lu'un-om.
bear-DIM that HAB-play-3SG NEUT-lie face/on POSS-bed-3SG:ANIM
The little bear that you play with is lying down on his bed.

In example (22), animacy is not imperative. The Figure could be alive or deceased. Compare this with *zub* in (16) above. In the latter case, the person must be deceased, and therefore inanimate. In contrast, *naga'a* only requires that the person lie horizontally.

Examples (24)-(27) below demonstrate that *naga'a* does not restrict the Figure's relationship to the Ground. Note especially (24) and (25).

(24) Yu'u **na-ga'a** kia yu'u.
house NEUT-lie head/on.top house
The house is lying on top of the house.[21]

(25) **Na-ga'a** yu'u loo liu.
NEUT-lie house face/on ground
The house is lying on the ground.

(26) **Na-ga'a** yaj loo nèèz.
NEUT-lie tree face/on street
The tree is lying in the street.

(27) **Na-ga'a** nis loo nèèz.
NEUT-lie water face/on street
The bottle of water is lying in the street.

In (24) the house lies on its side, elevated on top of another house, whereas the house in (25) lies horizontally in direct contact with the earth. The Figures in (26) and (27) lie in contact with the terrestrial ground.[22] The only requirement is that the Figures are in a horizontal posture. Example (24) represents a scenario in which either *naga'a* or *zub* can be used. (cf. (14), §3.1.3.) If the speaker wanted to convey, specifically, that the house is elevated from the earth, then *zub* must be used as in (14) above.

3.2.2 Rii[23] *piled, crowded together*

The positional verb *rii* requires two or more Figures to be located in relative proximity to one another, spread out (touching or not touching), or in a heap, placing focus on the form of the collection of Figures. The verb primarily stipulates that the Figures are part of a collection or group of objects.[24] The items can be found on several different Ground surfaces (e.g., on an elevated surface, in contact with the earth, under water, etc.), suggesting that the Figure's relationship to the Ground is irrelevant.

(28) La mingit **rii** mantuing loo mezh.
(?)[25] seeds HAB.piled mound face/on table
The seeds are in a mound on the table.

(29) **Rii** gu'ung nie daing.
HAB.crowded.together bulls foot/below mountain
A bunch of bulls are at the foot of the mountain.

(30) **Rii** gie loo liu.
HAB.piled rocks face/on ground
There are rocks piled on the ground.

(31) **Rii** kamion ku'ee nezh.
HAB.crowded.together cars side/beside street
There are cars along the street.

(32) **Rii** medih zhaa nis.
HAB.piled money buttocks/under water
There is money in (lit. under) the (pool) of water.

The Figures in (28)-(32) can all clearly be viewed as a collection or amassed group of objects. The mound of seeds in (28) is located on an elevated surface, whereas the Figures in (29)-(31) are not. The pile of coins in (32) is located at the bottom of a pool, submerged under water.

Example (33) below demonstrates that *rii* can also occur with a pair of Figures.

(33) **Rii** beeku kon zhid.
HAB.crowded.together dog with cat
There is a dog and a cat.

The dog and cat in (33) are shown sitting in close proximity to one another, indicating that *rii* requires a Figure to appear—at a minimum—as part of a pair of objects.

Rii also occurs with non-count Figures which inherently form a mass:

(34) Gii **rii** kud zu^{1}u^{2}b gule'eng=ree. (BP)
fire HAB.piled where NEUT.sit boy=PROX
The fire is next to where the boy is sitting.

(35) **Rii** nis loo nezh.
HAB.piled water face/on street
The water is in the street (in a puddle).

If the water in (35) were running down the street like a river, then *rii* could not be used. This suggests that the Figure must exist as a relatively static rather than dynamic mass.

3.3 *Positional verbs with restrictions on the Figure-Ground relationship*

In the last group of positional verbs, the Figure's relationship to the Ground accounts for why one positional verb must be used over another, irrespective of the Figure's orientation, shape or form. This category includes *nall* (hang) and *zèèbih* (float).

3.3.1 **Nall** *hang*

Nall requires that the Figure hang freely, to some degree, from the Ground by means of a string or some other hanging device and that the Figures have the potential for some amount of mobility. In the data set, *nall* only appeared with inanimate Figures. [26]

(36) Barkoh **nall**-eng zhaa yu'u.
ship NEUT.hang-3SG buttocks/under house
The (toy) ship is hanging from the ceiling (lit. under the house).

(37) Kuadr **nall** tex pader. (BP)
Painting NEUT.hang chest/on.vertical.surface wall
The painting is hanging on the wall.

(38) La'adix **nall** loo du. (BP)
ropa NEUT.hang face/on clothesline
The clothes are hanging on the clothesline.

(39) Xih-itxa-na **nall** loo xih-biga'-a. (BP)
POSS-saint-1SG NEUT.hang face/on POSS-necklace.chain-1SG
My saint pendant hangs from my necklace.

(40) Xih-le's-ang **nall** loo ganzhih. (BP)
POSS-*cobija*-3SG NEUT.hang face/on hook.
His *cobija*[27] is hanging on the hook (on the wall).

The toy-ship (36) and painting (37) both hang from visible strings. The clothes in (38) hang from a clothesline. The necklace pendant in (39) hangs from a chain, while the *cobija* in (40) hangs on the wall by means of a hook. All Figures have the potential to "swing" from the Grounds to which they are attached.

3.3.2 Zèèbih *float*

Zèèbih occurs with both floating and hanging Figures. In the latter case, *zèèbih* overlaps with scenarios in which one can also use *nall*. It differs from *nall* in that it does not require the Figures to "float" or "hang" by means of a hanging mechanism (i.e., hanging devices are optional). Similar to *nall,* however, all Figures have the potential for mobility. *Zèèbih* appeared only with inanimate Figures during elicitation.

(41) Zaa **zèèbih** zhaa giiba. (BP)
cloud NEUT.float buttocks/under sky
The cloud is floating in (lit. "under") the sky.

(42) Barkoh **zèèbih** loo nis. (BP)
ship NEUT.float face/on water
The ship is on the water.

(43) La bixtilih **zèèbih** loo nis.
(?)[28] soap NEUT.float face/on water
The soap is floating on the water.

The cloud (41) floats freely in the air, and the ship (42) and bar of soap (43) float on top of the water's surface.[29] *Nall* (hang) (§3.3.1) could not transpire with these Figures since they are not suspended by a hanging mechanism.

In contrast, the Figures in (44)-(46) below can occur with either *zèèbih* or *nall*. Compare these with examples (36)-(38) above.

(44) Bot **zèèbih**.
boat NEUT.float.
The boat hangs (from the ceiling).

(45) Kuadr **zèèbih** tex pader. (BP)
painting NEUT.float chest/on.vertical.surface wall
The painting is hanging on the wall.

(46) La'adix **zèèbih** loo du. (BP)
clothes NEUT.float face/on clothesline
The clothes are hanging on the clothesline.

The data suggest that the only condition that TdVZ places on *zèèbih* is that the Figures have the potential for varying amounts of mobility, whereas *nall* requires both this characteristic as well as the attachment of the Figure to the Ground by means of a hanging mechanism. For example, the cloud in (41) could glide across the sky, while the ship and bar of soap in (42) and (43), respectively, could float across the water. The suspended toy-boat in (44) has the potential to swing from the ceiling. The painting in (45) hangs on the wall by a visible string. If one were to push the painting, it would swing back and forth along the wall. Finally, the clothes on the clothesline in (46) could "swing" if the wind were to blow.

6 Summary

This preliminary description provides evidence that, typologically, TdVZ positional verbs can be categorized in three manners: 1) positional verbs with restrictions on the posture/shape of the Figure as well as its configuration with the Ground, 2) verbs which restrict the Figure's posture/shape, and finally 3), those positional verbs that primarily focus on the Figure-Ground relationship. The main goal of this discussion has been to provide a foundation for further investigation of TdVZ positional verbs which had not yet been described or documented and to contribute to the ongoing typological explorations and characterizations of Zapotec.

Notes

[1] First and foremost I want to thank Serafin Matias Gutierrez, without whose unyielding patience and assistance I could not have done this study. I would also like to thank Troi Carleton of San Francisco State University for providing me with the opportunity to participate and contribute to the Teotitlán del Valle Community Language Archive Project, for introducing me to Mr. Gutierrez, and for feedback on earlier versions of this paper. Finally, many thanks also go out to Diep Le for her invaluable suggestions and comments. All errors are my own.

[2] Several community members and San Francisco State University are currently collaborating on the Teotitlán del Valle Community Language Archive Project, a documentation effort headed by Dr. Troi Carleton.

[3] Lillehaugen (2006a) alludes to a third category of positional verbs in Tlacolula Valley Zapotec. She notes that positional verbs place "restrictions…on the Figure *and/or* the locative relationship between the Figure and Ground" (p. 280, my italics). Her study does not aim to present the data in terms of distinct categories (i.e., the study is not proposing a typology), but her statement notes that an overlapping juncture exists among the restrictions of *Focus on the Figure* and *Focus on the Figure-Ground relationship*.

[4] See discussion in §3.1.1 on the positional verb *zu^{1}u^{2}b* for examples.

[5] These categories are comprised of generalizations that appear most salient in the data sample. Exceptions to these rules do occur and will be addressed.

[6] This is a non-exhaustive list of TdVZ positional verbs.

[7] When an answer was provided in response to a locative question prompt (i.e., "Where is the…?"), word order always appeared as SVO.

[8] Abbreviations used in this paper: 1/2/3 SG/PL *first/second/third person singular/plural,* **-** *morpheme boundary,* **=** *clitic boundary,* ( ) *parenthetical information,* ? *undetermined status,* ANIM *animate,* INANIM *inanimate,* HAB *habitual,* NEUT *neutral,* INT *intensifier,* DIM *diminutive,* POSS *possessive,* PROX *proximate,* O *object,* S *subject*.

[9] There is a debate as to whether or not body-part words have fully grammaticized as prepositions or if they are nouns with extended metaphorical locative functions. (For an overview of the issues, see Lillehaugen 2006a, CH. 2. For further readings, see Lillehaugen 2003, 2004a, 2006b; Lillehaugen and Munro 2006; MacLaury 1989.) This paper will not commit to one view or another for the time being. All TdVZ body-part words are glossed with both the body-part term and its corresponding locative meaning.

[10] BP indicates constructions which were elicited by means of Bowerman and Pederson's (1993) *Topological Relations Pictures*.

[11]No examples appeared in which postural orientation was ambiguous, for example, with regular, symmetrical Figures such as cubes, spheres, etc. Such Figures need to be considered in the future.

[12] In cases where the location of a Figure was described without a question prompt, word order appeared as VSO.

[13] Similarly, *zu^{1}u^{2}b* would occur if a nail, stick, or pencil were stabbed into the palm of a hand enough so that the Figure was standing upright, relative to the hand's surface.

[14] *La'a* (sometimes *la*) only occurred in sentence-initial position. It was sometimes translated as the Spanish articles, *la* or *el*. However, at other times it was translated as an abbreviated version of the third-person inanimate TdVZ pronoun *laing*. Lillehaugen (2006a) cites Munro and Lopez as suggesting that *la'a* cognates express focus (pp. 42-43). However, Lillehaugen's own findings regarding the SLQZ cognate, *làa'* were inconclusive (p. 44). Further investigation is needed to explain the function of TdVZ *la'a* in the context of locative constructions.

[15] A discussion with Mr. Gutierrez suggests that if the tree's roots have been removed from their natural environment, the earth, then the tree is viewed as "standing" on top of the Ground (i.e., the pot is not viewed as an alternate Ground in which the tree's roots exist, at least in this specific instance).

[16] Operstein (2002) noted a similar distinction in ZZ (pp. 61-2) between Figures with and without visible basis with the ZZ verbs *zub* (sit) and zu (stand), respectively (pp. 61-2). Both positionals fall under the category, "Positional verbs focusing on the figure" (pp. 61-2) in her discussion.

[17] Galant (2006; forthcoming, respectively) noted a similar distinction with particular Zapotec positional verbs in both SAYZ (pp. 5, 11, 13) and SJYZ (pp. 10, 21), where Figures must be located in relatively elevated or non-elevated Ground surfaces.

[18] More data is needed to determine if this euphemistic usage would apply to all animates.

[19] See footnote 14.

[20] The form of this verb differs morphologically from those already discussed. During elicitation, Mr. Gutierrez translated *na-* as *estar* (to be), and *–ga'a* as *acostar* (to lie) in Spanish, indicating that *na-,* at least psychologically, is a prefix for Mr. Gutierrez. Lillehaugen (2006a) compared Tlacolula de Matamoros Zapotec (TMZ) *niga'ah* to its cognates in San Lucas Quiaviní Zapotec (SLQZ), *nàa'tga'ah* and *na'ga'ah,* "'is lying down, is (located) in a lying position' which are identified as neutral forms of ràa'tga'ah 'lies down, gets into a lying position'" (Lillehaugen citing Munro and Lopez, 299). For the moment, this interpretation shall be applied to the TdVZ, *naga'a,* as well, where *naga'a* is the neutral form of the verb "lie," with the prefix *na-* marking neutrality.

[21] See discussion of example (14) for a detailed description of the scenario.

[22] Most of the streets in Teotitlán are unpaved, so most likely the consultant was envisioning a dirt road in this scenario.

[23] Lillehaugen (2006a: 310) tentatively suggests that TMZ *rii* is in habitual aspect rather than in neutral form. This is based on a dictionary entry by Munro and Lopez, et al. wherein *mbih* is listed as the neutral form of this positional verb. For the time being, I will employ Lillehaugen's tentative analysis of this verb.

[24] Similarly, Lillehaugen (2006a: 310) found that the TMZ *rii* cannot occur with a single countable Figure.

[25] See footnote 14.

[26] Galant (forthcoming) found the SJYZ cognate *naala* in conjunction with a person hanging upside down from a tree (p. 16).

[27] A thick piece of cloth worn over the body as a covering, such as a shawl or coat.

[28] See footnote 14.

[29] This scenario also occurs with *zub* (cf. example (21), §3.1.3). If the speaker wants to emphasize that the bar of soap is elevated from the earth, then the speaker will use *zub*. Alternately, the speaker can focus on the soap's floating behavior on top the water's surface by using *zèèbih* as in (43). The different descriptive foci are encoded in the verb the speaker chooses to use.

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"There is no thermostat in the forest" - Talking about Temperature in Anishinaabemowin (Ojibwe)

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1. Introduction[1]

The last half-century has yielded much on the typology of semantic areas like color, body parts and kinship systems. In the same vein, temperature has emerged as a captivating new area of study in the last decade. Temperature terms do not only directly address the physiological reality of temperature, but also the cultural conceptualization of temperature sensations. Following Koptevskaja Tamm & Rakhilina (2002:1).

"Temperature phenomena are universal, relatively easily perceptible by humans and crucial for them, but their conceptualisation involves a complex interplay between external reality, bodily experience and evaluation of the relevant properties with regard to their functions in the human life. The meanings of temperature terms are, thus, both embodied and perspectival."

Cross-linguistically, much research remains to be done; are there morphosyntactic universals connected to the semantic field of temperature? How is the temperature semantic domain usually divided – and which, if any, are the cultural and linguistic universals? Do languages spoken in climatically very hot or very cold regions differ in their language use - both in descriptions of the world and in the way they construct metaphors? Currently more data from more language families is sorely needed, and this paper is the first attempt to get this kind of data from a Native American language – specifically the Algonquian language Anishinaabemowin (Eastern Ojibwe). We hope to test current methodologies and conclusions being developed for the study of temperature terms, and encourage other linguists working with Native American languages to carry out and publish similar studies.

2. Overview of the Lexical Typology of Temperature

Temperature is a bodily sensation communicated to the brain by thermoreceptors in the skin, as when we feel the heat on the surface of a teacup or a glass of juice. Temperature is also a mental perception, based on the information communicated by these thermoreceptors and integrated with world knowledge and memories, as when we state that a tea cup is cold but a glass of juice is luke-warm, even if the two objects have the same objective temperature. Temperature is also a factual state in the world, as when the weather forecaster discusses the current temperature in various parts of the world. We can further distinguish between temperature sensation and thermal comfort:

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"[t]emperature sensation is a rational experience that can be described as being directed towards an objective world, as expressed by the statement: 'It is cold.' Thermal comfort is an emotional or affective experience referring to the subjective state of the observer as expressed by the statement: 'I feel cold.'" (Hensel 1981, as cited in Koptjevskaja Tamm & Rakhilina 2002)

Temperature sensations and perceptions are evaluated in contrast to the typical skin temperature (33°C–34°C) – an object at 31-36°C does not trigger any temperature sensation, and in following Koptjevskaja Tamm & Rakhilina we refer to this as the *neutral zone*. Thermal comfort is evaluated in contrast to the body's inner temperature and can differ several degrees depending on, among other factors, gender, body mass and the temperature environment a person is typically exposed to. As we saw in the case of the cup of tea and glass of juice above, temperature perception is deeply anthropocentric. In everyday reflection and conversation, the objective (thermometer-measured) temperature of an object is generally less noteworthy than the functional temperature that object should have in the life of the human observer. Teacups are supposed to be warmed by almost boiling water; if their surface temperature dips down into the neutral zone, they are cold. On the other hand, glasses of juice are supposed to be cooled by cold juice, and if their surface temperature is within the neutral zone, they are too warm. Discovering the extent to which these psychophysiological facts are reflected in language structure and use is one of the core goals of the study of temperature expressions in human languages. Several recurring patterns of use is evident in published studies, but this field is only just beginning to be explored, so the analysis of semantic categories discussed below should be viewed as provisional.

2.1 Tactile and non-tactile temperature

Koptevskaja Tamm & Rakhilina (2002) show that the crucial semantic difference between the lexemes *žarkij* and *gorjačij*, both usually translated as *hot* in English, is that the latter is experienced by a single part of the body, often the hands (tactile) and the latter is experienced by the whole body (non-tactile, i.e., ambient). Shimotori (2004) shows that a similar difference exists in Japanese. The homonyms *atatakai* (warm, non-tactile) in (1) and *atatakai* (warm, tactile) in (2) are written with different kanji, as can be seen in the two examples below, and thus are evidently distinct.

(1) 暖かい
atatakai
warm, non-tactile (e.g room temperature)

(2) 温かい
atatakai
warm, tactile (e.g temperature of an object)

While individual languages differ in which exact sensations are deemed tactile and non-tactile, there does appear to be a cross-linguistic tendency for this division to exist in many languages. Typically, non-tactile temperature terms deal with evaluation of particular circumstances – the air in a certain place (e.g., a room) or time (e.g., the summer). Tactile temperature terms deal with the temperatures of objects that can be felt by the hands or other body part.

Some languages have a more detailed subdivision of their warm zone, or their cold zone. In a similar manner, a tactile/non-tactile distinction in the cold zone in a language does not presuppose a similar distinction in the warm zone, as Daniel & Khurshudian (2010) show in Armenian,

where there is one word, 'c'urt'(cold) for COLD[2] that can be used only for tactile sensations, while words for HOT can be used for both tactile and non-tactile sensations[3]. This is the opposite of Koptevskaja Tamm and Rakhilina's (2002) findings for Russian, where a tactile/non-tactile distinction exists for HOT but not for COLD.

2.2 Non-tactile temperature – thermal comfort

Languages sometimes have special terms for objects that affect the thermal comfort of humans. A typical example is *warm sweater* in English; though the sweater itself may not be warm, it makes the wearer warm[4]. There are several languages where an object bestowing warmth (or coldness) but which isn't that temperature itself cannot be described as warm or cold - instead alternate descriptions such as "thin", "thick", "heavy" etc. is used.

In English, there is a distinction between *I am cold* and *that thing is cold* - the former) is a report on a more subjective feeling and the latter is a comment on the objective state of affairs. In other languages, as in Yucatec Maya seen in examples 3 - 5 below, this distinction is also lexicalized, but by the use of different adjectives. Compare (3) where the adjective *síis* (cold) can be used with water (tactile) while its "synonym" *ke'elan* cannot, as seen in example (4). In (5), we see *ke'elan* in its proper environment, that of feelings of thermal comfort. (All examples are from Le Guen 2010)

(3) le **síis** ha'o'
DET cold water
the cold water

(4)*le **ke'el** ha'o'
DET cold water
*the cold water

(5) **ke'el**-en
cold-AFFIX
I am cold

Categories

The difference between tactile and non-tactile temperature terms at least partly rests on the different ways temperature is perceived by humans. As would be expected, many languages also use different temperature terms for different categories of objects - we will see that Ojibwe is a prime example of this when it comes to weather terms. Firsching (2010) finds that Baoulé, spoken in Côte d'Ivoire, recognizes five levels of heat intensity and four different semantic categories with their own set of temperature terms (which Firsching gives as experiencer, weather/environment/sun/wind, body parts, and food/liquids/surfaces/ice/snow/fire).

[2] Semantic concepts will be written in small CAPITALS.

[3] There are Armenian terms for "very hot" that can only be used for non-tactile terms.

[4] Cf. *cold sweater*, where it is much easier to get the reading that the sweater itself is cold than a sweater that makes the wearer cold.

Apart from the categories of tactile and non-tactile temperature, one of the most prevalent categories is water and liquids: if there is a special word for the temperature of a certain specific kind of substance, rather than just a general term for all tactile temperature sensations, this typically denotes water and/or liquids generally. Water is a substance with many different forms, all of which are necessary for human survival, so it is perhaps not surprising that several of the languages surveyed thus far treat water as a special case linguistically. Returning to Japanese, for instance, the noun *yu* ("hot water") specifically refers to water that already has a certain amount of heat and it is interpreted as "hot/warm water." The (unmodified) noun *mizu* means cold water specifically (Shimotori 2004). Several languages have intensifiers for heat that stem from properties of water: a hot summer's day can be *boiling hot* in English, for example, or the equivalent in Swedish *kok-hett* "boiling-hot."

The number of different categories a language can have is interesting, because the more fine-grained divisions we can find evidence for in language, the more fine-grained psychological categories we can posit. The contents of the different categories is therefore also of prime importance - a long time goal of the typological study of temperature term is to posit universals for which kinds of temperature perceptions are recognized by language and why.

2.3 Relative and absolute temperatures

Temperature is not a static property of objects or the environment; it rises and falls, and languages have strategies for expressing these notions. In Tagalog, *mainit* ("warm, warming") indicates a warm temperature that is rising even further, just like *malamig* ("cold, cooling") indicates a cold temperature that is falling (Sutrop 1999). Sutrop names these temperature terms, that indicate both their current and previous state, "relative temperature terms". Those terms that do not encode a change in temperature level are called "absolut temperature terms". Relative temperature terms can be found in many languages, like Chinese, French and Japanese, and as we will see, Ojibwe has its own implementation of this idea.

2.4 Anthropocentricity and antonymy

The anthropocentricity that is so prevalent in human perception of temperature is clearly seen in antonymy relations in language - as shown by Koptjevskaja Tamm & Rakhilina (2004) for Russian *xolodnyj* ("cold").The table below (our Table 1, Koptjevskaja Tamm & Rakhilina's Table 2) shows that the antonym of *xolodnyj* ("cold") is different not only depending on whether *xolodnyj* is describing a tactile or non-tactile perception, but also differs depending on the typical temperature of the object described. House temperatures seldom become hot, *zarkij* ("hot"), while outdoor temperatures do tend to.

Table 1: Anthropocentric antonymy

Table 2: *xolodnyj* and its opposites

	Antonym	Classes of entities	Russian examples
TACTILE USES	*gorjačij*	courses and drinks water in household and corresponding taps springs treatment (e.g., of metals)	*xolodnye vs. gorjačie bljuda, napitki* *xolodnaja vs. gorjačaja voda,* *xolodnyj vs. gorjačij kran,* *xolodnye vs. gorjačie istočniki,* *xolodnaja vs. gorjačaja obrabotka*
	teplyj	only cold-blooded and warm-blooded animals	*xolodnokrovnye / teplokrovnye životnye*
NON-TACTILE USES	*žarkij, znojnyj*	Geographic spaces: desert, steppe, plain	*xolodnaja vs. žarkaja / znojnaja pustynja, step', ravnina*
	teplyj	indoors: peasant house jumper	*xolodnaja vs. teplaja izba ** *xolodnyj vs. teplyj sviter*

* A house or a part of a house which was not heated and could only be used in the late spring, summer and early fall vs. a house or a part of a house which was intended for winters and could therefore be heated.

2.5 Basic temperature terms

Sutrop (1999) presented one of the first typological case studies of temperature, examining the basic temperature terms in several languages of the Baltic area and focusing mainly on Estonian. Sutrop introduced the concept of *basic temperature term*; for a term to be considered basic, it must be applicable in all domains and with all manner of subjects (animate, inanimate, weather etc.), must be psychologically salient and should be morphologically simple and of native origin. He finds languages with no basic temperature terms (all their terms are specialized or do not follow the other criteria mentioned above) and others with several. There doesn't seem to be a constraint on whether it is a HOT or a COLD word that is denoted when a language has only one term, though Sutrop notes that colder regions seem to have a COLD word in a one-term basic system, whereas hotter regions have a HOT word – it remains to be seen if this is carried out in a larger language sample. Sutrop also mentions languages with two, three or four basic terms. The languages mentioned do, of course, have additional temperature terms, but they were not judged to be basic by Sutrop, who further notes that while temperature terms may be adjectives, in some languages they are nominal or verbal. Unfortunately, none of the languages discussed by Sutrop are as highly synthetic as Ojibwe, and we do not know how he would handle languages where most words are morphologically complex.

3. Background on Ojibwe

As mentioned above, lexical typology of temperature studies originally focused on relatively isolating languages, but typological theories must hold when tested against a range of linguistic data. American Indian languages in general are known for polysynthesis, and Algonquian languages prove no exception; as such, some information on the languages will be necessary to orient the reader.

3.1 Situation and Language Family

A daughter of the Algonquian branch of the Algic language family, Ojibwe is one of a set of varieties known to speakers as *Anishinaabemowin* or *Nishnaabemwin*, an endonym that applies to speakers of other dialects of Ojibwe and even Potawatomi (Bodewadmi), but see Valentine (1994) for a more thorough, sociolinguistic survey of dialectal variation. Suffice it to say here that Mr. Howard Kimewon, our consultant and collaborator, self-identifies as a speaker of Eastern Ojibwe.

(See especially Valentine 2001, Rhodes 1985, Bloomfield 1958.) In Figure 1 below, Ojibwayan varieties can be seen in red, covering Michigan, Ontario, and Manitoba north of Lakes Huron and Superior. Figure 2 gives a tentative dialect grouping of the Anishinaabemowin varieties and a sister, Menominee, for comparison; as visualized through the MultiTree interface.

Figure 1: Distribution of Anishinaabemowin in North America. (Wikimedia Commons)

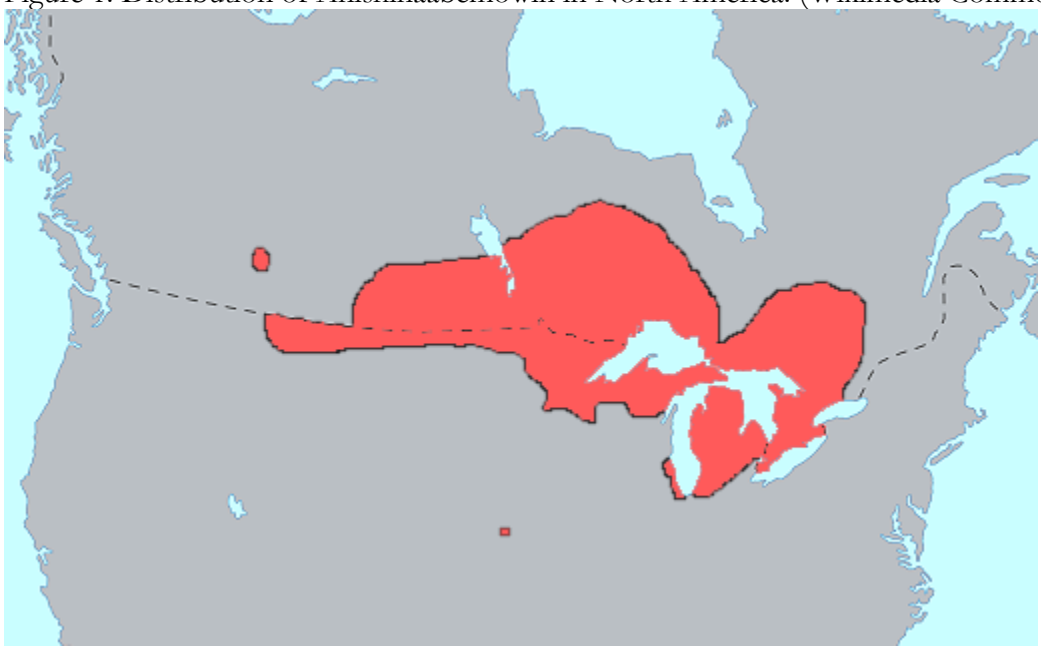
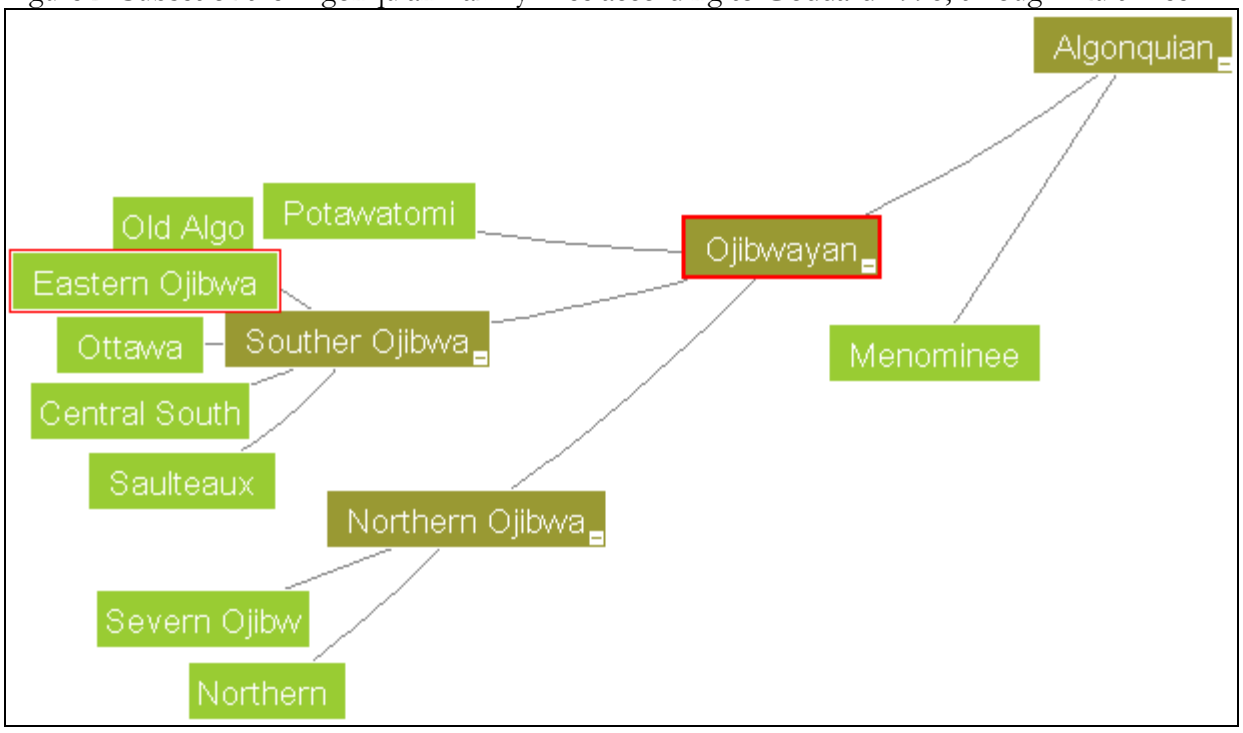


Figure 2: Subset of the Algonquian Family Tree according to Goddard 1996, through MultiTree.



Like other Algonquian languages, there is a deep history of scholarship on Ojibwe, so in preparing elicitation materials and analyzing Mr. Kimewon's responses, we had a number of resources at our disposal. With the widespread usage of the Internet in North American indigenous language communities, many examples can be quickly checked online against pedagogical websites (eg, Kimewon and Noori 2009) and online dictionaries (eg, Weshki-ayaad, Lippert, and Gambill 2009). Such resources were utilized to supplement resources more well-known to Algonquianists (particularly Rhodes 1985 and Valentine 2001). Besides being an unspeakably invaluable resource on the language in general, Valentine (2001) contains an organized list of examples of temperature expressions (ibid. 896-898), which will be discussed in more detail. It was also necessary on occasion to consult older resources, namely Baraga 1878 and Wilson 1875; both contain an excursus on grammar from a missionary's perspective, example sentences, and a fairly accurate dictionary. Even with all these materials, the fortis/lenis contrast in stop consonants and highly synthetic nature of Ojibwe words meant that some words and expressions were difficult to find documented.

3.2 Ojibwe Morphosyntax

Ojibwe is known as a head-marking, polysynethetic language with a direct-inverse type of alignment system. Valentine 2001 lists the following parts of speech: nouns, pronouns, verbs, adverbs, numbers, particles, prenouns, and preverbs. Like the other Algonquian languages, nominal gender is animate/inanimate, and following Bloomfield's landmark analyses (eg Bloomfield 1946, Bloomfield 1958), Algonquian verbs are traditionally described as falling into four major categories based on animacy and transitivity: inanimate intransitive verbs (VII), animate intransitive verbs (VAI), inanimate transitive verbs (VTI), and animate transitive verbs (VTA). Importantly, note the lack of an adjectival category in the list above; words that serve an adjectival function are invariably verbs, carrying a reading like 'to be a hot X' rather than 'a hot X.' Due to the nature of temperature expressions and following Koptjevskaja Tamm & Rakhilina (2006), we focus on the intransitive inanimate (VII) and animate intransitive (VAI) verbs[5].

Prenouns/preverbs are (generally) modifiers that prefix to nouns or verbs, respectively, but are treated as separate parts of speech for reasons beyond the scope of our discussion. Table 2 gives a word template for the class of intransitive inanimate verbs (i.e., intransitive verbs with inanimate subjects), modulo suffixes that are not important here (and person prefixes only applicable to vai). Note the complex stem consisting of initial, medial, and final elements. Typically at least an initial and final element are present in every intransitive verb, but many of the examples we present crucially differ in terms of medials. Valentine 2001:424 notes that "the boundary between the preverb and initial position is relatively porous, and some elements show variable representation depending on the nature of the material they are associated with." In the analysis presented below we make note of such preverb-initial pairs, like the preverb *ggwetanaa-* and the initial *ggwetaan-*, which have essentially the same meaning, "awfully, extremely," but the preverb can optionally be attached to any lexical unit whereas an initial is requisite in constructing a lexical unit**.** We take up these issues further in the next section.

Table 2: Ojibwe word template (After Valentine 2001:93).

Preverbs/Prenouns	**Initial**	**Medial**	**Final**

[5] For an exceptionally detailed analysis of intransitive verbs, the reader is referred to Denny 1978 and Valentine 2001, especially chapters 5, 6, 9 and 17.

Methodology

The current study took as its foundation a questionnaire developed by Professor Koptjevskaja Tamm (Koptjevskaja Tamm 2007). The questionnaire considers the properties of of tactile, non-tactile, experiencer-based and extended (e.g. metaphorical) uses of temperature terms, the relations between these terms when it comes to intensity scales, synonymy and antonymy, and the general characteristics of the temperature terms in the way they are handled morphosyntactically. Based on the questionnaire, we developed plans for four elicitation sessions with Mr. Kimewon. Mr. Kimewon is bilingual in Ojibwe and English, and is now a teacher of Ojibwe at the University of Michigan and a driving force in various language revitalization activities, including Kimewon and Noori (2009).

Due to the time constraints of the current study we chose not to delve into the metaphorical use of temperature expressions – and at first glance there do not seem to be many metaphors taking temperature expressions as vehicles to express other semantic concepts, but this is a topic for future research (and see Rhodes & Lawler 1981 and Rhodes 1986 for some discussion on metaphors, morphemes and meaning in other domains in Ojibwe). It is possible that there is a very low level of native metaphorizing in Ojibwe as a whole; as Goddard (2004) notes, metaphorizing is not necessarily a universal human illocutionary tool.

The first elicitation session served as an initial exploration of Ojibwe temperature terms, beginning with a free association task where we asked Mr. Kimewon to come up with as many temperature terms as possible to discuss their uses. Following that, we asked him to judge the temperature-related sentences listed in Valentine (2001:896-898). The female speaker cited therein hails from Mr. Kimewon's home island, so we did not expect to see major discrepancies between the speaker and Mr. Kimewon. We will see how this hypothesis fared below.

The second session focused on the various semantic classes that exist in the temperature domain. We noticed that Mr. Kimewon would provide slightly different temperature words for nouns that fit into such categories as metal/stone, liquids, round objects, personal temperature, and ambient temperature, some of which we delve into below. Weather and ambient temperature terminology noticeably differed with respect to not only indoor and outdoor temperature, but also varied based on whether the air was moving, or whether the sun is shining, among other factors. We wrote the forms on small notecards in the Fiero Double Vowel orthography that enjoys popular use among the Ojibwe community (Valentine 2001:29). Mr. Kimewon then rearranged the words to align to a hot-cold scale for each apparent semantic domain.

The third elicitation session focused on relationships between various temperature expressions and on the anthropocentricity of the system – the lexical behavior of qualifiers for naturally hot and cold liquids (tea and juice) were contrasted, for example. Mr. Kimewon then participated in an antonym task, both by looking at the opposites of the temperature words in isolation and by looking at the antonyms of temperature terms modifying noun headwords of different types. The fourth session was devoted to comparatives and to the difference between various kinds of animate beings (chiefly animals and humans) and the way they are described to experience temperature, as well as checking results from previous sessions.

4. Results

As discussed above, the Ojibwe verb stem is complex; in practice this means that each response Mr. Kimewon gives must be analyzed and decomposed not only into words in a sentence but also into the major categories within each individual word. The examples below illustrate the medial classifier stems meaning "liquid" and "metal, inorganic solid" (Valentine 2001) and how prefixes and suffixes work together to contribute to a meaning that is the equivalent of a complete sentence of English.

Table 3: Sample Ojibwe Temperature Terms

Preverb	STEM: Initial	STEM: Medial	STEM: Final	Gloss [6]
(6) Ø-	dk- (cold)	-aagam- (liquid)	-i (VII)	"(The) liquid is cold."
(7) Ø-	gzh- (hot)	-aagam- (liquid)	-ide (heating. VII)	"(The) liquid is hot."
(8) Ø-	Ggwetan- (awfully, extremely)	-aagam- (liquid)	-ide (heating. VII)	"(The) liquid is awfully hot."
(9) mno- (good, nice)	dk- (cold)	-aagam- (liquid)	-i (VII)	"(The) liquid is pleasantly cold; lukecold."
(10) Ø-	giizhoo- (warm)	-aabik- (metal)	-ide (heating. VII)	"(The) metal is warm."
(11) Ø-	msko- (red)	-aabik- (metal)	-ide (heating. VII)	"(The) metal is red hot."
(12) Ø-	dk- (cold)	-Ø-	-aanimad (wind. VII)	"It's cold and windy."

In (6) we see the use of an initial *dk-* (or *dak-*) to indicate coldness, and a simple verbal final element *-i* which serves only a grammatical function, marking an intransitive verb acting on or modifying an inanimate subject (also an experiencer). In (8), Ojibwe uses the initial *ggwetan-* "awfully, extremely" (Rhodes 1985) where in English we see the adverbial modifier "awfully" as an independent lexical unit, and the final in (7), (8), (10), and (11) *-ide* has semantic content on top of serving a grammatical function, indicating heat, contrasting with (6) where the final meant neither hot nor cold. So in (8) *ggwetan-* and *-ide* both contribute to the overall meaning of "awfully hot" where in (6) only the initial *dk-* refers to the cold. In (9) "lukecold metal" the positive evaluative preverb *mno-* is prefixed to (6), and serves to mollify the meaning of (6); the liquid is now cold, but more pleasantly so, the cool end of the neutral zone. In (11) we see the use of the color term *msko-* "red" to mean that the metal in question is red hot - with our common sense and experience we know that substances go through physical (and sometimes chemical) changes in the presence of heat and that metal glows and becomes pliable, which licenses the color preverb. Alternatively, (12) shows us that the initial *dk-* combines with the verb final *-aanimad* that carries the meaning of

[6] In the following tables, glosses will not always be provided in the form of complete English sentences; these forms are generally given as "(liquid/metal/etc.) is (cold/warm/etc.)" – this is meant to indicate the form's requiring a subject/experiencer argument of an appropriate sort (a glass of tea or a metal pole that's been outside all winter, for instance).

windiness with no medial classifier; as we will see below, expressions of ambient temperature in this way behave differently than temperature expressions describing inanimate objects.

After the first elicitation session we were left with a long list of expressions similar to the ones given above. Upon completing the ranking task in the second elicitation session we were presented with a series of scales which was submitted to further analysis in the third and fourth sessions. Below we present the three domains for which the most comprehensive data was obtained; first liquids and metals, and then ambient (weather/climate) temperature. The candidates for basic temperature morphemes will be in bold, the morphemes that are not exclusive to the temperature domain (ast *mno-*, *msko-* and *ggwetan-* above) will be underlined, and the medial classifiers and domain specific expressions will be italicized.

We see several patterns in Tables 4-6: words describing the temperature of objects like liquids and metals require medial classifiers that differ depending on the type of object described. Ambient temperature words cannot take medial classifiers. All the ambient temperature expressions and the hot non-climate temperature expressions take suffixes that carry semantic information, summed up in Table 7.

Table 4: Temperature of Liquids

	Ojibwe	**English**
HOT	(13) wiisag-*aagam*-**ide**	"liquid is painfully, seriously hot"
	(14) ggwetaan-*aagam*-**ide**	"liquid is awfully hot"
	(15) **gzh**-*aagam*-**ide**	"liquid is hot"
	(16) **giizhoo**-*aagam*-**ide**	"liquid is warm"
NEUTRAL	(17) mno-piit-*aagam*-**ide**	"liquid is lukewarm"
	(18) mno-*aagam*-**ide**	"liquid is lukewarm"
	(19) mno-**dk**-*aagam*-i	"liquid is lukecold, cool"
COLD	(20) **dk**-*aagam*-i	"liquid is cold"
	(21) *mkomiw-aagam-i*	"liquid is ice cold, frozen"

In this table we see clearly defined above normal, neutral temperature and below normal levels of intensity; the different is above normal temperatures are defined by the final *–ide* in examples (13) – (18) and also the initials *gzh-* and *giizhoo-*, 'hot' and 'warm' respectively, and 'cold' is indicated with the initial *dk-*. The neutral zone shows the verb final *–ide* 'heating' as well as the perverb *dk-* 'cold' in different combinations with the initial/preverb *mno-* 'good, well, fine, nice' (see examples (17) - (19)). Initials that alternate with preverbs of the type discussed in §5.2 are underlined in e.g. (13) and (14); *wiisag-* and *ggwetaan-* can serve as initials as they do in these examples, but speakers can also attach the corresponding free standing preverb, as in:

(14')
ggwetaanaa ggwetaan-aagam-ide
very very-liquid-hot.VII
"(the liquid) is really, awfully hot."

(21) is entirely italicized because it is relatively domain specific; use of the initial *mkomiw-* is restricted to those situations where ice is actually present.

Table 5: Temperature of Metal, Stone, and Inorganic Solids

	Ojibwe	**English**
HOT	(22) *misko-aabik-**ide***	"metal is red hot"
	(23) wiisag-*aabik*-**ide**	"metal is painfully, seriously hot"
	(24) ggwetaan-*aabik*-**ide**	"metal is awfully hot"
	(25) **gzh**-*aabik*-**ide**	"metal is hot"
	(26) **giizhoo**-*aabik*-**ide**	"metal is warm"
NEUTRAL	(27) mno-piit-*aabik*-**ide**	"metal is lukewarm"
	(28) mno-*aabik*-**ide**	"metal is lukewarm"
	(29) mno-**dk**-*aabik*-i	"metal is lukecold, cool"
COLD		
	(30) **dk**-*aabik*-i	"metal is cold"
	(31) ?*mkomiw-aabik-i*[7]	"metal is frozen"

Table 5 shows much the same pattern for metal/stone/inorganic solids as liquids above, including the domain-specific (22) *misko'aabikide* "metal is red hot" (cf. Denny 1978 p301 for a more detailed analysis that involves breaking down finals like *–ide* and the ones presented below). Table 6 below shows a slightly different pattern; no medials and more specific, environmental verbal finals in place of *–ide*.

[7] This expression is reportedly only acceptable if the metal actually has ice on it.

Table 6: Weather & Ambient Temperature, non-personal

	Ojibwe	**English**
HOT	(32) **gzh**-inaamde	"it's hot and humid"
	(33) **gzh**-aate	"it's hot and sunny"
	(34) **giizhoo**-aanimad	"it's warm and windy"
NEUTRAL	(35) mno-**gzh**-**ide**	"it's comfortably warm"
	(36) mno-**dk**ate[8]	"it's comfortably cool"
COLD		
	(37) **dk**-asin	"it's cooling off; it's cold"
	(38) gsin-aa	"it's cold"
	(39) **dk**-aanimad	"it's cold and windy"

In every domain we see well-defined hot, cold, and neutral zones. We see in tables 4 and 5 that non-climatic temperature expressions require medial classifiers that index the type of material being described, and in table 6 we see that these medial classifiers are not allowed for climate expressions. There is only one suffix in tables 4 and 5 that carried temperature information, namely, *-ide*, which meant 'hot', but there are several different kinds of verbal finals present in Table 6**.** They have to do with the weather or ambient/atmospheric conditions, except in the case of example 37, which we will discuss below. We see *–inaamde* (Example 32), referencing the humidity, and *–aate*, referring to the sun (example 33). The suffix *–aanimad* can be used when the air is circulating, by wind or air conditioner, and is the only verbal suffix that we find used for both the hot and cold domain (examples 34 and 39) – in which case it is the lowest temperature on both the hot and cold scale. Our discussion in §4 showed that some languages, e.g. Russian, expresses hot and sunny temperatures with its own temperature expression *zarkij* ("hot and sunny"). Both English and Swedish have temperature expressions which must denote humidity: *clammy* and *rått*, for example, both meaning cold, humid, and unpleasant, and *muggy* in English meaning warm and humid. It may

[8] Cf. Rhodes 1985 *dkate* "be cold in a room/house" – note that '-ate' is different from the '-aate' ending which is also discussed in this chapter.

well be that sun, wind and humidity are the three most common temperature sources in the weather domain, and that they therefore will be the ones most often given their own vocabulary.

Example 37, *dkasin* ("It's cooling off") is our one example of a relative temperature term - it has the semantic feature of falling temperature. We have not been able to find the 'gsin-' initial in example 38, 'gsinaa'(it is cold), in any other expression.

The personal feeling temperature terms in Ojibwe pattern closely after the weather temperature terms morphosyntactically, but with different verb endings, as can be seen in Table 7 below.

Table 7. Personal feeling temperature terms in Ojibwe

(40)gzh-ayaa	I feel hot/it is hot [in this place]
(41)gizhoo-ayaa	I feel warm/it is warm [in this place]
(42)mno-zhayaa	I feel good, comfortable
(43) ***dk-****aayaa*	I feel cold/it is cold [in this place]
(44) biing-**ej**	I feel cold/it is cold [in this place]
(45) mshkaw-ninji-**wj-**i (cf. Valentine 2001:385-8)	He has frozen, frostbitten hands

Examples (40), (41) and (43) are fairly straight forward – they take no medial classifiers, they use the verbal ending –ayaa which loosely translates to "I feel", and they take a temperature preverb (gzh-, gizhoo- and dk-). Example (42) is not a temperature term in the strictest sense – but it is the most common elicited response to the question "how do you say, 'I feel warm"'. The phrase can be used to comment on health as well, or mood, and it therefore not exclusive to the temperature domain. Finally example (44) is a very common term indicating that the speaker feels cold. It uses a to us unfamiliar preverb, 'biing-', and a verbal ending '-ej'. An allomorph of this verbal ending can also be seen when temperature information is incorporated into body part terms, as in example (45).

We have chosen not to treat every single kind of weather temperature as its own semantic domain – they can be abstracted to a common template, presented in table 8 below, where parantheses indicate optionality. As seen in Table **8**, the main distinction we have evidence for in the Ojibwe temperature system is between ambient and personal feeling temperature on the one hand and non-ambient expressions on the other. This division is similar, but not identical, to the Japanese distinction. For instance, in Japanese, the temperature that clothing bestows on the bearer is denoted with the same expressions as ambient temperature, while in Ojibwe clothing temperature is denoted with the same expressions as are non-ambient perceptions. Yet the same basic distinction, between temperature perceivable through one body part, and temperature perceivable by the whole body remains, with different nuances and minor differences in the two languages. The fact that no classifier is necessary for weather expressions merits further semantic studies – an initial hypothesis is that this indicates the presence of a greater degree of agency present in the weather terms than in non-weather terms. The other object of interest in table 7 is that hot and cold non-ambient

expressions are treated morphosyntactically different. For non-climate expressions, there is a verbal ending with the semantic feature HOT, but no such corresponding ending expresses COLD. The fact that such a HOT suffix exists leads to greater flexibility with the use of preverbs – it is possible to skip the preverb expressing HOT and substitute a degree preverb, as long as the heat is expressed in the verbal ending.

Table 8: Template for Temperature Expressions

Domain	**Preverb**	**Prefix**	**Medial**	**Suffix**
Non-ambient: Hot	(Degree/Evaluative- AND/OR HOT-)		Classifier	-HOT.VII
Non-ambient: Cold	(Degree/Evaluative)	COLD-	Classifier	-VII
Weather: Hot	(Degree Evaluative)	HOT-	∅	SOURCE. VII
Weather: Cold	(Degree/Evaluative)	COLD-	∅	SOURCE. VII
Personal feeling: Hot	(Degree Evaluative)	HOT-	∅	-to experience.VII
Personal feeling: Cold	(Degree/Evaluative)	COLD-	∅	-to experience VII

5 Discussion & Conclusion

Every additional language which has its temperature term system studied brings new linguistic data and insight, whether by confirming existing theories or by showing us new ways that the human mind can perceptualize temperature sensations. When the language is from a family that hitherto has not been studied from this angle, as is the case with Ojibwe at present, it has an even greater potential to offer new insights. As seen from a typological perspective, the data from Ojibwe reinforces the theory that the division between ambient and non-ambient kinds of temperature is fundamental in many languages and cultures. As we would have expected, the distinction is not clear cut across languages – what exactly counts as a tactile and non-tactile temperature sensation is different in different languages and communities.

5.1 Weather terms

The present study has made us very interested in the way that temperature terms and weather terms interact. In Ojibwe, speakers have to choose in which way non-tactile weather temperatures reached their specific temperature level. Was the greatest factor the sun shining, the wind blowing or the humidity in the air? Having seen how clearly Ojibwe recognizes these weather factors, we can look at other languages and see that while e.g. Swedish has a simpler temperature system than Ojibwe (in that it does not recognize the tactile/non-tactile distinction other than in certain specialized words) it does, however, have certain words that can only be used to describe the weather (or be used metaphorically), such as *kylig* ("chilly"), *mild* ("mild"), *kvalmig* ("unpleasantly hot and humid") and *rått* ("unpleasantly cold and humid"). Weather temperature can also be indicated by reference to the source of the heat, as in the adjective *solig* ("sunny and warm"), or *frisk* ("fresh, cool and invigorating"). *Frisk* is a complex word, which probably has a primary meaning of invigorating, but also carries a sense of coolness with it when applied to places or times – *en frisk dag* ("a fresh day") is noticeably cool, but in a pleasant, energetic way. The temperature information can also be incorporated into nouns, as it is in *bris* ("breeze"), which denotes a breeze that has a natural, pleasant coolness to it.

The Swedish temperature term system clearly recognizes the effect of the sun, moving air and humidity on the resulting temperatures – though this fact was hard to notice until we were made aware of this possibility through the Ojibwe data. This raises further questions, of course, about whether there are universal weather factors encoded in the world's temperature term systems, or if there are culturally or climatically driven patterns as to which kinds of weather factors are embedded in lexemes.

5.2 The question of basicness

One of the criteria proposed by Sutrop (1998) is that the basic terms be morphologically simple; languages with a higher morpheme-to-word ratio illustrate the need for a shift in how basic temperature terms are to be discovered in languages. This is the first study of the semantic temperature domain in an Algonquian language, and in lexical typology it is of course crucial to gather data from as many language families as possible. Our hope is that this study can serve as a stepping stone to similar studies in other American Indian languages and other endangered languages before it is too late.

Even if the recognition of basic colour terms has been a good tool in the study of color term systems in the world's languages, it is not necessarily the case that the same is true for other perception-reporting linguistic systems.[9] Sutrop (1999) lists grammatical complexity, cross-semantic applicability and nativeness as the main criteria for temperature basicness. We have already mentioned that grammatical complexity is a hard criteria to meet for a synthetic language where temperature is expressed through affixes. Tied to this is, in the case of Ojibwe, the issue with the cross-semantic applicability. In the examples below we could say that the bound preverb *gzh-* is applicable both for weather related temperature terms (46) and for tactile terms (47).

(46) *gzh-* Ø *-inaamde* "it's hot and humid"

(47) *gzh-aagam-ide* "some liquid is hot"

But in (46), *gzh-* alone cannot indicate temperature level; it must be combined with the verbal ending *-ide*, which also carries the semantic feature HOT. Unlike *ide-*, *gzh-* is not mandatory for non-ambient temperature terms; it can be swapped out with a different initial as long as *–ide* is present. On the other hand, for ambient temperature terms and personal feeling expressions *-ide* is not allowed, while *gzh-* or *dk-* are mandatory. In short - there are no cross-semantically applicable morphemes for temperature, and thus, on previously accepted definitions, no basic temperature terms.

We question the definition of the criteria of basic temperature terms if there are many more languages like Ojibwe which, due to their lexical structure, can never qualify for basic temperature terms under now-accepted definitions. The definition of cross-semantic applicability should be further refined. To accomplish this, it will be necessary to study more languages where temperature features are expressed in bound morphemes before the question of cross-semantic applicability can be revisited in a fruitful manner. But it may be that there are other tools than basicness which will reveal more about the typology of temperature expressions - such as the semantic categories that can be recognized in languages. There are many languages which, if they have two semantic categories,

[9] See e.g. Lucy 1997:299-300 and Levinson 2001.

recognize the difference between ambient/weather and non-ambient/non-weather perceptions of temperature – or between personal feeling temperatures and other temperatures. Likewise, it would be interesting to see which kinds of temperature-related weather phenomena are lexicalized in languages; we have seen sun, wind and humidity so far in Ojibwe. Bergström (2010) introduces the term "temperature bearer" for concepts which, like 'wind', 'fire' or sun', are often the etymological root of temperature expressions.

5.3 A note on sociolinguistics

As indicated above, Valentine 2001 presents a list of temperature expressions in Ojibwe (ibid. 896-8) which were important in our preparing for and carrying out this study. As we noted in the Methodology section, we did not expect Mr. Kimewon's productions to veer too far from what was set out in Valentine 2001. While also demonstrating the use of medial classifiers for "liquid" and "metal" described above in detail, Valentine 2001 contains expressions like the following (both provided by a college-educated female speaker):

(48) Aaniish epiichi-gsinaag?
"How cold is the weather?" (ibid. 896, #126)

(49) Niizhtanaa *piichi*-gsinaa
"It's 20 *degrees* cold." (ibid. 896, #127, emph. added)

These sentences were met with some measure of surprise by Mr. Kimewon because of the italicized preverb, a particular type of relative root, in Algonquianist terminology an element that "may serve to indicate the predicate's source, reason, manner, location, quantity, degree, or extent" (ibid. 421). Valentine glosses this particular relative root, /apiit/, as "extent; particular amount," and in this usage it explicitly refers to the numerical degree of temperature (*niizhtanaa*, "20") as shown in (43). Using numbers to describe temperature is a relatively modern contrivance; before the invention of the numerical thermometer in the 17th century there was no way to discuss temperature in terms of numbers, and the development of the consistent numerical scales (Kelvin, Celsius, and Fahrenheit) that we now take for granted are matters of the history of the physical sciences.

Apparently as a result of English intrusion there are gender, educational, and/or generational differences in acceptability judgments of temperature words vis-à-vis the use of numbers. Deep-seated changes to indigenous perspectives came about as a result of American expansion and missionary activity, and individuals undertaking this type of work on American Indian languages must always bear this in mind. As Howard Kimewon reminded us: "You would be looking at the thermostat, asking this. There is no thermostat in the woods (...) You know, they never used numbers (...) before in the language. The settlers came around, they started using numbers on how cold it was."

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Building an Intergenerational, Home-Based Language Nest

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Abstract

This talk reports on the efforts of a small family that is striving to maintain the Seneca language by establishing a language nest in the home of one of the speakers (King, 2001; Reyhner, 2005). Many Seneca people are currently struggling to preserve their heritage language. Although estimates vary, people who speak Seneca may number less than 50. On the eight-stage "Graded Intergenerational Disruption Scale" to measure language endangerment developed by Joshua Fishman (1991), 1 represents the least endangered while 8 represents the most. Seneca may represent Stage 7, where nearly all fluent speakers are beyond childbearing age. A language in that position is seriously endangered.

Although Indigenous communities are adopting various locally-specific ways of maintaining their languages in the face of endangerment and domination by English, a body of research suggests that intergenerational language nests are often key ways to reverse language shift effectively (Reyhner, 2005; Wilson & Kamanā, 2001). The presentation describes a project designed to explore the importance of using practical language in the home on a regular basis and transmitting linguistic and cultural knowledge from fluent grandparents to grandchildren. The two presenters will give an analysis and description of building such a language nest.

The project includes a grandmother and her two granddaughters speaking the language in the granddaughter's house on the Allegany Territory in western New York State. The granddaughters and their children are asked questions that initiate reflection on appropriate activities in the language nest setting. Analyzing and sharing these experiences can be an important contribution to the field of language maintenance. The intent is to encourage and assist this family and other families to help maintain Seneca language and culture for future generations. Ideally the project will also provide incentives to other small families and groups that are trying to revitalize languages on their own. The experiences and feelings of these few people may serve to ground the experiences of others who are striving to do whatever they can to pass on the heritage language.

1. Introduction

This project involves a grandmother and her two granddaughters teaching their children in the granddaughter's house on Ohi:yo′ (the Allegany Territory) in the Southern Tier of New York State. They discuss individual teaching/learning/language activities in the language nest. Creating a nest in Seneca and disseminating its progress is a new contribution to the field of language maintenance. The intent is to encourage and assist this family and other families to help maintain Seneca language and culture for future generations. Ideally the project will also provide incentives to other small families and groups that are trying to revitalize languages on their own. The experiences and feelings of these few people may serve to ground the experiences of others who are striving to do whatever they can to pass on the heritage language.

2. Context

The Seneca are part of the *Hodínöhšö:ni:h* (also Haudenosaunee, Iroquois, or Six Nations) Confederacy, which also includes the Mohawk, Oneida, Onondaga, and Cayuga, and Tuscarora. The Iroquois' traditional territory spanned the eastern Great Lakes area; today they live in Canada, Wisconsin, Oklahoma, and western New York State. Their tradition states that they have inhabited the Northeast "since the beginning of human time" (*Basic Call*, p. 80). The focus of this project centers on one of the territories of the Seneca known as the Allegany Territory, or Allegany Reservation, in the Southern Tier of the state bordering northcentral Pennsylvania. This territory includes 3,500 enrolled Senecas[1] living in and around the city of Salamanca, New York. The Territory is in the foothills of the Allegany Mountains and straddles the Ohi:yo:h (Allegany) River.

Endangerment

In terms of language endangerment in the United States and Alaska, of the approximately 300 Indigenous languages, only 175 are still spoken; 135 to 155 of those are moribund (Crawford, 1996; McCarty, 2008; Pease-Pretty On Top, n.d.). Only 20 are still transmitted to children (Hornberger, 1998). McCarty (2008) indicates that in 2000, 72 percent of Indigenous children under 5 years of age spoke only English at home. Although the statistics are dire, there is still cause for hope as some languages, such as Hawaiian, are making a comeback from endangerment. As Hinton (2001) explains, "This is also a time of unprecedented efforts on the part of minority peoples to keep their languages alive and to expand their usage" (p. 4).

[1] Enrollment, for Onöndowa'ga people, is granted to descendants whose maternal side is Onöndowa'ga. While several other Indigenous nations use the same system as the Onöndowa'ga, some nations require a percentage of blood quantum, a complicated system devised by the government's bureau of Indian Affairs (BIA).

3. Seneca Endangerment

Many Seneca people struggle to preserve their heritage language. Although estimates vary, people who speak Seneca may be as few as 150 ("Seneca," 2007). Even since this minimal figure was published, the numbers may have dwindled. Chafe (personal communication, 10 November, 2007) offered a more pessimistic estimate: "My guess is that there are less than 50 speakers altogether." Chafe went on to refer to an eight-stage "Graded Intergenerational Disruption Scale" to measure language endangerment, developed by sociolinguist Joshua Fishman (1991). On this scale, a 1 represents the least endangered while 8 represents the most. Speaking of the Seneca language, Chafe commented that he "would definitely put it at Stage 7." In Stage 7, most speakers are beyond childbearing age, and a language in that position is seriously endangered.

4. Revitalization

Although hundreds if not thousands of different languages and communities are conducting revitalization efforts, the conditions that lead to the loss of languages and the need to revitalize them often feature very similar stories of colonization and oppression. The people who maintain their languages and cultures in the face of such opposition are often nothing less than heroic. In consideration of the differences and similarities across cases in the challenge that is language revitalization, communities often look to other populations facing similar challenges as they try to find the best of existing models and adapt them to meet their specific, local needs. There are different histories, demographics, values and funding sources that cause these differences, but shared aspects of their histories should not be overlooked. Speaking of Indigenous peoples in North America, McCarty & Watahomigie (1999) emphasize this point: "The uniqueness of individual tribal and community situations notwithstanding, all indigenous peoples in the USA share a history as the targets of federal policies aimed at eradicating their languages and lifeways" (p. 80).

The oppression of colonialism can be seen in the biography and teachings of Sakokweniónkwas (Tom Porter), an Akwesasne Mohawk and director of the traditional community of Kanatsioharé:ke. His narrative attests to researchers' findings:

> I attended a government school. It was organized by the federal and the state governments together through some kind of agreement. But the Christians – the Catholic and the Protestant religions – were the only two religions that were allowed to instruct the kids … there was no other choice. (2008, p. 28)
>
> I've been told over and over that to be an Indian, to believe the way an Indian believes, to dress like an Indian, to behave like an Indian is hocus-pocus, nonsense, and you'd best straighten up and start accepting the Western world: the language, the religion, the everything. Being told that over and over since I was little is what made me rebel, in a sense … But, I'm not immune to colonization either, 'cause I was just a kid. So one of the things that hurts me so bad I still

> can't even deal with it is … I had good teachers, good teachers: Grandma and Grandpa and all of them. And I can name all of them for you. And they told me things, and then the school told me not to believe in them because they weren't "documented." (p. 30)

This reflection echoes May's estimation of the complicated nature and internalization of linguistic and cultural colonialism. "Moreover, while the supposedly inexorable process of such language loss is often articulated and defended by majority language speakers (secure in their own linguistic and cultural heritage), it has also come to be internalised by many indigenous speakers themselves – the result, largely, of the long process of negative ascription to which indigenous languages and cultures have been consistently subject" (May, 1999, p. 2). May does assert that the situation is by no means hopeless, and that attestations of language endangerment as "fait accompli" are premature. "Nonetheless, indigenous community-based education stands as an example of just what can be achieved in 'turning the tide' of these long-standing hegemonic processes" (May, 1999, p. 2). Darrell Kipp, a Blackfeet educator and researcher, remarks on the strength of community-based models, since in their adoption, "You don't reform, you abandon bad systems" (2000, p. 23).

Innovative language revitalization and education efforts include school-based initiatives, programs outside of but connected to schools, such as after-school or summer programs, programs for adults, efforts aimed at language documentation and materials creation, and programs based in the home.

Again, Tom Porter sheds light through his personal reflection:

> We must immerse our people, our children, and teach them how to be mothers and fathers, give them back their ceremonies, give them back their language, give them back their spiritual history altogether, teach them how to be wholesome family members, ambitious, honest, and morally good … I believe this dream will be fulfilled. (2008, p. 389)

Often, the people who possess the fluency and cultural and historical knowledge are tribal elders. "To succeed, language renewal projects require not only good intentions but enormous practical efforts … As a result, these projects must draw on cultural resources available on reservations, relying especially on elders, the true experts in these languages" (Crawford, 1996, pp. 8-9). Pease-Pretty On Top echoes this sentiment in her *Native American Language Immersion* report. "Elder involvement in Native language immersion camps, classrooms and activities is multi-dimensional and integral to the language learning in tribal communities" (n.d., p. 38). Elders are part of the intergenerational web of language speakers and learners in the community. Researchers have long advocated for intergenerational language transmission and cooperation of community efforts as critical for endangered language revitalization. In terms of the vitality of the language using this concept, "perhaps it can aspire to societal re-attachment or even more to inter-generational mother-tongue transmission, not just to societal re-attachment. It may realistically aspire to the inter-generational transmission of that re-

attachment, so that it becomes the mother tongue of a vibrant speech community" (Fishman, 1996, p. 4). Other parts of the intergenerational web include parents. *Guidelines for Strengthening Indigenous Languages* (2001), from the Assembly of Alaska Native Educators, advises elders and parents to:

- Keep heritage language alive by using it as much as possible in everyday activities and in ceremonial events.
- Assist younger speakers of the heritage language in expanding their fluency to deeper levels and enlist their support in passing the language to other members of the community.
- Be a role model for all generations by practicing and reinforcing traditional values and using the heritage language to maintain spiritual traditions and convey the history of the community.
- Assist all members of the community (especially new parents) in providing opportunities for young children to grow up hearing their heritage language spoken in the home and community.
- Assist others to acquire the heritage language by using it on an everyday basis, and serve as a mentor to those wishing to learn the language." (*Guidelines,* 2001, p. 3)

How this is done varies by local context, but a few principles may apply to all efforts. Hinton (2001a) also advises speaking primarily in the language at home:

> If parents try to do something like spend "equal time" on the two languages, it is the endangered language that will suffer, for unlike the mainstream language, the endangered language receives little or no reinforcement outside the home. Since children do a great deal of language learning outside the home, the parents, if their goal is bilingualism for their children, should spend relatively little time on the language that is dominant in the general environment and concentrate instead on speaking in the endangered language … if the parent is fluent, then that must be the language of communication between the parent and child, either at all times or during a significant amount of time … for a person in danger of dying, the first job of medics is to get the heart beating again. For an endangered language, the first job is to get the native speakers speaking it again. (p. 13)

Parents are advised to start with their young children by immersing them in the language at home. "Immersion programs should begin as early as possible" (DeJong, 1998, p. 5). "The home must be the central focus of native language learning" (p. 3).

Parents might not know enough of the language to transmit it, and communities are sometimes splintered so that local organization is difficult. "Even when a family continues to use a threatened language in the home, the outside environment may be so steeped in the majority language that the child unconsciously shifts languages around school age and no longer speaks the minority language even at home" (Hinton, 2001a, p. 4). This is a phenomenon that stalls many revitalization efforts. But researchers

emphasize that speakers need to start somewhere. "Should they take two intermediate speakers and an elder and start with five students and just go for it? Yes." (Kipp, 2000, p. 29). One way to initiate small-scale revitalization is through language nests.

5. Language Nests

Outside of the continental US, two of the most famous and successful programs of all language revitalization efforts are found in the Pacific Islands in Hawai'i and New Zealand. New Zealand is where the language nest, or *Te Köhanga Reo*, was established in 1982. This initiative resulted from the knowledge that a majority of Maori speakers were elders beyond childbearing age. The generations of parents and young people were those whom King describes as having "missed out" from knowing the language; in the 1970s, fluent speakers represented roughly 20% of the population, yet most were over the age of 50 (2001). The nest is designed for preschool-aged children and their parents who do not or cannot take part in other early childhood programs. Nests provide daycare services through the heritage language. Language nests often take place in the home, with elders and young adults transmitting the language and cultural practices to young children while caring for the children's daily needs. As the nests grew in popularity, they extended from strictly home-based locations to centers throughout the communities.

Today there are 704 nests in New Zealand enrolling 13,000 children. Although by 1995, 72% of speakers over age 16 were "low fluency" speakers, 29% reported knowing enough to carry on conversation (King, 2001). The nests became the "most popular early-childhood option for Maori children" (p. 122). Often, the participants are related, or at least have kinship ties. The language used is informal, conversational, and imbedded with cultural values, for instance, in the teaching of traditional children's stories that teach religious values or cultural beliefs. They teach customs, greetings, "tribal connections" (p. 123), and group relationships, and utilize natural materials in the lessons. Thus, they "affirm" the culture (p. 123). Parents are encouraged to participate and to use the language in the home. King has noted a few difficulties experienced over the years. One is that the transition from the nest to mainstream education has been difficult for some children, as the schools do not value the teachings of nest programs. Also, the organization of the nests has changed multiple times, and there has been a need to find qualified teachers and speakers. Other problems include low enrollment, lack of family support, difficulty in avoiding the use of English, and a lack of staff. Teachers and staff need to be reassured that formalized teaching of the language is not necessary since children will acquire language when it is used naturally. Thus the nest programs are providing more training for nest teachers and staff.

Hawaiians began aggressive immersion programs by adopting the Māori language nest model. The *'Aha Pūnana Leo*, the preschool language nest, co-founded by William Wilson, was inspired by the Māori model ("'Aha Pūnana Leo," 2006; Pease-Pretty On Top, n.d.). Kipp states that in Hawai'i, "[t]hey were Native Hawaiians, and they were down to less than a thousand native speakers. So, they started the language nests called *Punana Leo* in their language and taught their children their language … today, they have twenty-eight schools" (2000, p. 8). In 1983, the nest was legally registered as a non-profit

(Wilson & Kamanā, 2001). In the early years, there was no state support for the nests, but eventually, a coordinator and advisory council were established, and they were able to secure funding and partner with the University of Hawai'i.

In these Hawaiian nests, parents, as well as children, learn the language; they also participate in administering their own local schools. The central idea of these nests was to use a Hawaiian-dominant model, not Hawaiian as a Second Language. They insist on "the total use of the indigenous language" in communication, and integrate culture into the teachings (p. 151). They use a daily routine and have adapted Montessori methods to transmit family experiences and values. The routine starts with a circle in the morning, with singing, stories, exercise, and cultural activities, to free playtime, to a structured lesson featuring activities such as premath skills, to outdoor play, lunch, nap time, snack time and more story time in the afternoon. Nests often contain 10 to 12 children aged 3 to 5 attending Monday Through Friday from 7:30 until 5:00 during the months of September to July. Parents are encouraged to participate and provide in-kind services; in the beginning stages when materials were scarce, they helped to create culturally-relevant materials in the language, such as books with family photos and information (Wilson & Kamanā, 2001).

Immersion increased fluency in youth from 35 to 2,400 young speakers (Pease-Pretty On Top). Wilson and Kamanā reported in 2001 that the nests increased "strong Hawaiian communicative and behavioral fluency" among five-year olds (p. 153). In addition, it helped to build confidence and acceptance of Hawaiian as a part of daily conversation. The young adult/parent generation has also increased its use of conversational Hawaiian, building community-wide excitement for language revitalization, more statewide receptivity, and popular use in the public arena.

Seneca Language Nest

During the summer of 2009, Sandy Dowdy, fluent speaker of Seneca and veteran teacher of Seneca language and culture, capitalized on the inspiration she gained from existing language nests and started to build her own. Dowdy was aware of the nature of Seneca endangerment and saw a similar historical trajectory between Seneca, Māori, and Hawaiian. She was deeply concerned that the various teaching activities that she and her community have engaged in were not addressing the key element in language revitalization – the youngest children in the community. She saw that the model nests that were so successful in other communities were the missing piece in her own community. Her son and granddaughters, who are capable speakers and language teachers, often become entangled in day-to-day commitments and find little time to engage their own youngest generation in conversational Seneca language, much like the "generations who missed out" in King's narrative of New Zealand. Since Dowdy had extensive experience in early-childhood training in Montessori and Asher's Natural Approach teaching methods, and was well-versed in language teaching strategies such as Total Physical Response, she understood her unique appropriateness as the language nest progenitor in her community. Her position with the Seneca Nation Language Department allowed her the flexibility and support to begin the nest-building process. She started, then, with her own great-grandchildren at the home of one of her granddaughters.

Interruptions from other commitments caused a lapse in planning and utilizing the nest, but she restarted it again in late 2009 when she formalized the nest concept and gave it a name, Onödowa'ga: Wadehsayë' Oiwa'shö'öh, or The Seneca Language Nest. In addition to teaching language and culture, the nest has a mission to be a "green" campus and to teach concepts of environmental sustainability to students and teachers alike. Nest activities often take place outdoors, as the seasonal cycle is important; ceremonies follow the natural order of the seasons. Dowdy began regularly teaching four preschool children, three of which were her great-granddaughters and one preschool daughter of another language teacher, and occasionally included her 10-year-old great grandson who is not only a learner but also a facilitator. She also mentors the parents in incorporating the nest vocabulary and conversation materials into the home for daily use. Parent inclusion is accomplished through daily contact when parents drop off and pick up children, through informal meetings, and by informing parents of the teaching methods and language activities and goals. Dowdy created a series of Parent Brochures (see Appendix 3) so that parents are aware of the content taught in the nest and are encouraged to reinforce it in appropriate units. Families participate in seasonal ceremonies throughout the year.

Children in the nest learn about clothes, foods, numbers, pets, commands (see Appendix 1 for chart of commands used in TPR lessons), names, family terms, miscellaneous items such as questions and observations, songs, and the Ganö:nyök, all in the Seneca language. The 20 verses of Ganö:nyök is a daily recitation in the Seneca language that gives thanks to all the vital natural elements, such as water, medicines, and the sun, and to the Creator. The children are learning the basic vocabulary words for the elements using images (See Appendix 2) as they hear a short version of the recitation. Each verse has a repetitive portion that facilitates learning. Thus they are beginning preparation to be able to recite the Ganö:nyök in their daily lives, at social occasions, and at ceremonial events. The great-grandson has delivered it at special community occasions and is able to ad-lib his version with relative ease. Dowdy teaches its initial use using various educational strategies using the flash cards.

Conscious effort is made to use Montessori and Natural Approaches. There is a defined structure to the daily routine (See Appendix 5), yet the routine can be flexible depending on the children's needs and community doings. Direct translation to English is avoided, but children's responses are acknowledged whether they are in English or in Seneca. When children show disinterest, they are not redirected immediately. They are permitted to grow and attend to activities when they are ready. Social skills, Seneca ways of behaving and acting accordingly, and cultural materials are incorporated as much as possible and overlap the language goals. Dowdy reflected on the nest during the initial start-up phase:

> Pre-school children are quick at mastering the language; meaning that they use the language with each other naturally. The students unconsciously used the phrases they heard with each other. We never had to translate when using TPR method. We used many non-verbal gestures throughout the day, during class time and during free play. Having a flexible schedule allows the children to freely express themselves during free play situations … We use a lot of positive reinforcement,

smiles, hugs. Some students are more dominant and others are more out-going. Their 10-year-old brother was constantly calling the girls by their native names. On the sixth day of the language nest, one of the students called to one of the other students and gave her the Seneca command to "come here!

Dowdy is currently at the stage of developing and using a regular formal assessment tool to measure the children's progress (See Appendix 4). This sheet is intended for keeping track of concepts as well as for sharing with parents. This tool is designed to be easily expanded as new vocabulary is introduced. There is emphasis on simply hearing the vocabulary, ability to repeat it, and ultimately, using it spontaneously without prompting. Other components will be added to the nest as it evolves.

Recently, the nest has moved from the granddaughter's house to Ganöhsesge:kha Hë:nödeyë:stha, or the Faithkeepers School, a small community school co-founded by Dowdy and her husband, Lehman "Dar" Dowdy, a Faithkeeper in the Seneca-Allegany community. The school has been the site of various Seneca programs, including ceremonial language classes for adults, and summer immersion camps for youngsters. It is a natural location for the nest as well, as if offers a larger building set in the woods and near a playground. At the school, the Nation provides an assistant who prepares breakfast and lunch and provides other ancillary services.

In the near future, Dowdy hopes to expand the nest to include up to ten children, hire an assistant language teacher that she can mentor, expand the nest days from once a week to five days per week, and increase parent involvement.

Overall, the nest operates with the acknowledgment of the sage advice of Darrell Kipp: "Your language is your curriculum" (2000, p. 26).

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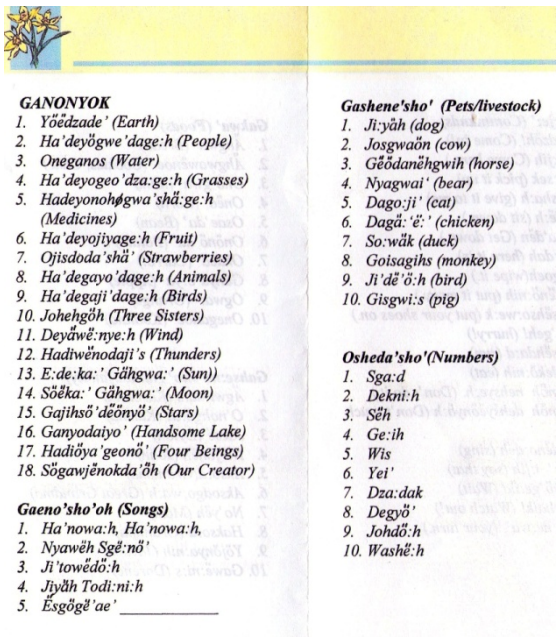
6. Appendices

Appendix 1: TPR Chart/Word Wall

Appendix 2: Ganö:nyök Flash cards

Appendix 3: Page From Parent Brochure



GANONYOK

1. *Yŏ̈dzade' (Earth)*
2. *Ha'deyŏgwe'dage:h (People)*
3. *Oneganos (Water)*
4. *Ha'deyogeo'dza:ge:h (Grasses)*
5. *Hadeyonohøgwa'shă̈:ge:h (Medicines)*
6. *Ha'deyojiyage:h (Fruit)*
7. *Ojisdoda'shă̈' (Strawberries)*
8. *Ha'degayo'dage:h (Animals)*
9. *Ha'degaji'dage:h (Birds)*
10. *Johehgŏh (Three Sisters)*
11. *Deyă̈wë:nye:h (Wind)*
12. *Hadiwĕ̈nodaji's (Thunders)*
13. *E:de:ka:' Gähgwa:' (Sun))*
14. *Sŏ̈ka:' Gähgwa:' (Moon)*
15. *Gajihsŏ'dĕ̈ŏ̈nyŏ' (Stars)*
16. *Ganyodaiyo' (Handsome Lake)*
17. *Hadiŏ̈ya'geonŏ̈' (Four Beings)*
18. *Sögawjĕnokda'ŏh (Our Creator)*

Gaeno'sho'oh (Songs)

1. *Ha'nowa:h, Ha'nowa:h,*
2. *Nyawĕh Sgĕ:nŏ'*
3. *Ji'towĕ̈dŏ:h*
4. *Jiyă̈h Todi:ni:h*
5. *Ĕsgŏgë'ae' _____*

Gashene'sho' (Pets/livestock)

1. *Ji:yă̈h (dog)*
2. *Josgwaŏ̈n (cow)*
3. *Gĕ̈ŏdanĕ̈hgwih (horse)*
4. *Nyagwai' (bear)*
5. *Dago:ji' (cat)*
6. *Dagă̈:'ë:' (chicken)*
7. *So:wă̈k (duck)*
8. *Goisagihs (monkey)*
9. *Ji'dë'ö:h (bird)*
10. *Gisgwi:s (pig)*

Osheda'sho'(Numbers)

1. *Sga:d*
2. *Dekni:h*
3. *Sĕh*
4. *Ge:ih*
5. *Wis*
6. *Yei'*
7. *Dza:dak*
8. *Degyŏ'*
9. *Johdŏ:h*
10. *Washĕ:h*

Appendix 4: Assessment Sheet Sample

Language Nest 2009-2010
Vocabulary Checklist

	Listened	Repeated	Mastered	Comments
Gano:nyok				
1. Yŏ̈dzade'				
2. Ha'deyŏgwe'dage:h				
3. Oneganos				
4. Ha'deyogeo'dza:ge:h				
5. Ha'deyonŏhgwa'shă:ge:h				
6. Ha'deyojiyage:h				
7. Ojisdŏda'shă'				
8. Ha'deganyo'dage:h				
9. Ha'degaji'dage:h				
10. Jŏhehgŏh				
11. Dĕyă:we:nye:h				
12. Hi'nŏ'				
13. Ĕde:kha:' Gähgwa:'				
14. Sŏekha:' Gähgwa:'				
15. Gajihsŏ'dĕ̈ŏnyŏ'				
16. Ganyodaiyo'				
17. Hadiŏya'geonŏ'				
18. Sögwajënŏ'kda'ŏh				
Colors				
1. Gwĕhdă:'ë'				
2. Jitgwă:'ë'				
3. Oshă:'ë'				
4. O:ya'ë'				
5. Jinyowae'				
6. Ganĕhdaikŏ'				

1

Appendix 5: Daily Routine

8:30 - CHILDREN SAY, "Ësgögë' ae' No'yëh!

8:45 - BREAKFAST

9:00 - CIRCLE TIME (Sing songs, Ganö:nyök lesson, introduce new "table work," do a language activity)

9:30 - TABLE WORK (puzzles, drawing, coloring, sorting, play dough, manipulatives)

9:45 - STORY TIME

10:00 – WASH HANDS, SNACK

10:30 – FREEPLAY (in classroom)

11:00 – CLEAN UP, WASH HANDS, LUNCH

12:00 – OUTDOOR PLAY/FIELD TRIP/PLAYGROUND/RIDE/NAP

2:00 - WASH HANDS, SNACK

2:15 - CIRCLE/STORYTIME

2:30 – FREE PLAY

3:30 – CLEAN UP, CLOSING