

Grammatical tone in Kanise Khumi: exclusive/inclusive pronominal agreement

Elissa Ikeda & Ryan Gehrmann
 Payap University, Chiang Mai, Thailand
 elissa_i@payap.ac.th, ryan_g@payap.ac.th

ABSTRACT

Kuki-Chin languages are known for using tonal variation to mark grammatical relationships [1]–[3]. This paper provides evidence that tone is used to mark an inclusive-exclusive distinction in pronominal subject agreement markers on Kanise Khumi verbs. An inclusive-exclusive distinction is common for Kuki-Chin independent pronouns, but not for pronominal agreement marking on the verbal complex [4], [5]. Using elicited sentences, this paper compares exclusive and inclusive agreement prefixes with respect to vowel quality (F1) and pitch (F0).

When the object is 3rd person, segmental information (i.e. vowel quality) is one feature that distinguishes exclusive from inclusive in the person-marking prefix. Pitch is another. However, in reflexive/reciprocal interpretations, pitch is the distinguishing feature between exclusive and inclusive agreement prefixes. Thus, exclusive-inclusive pronominal agreement provides an example of morphosyntactic tone in Kanise Khumi.

Keywords: grammatical tone, pronominal agreement, Tibeto-Burman, Kuki-Chin, Khumi.

1. INTRODUCTION

As Hyman [6] pointed out, tone can do everything that segments can do and more. In Kuki-Chin languages, tone can mark a variety of grammatical relationships such as genitive, benefactive, causative, number, negation, and nominalization to name a few. Peterson [7] argues that to his knowledge, “no other language of the area is reported to exhibit as widespread use of tone for marking morphosyntactic information as [Bangladesh] Khumi does.” This paper provides evidence that tone is used to mark an inclusive-exclusive distinction in pronominal subject agreement markers on Kanise Khumi verbs. Kanise is a Khumi variety spoken mainly in Paletwa Township, Chin State, Myanmar.

Kanise Khumi distinguishes between exclusive and inclusive using both independent pronouns and agreement prefixes on the verb. For first-person reference, exclusive indicates that the speaker is included but the addressee is excluded. In contrast, an inclusive pronominal includes both the speaker and addressee. Table 1 displays the clusivity distinction in independent pronominals in Kanise Khumi.

	Sing.	Dual	Plural
Exclusive	kaĩ	kaĩ ɲĩ	kaĩ tsɿ̃
Inclusive		ʔaĩ ɲĩ	ʔaĩ tsɿ̃

Table 1: First-person independent pronominals in Kanise Khumi.

Kuki-Chin languages may have bound pronominal agreement prefixes on verbs that mark subject and object [4]. Among Khomic (Southwestern) Kuki-Chin languages, Kanise Khumi appears to have the most complex pronominal agreement marking system (cf. [8]–[11]). Prefixes agree with subject person (See Table 2). Subject number is marked through suffixes: dual suffix /hœl/, plural suffix /uʔ/, and singular -ø.

Object	Subject			
	1 excl	1 incl	2	3
1			ɲ̃	ɲ̃
2	kã	kã		ɲ̃
3 or Intransitive	kə̃	kã	ɲ̃	ə̃
Reflex./Recipr.	kã	kã	kã	ã

Table 2: Person agreement prefixes in Kanise Khumi.

Three lexical tones have been observed on noun and verb roots in isolation. Tone 1 has high level pitch and modal voice quality. Tone 2 is a mid checked tone (short duration & glottalized voice quality). Tone 3 is low-falling with breathy voice quality [12], [13]. A consistent association between one tone on the inclusive prefix and a different tone on the exclusive prefix would provide evidence that tone is used to distinguish this grammatical relation [14]. However, inconsistent variation of pitch on any one of the first-person subject prefixes might indicate that 1) the prefixes are simply not specified for tone, 2) the tone of the verb root might affect the tone of the agreement prefix, or 3) that a full syllable prefix might vary freely with a reduced syllable [15], [16]. In the final case, we might expect other features of syllable reduction to correlate (i.e., neutral or mid-central vowel quality, shorter duration, gradient realizations of pitch [17]–[21]).

2. METHODOLOGY

2.1 Data collection

We recorded pronominal agreement marking in sentence frames. Ezra, a 50+ year-old male speaker, provided the data from Yangon, Myanmar. We presented sentence frame prompts using PowerPoint during a Zoom meeting. Each slide contained one of five sentence frames written in Kanise orthography with a blank space for the verb. The sentence frames varied only by the independent pronoun provided as the subject of the sentence: 1st singular, 1st dual inclusive, 1st dual exclusive, 2nd singular, or 2nd dual. Each slide also included the Burmese gloss for one of 48 verbs to supply the blank space. For example, *Jandyh kai hni* ____ (ကတညှ်း): “Yesterday we [dual exclusive pronoun] ____ (dance).” The 48 verbs represented three tone groups based on the tone melodies found on verb roots in citation forms. For transitive verbs, we did not specify an object pronoun so as to keep the sentence frames constant.

During the call, the speaker responded to each of the 240 PowerPoint slides by producing three repetitions of the sentence and then whistling the tone melody of the entire sentence. He recorded the sentences using the on-board microphone of a Samsung 11 phone in .wav format at 44.1 kHz using the ASR app [22]. He transferred recordings through Signal [23] with the “sent media quality” setting at the “standard” level.

2.2 Data analysis

We selected the two sentence frames with a first-person dual subject, either exclusive or inclusive. These frames maintained a constant grammatical structure and tone environment surrounding the subject agreement prefix and verb root. In examples 1-2, the grammatical structure appears in the first line and the tone environment in the second.

(1) [Yesterday] [**1.excl pronoun**] [**1.excl-verb-dual**]
[M H] [H M] [1.excl-verb-H]

(2) [Yesterday] [**1.incl pronoun**] [**1.incl-verb-dual**]
[M H] [M M] [1.incl-verb-H]

For each group, we eliminated sentences where 1) an extra suffix was added; 2) a phrase intervened between the independent subject pronominal and the verbal complex; 3) a valency-changing prefix intervened between the person-marking prefix and the verb root; or 4) person agreement involved a reflexive/reciprocal interpretation. Thus, we were left with 28 sentences with an inclusive subject and 27

sentences with an exclusive subject using the same set of verbs minus one. Reciprocal interpretations with six verbs were analyzed separately (See Section 3.2).

We used Praat Text Grid to annotate the vowel portion of each subject agreement prefix, each verb root, and each dual suffix in the second and third sentence repetitions.

Acoustic measures were extracted at 5 ms intervals in Praat using the PraatSauce script [24]. The data was analyzed and the plots drawn in python using the plotnine module [25]. F0 measurements are displayed in semitones relative to the mean F0 value for all of the tokens annotated for this project. All F0 and F1 plots are smoothed via loess regression with confidence intervals displayed.

3. RESULTS

3.1 Exclusive-inclusive distinction with 3rd person objects

3.1.1 Vowel quality

With third-person objects, there is a segmental distinction between 1st exclusive and 1st inclusive in terms of the vowel quality of the prefix: exclusive [kə] vs. inclusive [ka]. Figure 1 compares the F1 values of the two prefixes where values associated with the exclusive are plotted with solid lines and inclusive with dashed lines; means are shown in bold.

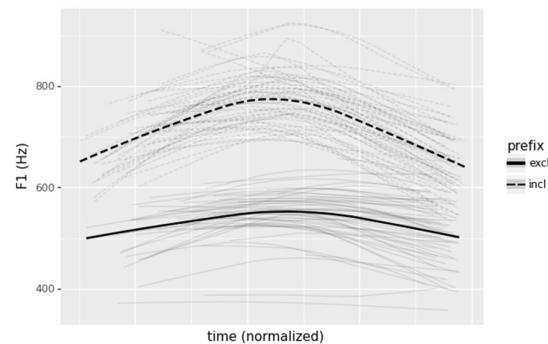


Figure 1: F1 comparison of the prefix.

At the midpoint of the vowel of the exclusive prefix, the mean F1 is around 575 Hz contrasted with around 775 Hz for the inclusive prefix. Across all observations, there is no overlap between exclusive and inclusive at the center of the vowel. This suggests that there is a distinct vowel quality target associated with each prefix, and that the vowel quality associated with the inclusive prefix is consistently more open than the exclusive prefix.

3.1.2 Pitch

There is also consistent mapping between fundamental frequency and clusivity. Figure 2 displays F0 in semitones relative to the mean where time is normalized. There is a difference of 2-3 semitones between the mean F0 curve for the exclusive prefix and the mean F0 curve for the inclusive prefix. When all tokens are considered, there is no overlap between the pitch curves of the two prefixes. This suggests that there is a distinct pitch target for each prefix, with the exclusive prefix produced with a consistently higher F0 than the inclusive.

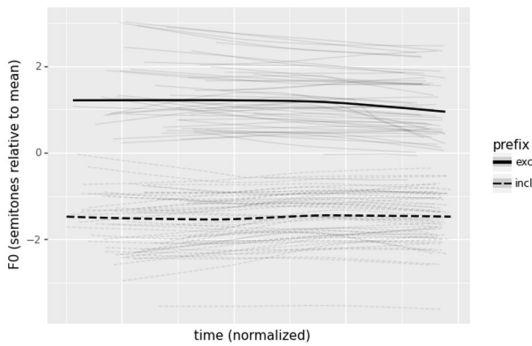


Figure 2: F0 comparison of the prefix.

The verb complex investigated in this study is comprised of three syllables: 1) person prefix, 2) verb root, 3) number suffix. Mean pitch curves spanning the verb complex are given in Figure 3. Verb complexes with an exclusive subject are plotted on the left, inclusive subject on the right. On the x-axis, time is normalized by syllable: The person prefix is represented between 0-1; the verb root between 1-2; and the number suffix between 2-3.

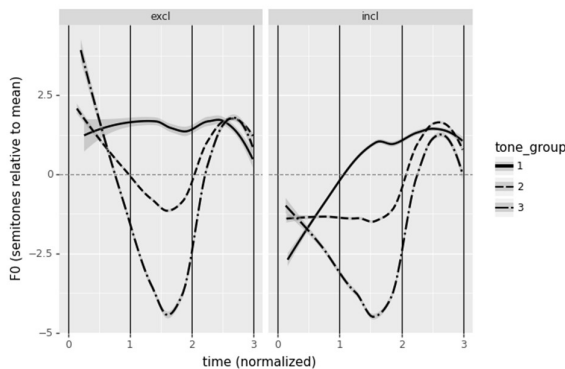


Figure 3: F0 comparison of the verb complex.

As follows from the above, prefixes associated with an exclusive subject are set higher than prefixes with an inclusive subject. The tone of the

verb root does not appear to affect this pattern. The pitch target of the verb root is generally realized by the midpoint of the root (x-axis = 1.5). As expected, the suffix is consistently associated with a high pitch target.

The left boundary of each prefix was a word boundary, so the pitch of the prefix at onset gives a good sense of the pitch target of the prefix, while the right edge of the prefix indicates movement toward the pitch target of the verb root. The mean onset of the exclusive prefix is at or higher than the mean pitch target for Tone 1 verb roots (left graph, solid line at x = 1.5). Assuming for declination across the phonological word, this suggests that the pitch of the exclusive prefix could be associated with the pitch level of Tone 1. In contrast, the onset pitch of the inclusive prefix is near or below -1 semitones, close to the level of the mean pitch target for verbs associated with Tone 2 (right graph, dashed line at x = 1.5). There is an inverse relationship where the mean onset pitch of the exclusive prefix is highest before a low-tone root, while the mean onset pitch of the inclusive prefix is lowest before a high-tone root.

3.2 Reflexive and reciprocal interpretations

We designed the experiment with a third-person object in mind; however, no object was specified in the sentence prompts. Without prompting, Ezra produced sentences with a reflexive or reciprocal interpretation for six verbs. These verbs were /təʎ/ ‘fight’, /göʎ/ ‘meet’, /jɔʎ/ ‘sell’, /ʔɥʎ/ ‘bury’, /ʔɔʎ/ ‘cut’, and /ŋajʎ/ ‘love’. Many Kuki-Chin languages have preverbal middle voice markers that distinguish person [4]. In Kanise Khumi, a reflexive/reciprocal interpretation affects the person-marking prefix as shown previously in Table 2. In these cases, vowel quality is not relevant in the exclusive-inclusive distinction. Pitch, however, is a reliable cue. Examples 3-6 demonstrate this point. Examples 3 and 4 involve a third-person object. The exclusive and inclusive agreement markers differ in both vowel quality and pitch. Examples 5 and 6 involve a reciprocal interpretation where the exclusive and inclusive agreement markers differ only in pitch.

- | | |
|-------------------------------|--------------------------------|
| (3) (kaiʎ-ŋiʎ) (ʔəʎniʎ-teŋəʎ) | kəʎ-təʎ-həeʎ |
| (1.excl-dual) (3.sg-obj) | 1.excl-fight-dual |
| (4) (ʔaiʎ-ŋiʎ) (ʔəʎniʎ-teŋəʎ) | kaʎ-təʎ-həeʎ |
| (1.incl-dual) (3.sg-obj) | 1.incl-fight-dual |
| (5) (kaiʎ-moʎ-ŋiʎ-teŋəʎ) | kaʎ-təʎ-həeʎ |
| (1.excl-recip-dual-obj) | 1.excl.recip-fight-dual |

(6) (ʔai̯l-mo̯l-ŋi̯t-teŋə̯l) ka̯t-tə̯l-hə̯e̯l
 (1.incl-recip-dual-obj) 1.incl.recip-fight-dual

3.2.1 Reciprocal interpretation and pitch

Figure 4 illustrates the pitch contrast between the exclusive and inclusive prefixes that correspond to a reciprocal interpretation.

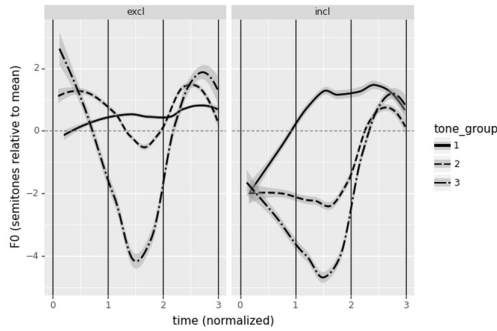


Figure 4: F0 comparison of the verb complex in reciprocal interpretations.

The prefix pitch is displayed between timepoints 0 to 1. The pitch of the prefix is above 0 semitones for the exclusive and close to -2 for the inclusive. Like Figure 3, this F0 comparison of the prefixes shows that pitch distinguishes exclusive and inclusive.

3.2.2 Reciprocal interpretation and vowel quality

Vowel quality does not distinguish the exclusive and inclusive prefixes in reciprocal interpretations (Figure 5).

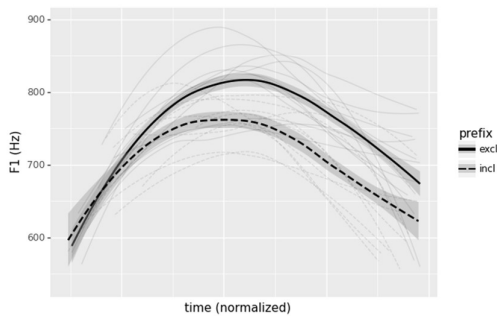


Figure 5: F1 comparison of the prefix in reciprocal interpretations.

In Figure 5, the F1 of the prefix ranges between 700-800 Hz regardless of whether it is exclusive or inclusive, signifying an open vowel for both. This contrasts with Figure 1, which showed a difference in F1 when the object is 3rd person. In those cases, the exclusive prefix had a mean F1 of 550 Hz, signifying a mid vowel height.

3.2.3 Alignment with other subjects

Reflexive and reciprocal constructions with other subjects confirm a clusivity distinction signalled through pitch. The person agreement prefix [ka̯l] is used with first-person singular and first-person exclusive (dual/plural) subjects. On the other hand, [ka̯t] is used with first-person inclusive (dual/plural) and second-person subjects. In other words, [ka̯l] includes the speaker but excludes the addressee(s) in a reflexive/reciprocal construction. In contrast, [ka̯t] includes the addressee(s) as sole or part-actor. Table 3 displays this alignment pattern.

	High prefix ka̯l	Mid prefix ka̯t
1 st singular	X	
1 st dual exclusive	X	
1 st dual inclusive		X
2 nd singular		X
2 nd dual		X

Table 3: Tone alignment in pronominal subject agreement marking with reciprocal/reflexive interpretations.

4. DISCUSSION

In Kanise Khumi, exclusive and inclusive are distinguished in independent pronouns and preverbal agreement. Vowel quality (F1) and pitch (F0) signal this distinction in first-person subject prefixes when acting on a third person object. However, sentences with a reflexive or reciprocal interpretation reveal that pitch is the most consistent feature distinguishing clusivity on agreement prefixes. While there may be redundant cues in the noun phrase, this constitutes a form of *morphosyntactic tone* where “a form carrying a specific meaning must be marked by a specific tone, which is interpreted as being directly linked to this meaning” [14, p. 13].

This paper has not addressed other suprasegmental features that typically bundle together with pitch in Southeast Asian tone systems such as voice quality and duration [26], [27]. To accurately interpret duration and voice quality in a preverbal position, we must first investigate the reliability of duration and voice quality as tone cues on verb roots that precede a suffix. In addition, the results of this study should be corroborated by testing listener discrimination and the production of other speakers.

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