0. Introduction

Chungli Ao, like the closely related language Mongsen Ao\(^1\) (Coupe 2004, 2007), is a tone language. The purpose of the current paper is to describe the basic facts of the lexical tone system of Chungli. Wherever possible, the details of this system will be situated in a larger typological context and/or compared with the details of the Mongsen system.

The structure of the paper is as follows. After a brief discussion of the method used to determine the tones on particular words in section 1, the number of tones in the system is discussed in section 2. In section 3, I present the evidence that Chungli is a register tone language, rather than a contour tone language. Section 4 focuses on differences in the tonal combinations found in nouns and verbs. Section 5 covers the implementation of tones in terms of relative pitch. In section 6, I mention a few remaining issues. Finally, Section 7 offers a brief conclusion.

1. Basic methodology

In order to determine the tones on a word, we had the consultant produce the word in the frame in (1).

(1) pa _____ intaŋ tʃimˈpr\(^2\)

_He is speaking about ______

This frame is useful for identifying a word’s tones because the target word is surrounded by mid tones on both sides. This means that high and low tones stand out

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\(^1\) For the remainder of the paper I will refer to Chungli Ao and Mongsen Ao as Chungli and Mongsen, respectively.

\(^2\) Tones will be marked in the following way in this paper: a Low tone is indicated with a grave accent (’), a Mid tone is indicated by the absence of any accent above a vowel, a High tone is indicated with an acute accent (’), a High-Low (high falling) contour tone is indicated with a circumflex accent (ˆ), a Low-Mid (low rising) contour tone is indicated with a caron (ˇ).
as different from the neighboring tones. If the tone on the target word is higher than the tone on the neighboring word it is High and if the tone is lower than the tone on the neighboring word it is Low. Of course, if the tone is the same then the tone on the target word is Mid.

In addition to using a frame, we had our consultant hum words, both in frame and in isolation. We found it to be easier to identify tones when words were hummed. This is likely due to the fact that segmental effects on pitch are attenuated, if not completely eliminated, when the consultant hums. For example, the pitch at the beginning of a syllable starting with a voiceless consonant is relatively high when the word is pronounced. If the syllable is short enough, this relatively high pitch can give the impression that the tone of the syllable is higher than it actually is (e.g. High rather than Mid). When the word is hummed this effect is eliminated, allowing us to correctly identify the tone of the syllable.

2. **Number of tones**

As shown in Figure 1, in Chungli there are three distinct pitch levels: Low, Mid, and High.

![Waveform and pitch trace of hummed mutsitsu 'molasses'](Ao_MI_01Apr09_08_RR.wav; 23:22)
Notice that the first syllable, which is Low, is lower than the second syllable, which is Mid and the second syllable is lower than the third syllable, which is High.

There is clear evidence that Low and Mid are contrastive. In (2) and (3), we see that there are minimal pairs differentiated only by one word carrying Low tone and the other Mid.

(2) a. tʃæŋ ‘buffalo’ (Ao_MI_26Sep08_6_RE.wav; 2:54)  
    b. tʃǎŋ ‘uncooked rice’ (Ao_MI_26Sep08_6_RE.wav; 3:00)

(3) a. nə ‘spear’; ‘your’ (sg.) (Ao_MI_09Oct08_1_DB.wav; 4:08)  
    b. nə̀ ‘yam’ (Ao_MI_04Feb09_7_MP.wav; 5:51)

There is also evidence that Low and High are contrastive. In (4), we see a phrasal minimal pair where the two phrases differ only in that the first word in (a) carries Low tone and the first word in (b) carries High tone.

(4) a. úzu tʃi ‘our (exc.) food’ (Ao_MI_06May09_1 RR.wav; 1:29)  
    b. úzu tʃi ‘the bird’s food’ (Ao_MI_06May09_1 RR.wav; 1:42)

There are no minimal pairs, phrasal or otherwise, that illustrate a contrast between Mid and High. This may simply be because High tones have a restricted distribution. Of the 456 words in our tone database, only 16 words (3.5%) carry only High tone. Compare this to the 40 words (8.8%) in the database that carry only Low tone and 201 (44.1%) that carry only Mid.

In having three levels of tone, Chungli is relatively unexceptional, both among tone languages in general and among tone languages in Northeast India. Among tone languages in general, languages with three tone levels are common, though not as common as languages with two (Maddieson 1978). Among the Tibeto-Burman languages of Northeast India that have been described as having tone, languages with three levels are not just common, they are the most frequently occurring type. According to Namkung (1996), 32 Tibeto-Burman languages spoken in or around Northeast India have been described as having lexical tone. Of these, the majority (20 languages) have three tonal levels.

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This contrast is illustrated with a phrasal minimal pair rather than a minimal pair of words because, in isolation, ụzu ‘our (exc.)’ carries a Mid tone.
The three tones, Low, Mid, and High, discussed so far are level tones. Pike defines a level tone as “one in which, within the limits of perception, the pitch of a syllable rise or fall during its production” (1948:5). For many productions of the Low, Mid, and High tones in Chungli, there is no perceptible rise or fall in pitch, but not for all productions. The fact that not all productions have level pitch does not mean that these tones are not level. Maddieson loosens the definition so that a level tone is “one for which a level pitch is an acceptable variant” (1978:337). For each of these three tones, a level pitch is indeed an acceptable variant, so they certainly qualify as level tones.

Just like Chungli, Mongsen has three level tones (also Low, Mid, and High). However, it is important to note that tones in Chungli do not consistently correspond tones of the same level in Mongsen. It is not difficult to find examples of cognate forms with different tones. For example, ‘daughter’ is tfala in Chungli (Mid-Mid), but tfala in Mongsen (Low-Mid), and ‘thunder’ is tsəŋmuk in Chungli (High-Low), but tsəŋmuk in Mongsen (Mid-Mid).

### 3. Type of tone language

In addition to the three level tones, Chungli has two contour tones: High-Low (Figure 2) and Low-Mid (Figure 3). Though these two contour tones occur, they are rare. Only 20 words (4.4%) in our database contain a contour tone, while nearly every word contains at least one level tone (444 words; 97.4%).

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5 There are actually no regular correspondences between tones on Chungli and Mongsen (e.g. High-Low in Chungli always corresponds to Mid-Low in Mongsen). Often words in both languages will only carry Mid tones, but this is probably just the result of the fact that Mid is by far the most frequently occurring tone in both languages.
In spite of the fact that these two contour tones occur, Chungli is a register tone language, not a contour tone language (Pike 1948). As Pike explains, contour tones sometimes occur in register tone systems, but these contour tones can generally be treated as the combination of two or more level tones in the system. So the contour

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6 Ao_MI_04Mar09_1_RR.wav; 4:57
7 Ao_MI_04Mar09_1_RR.wav; 13:28
tone will start at the pitch level of one tone and end at the pitch level of another tone in the system. In Figure 2, the falling tone can be seen as starting at the level of the High tone and ending at the level of the Low tone. In Figure 3, the rising tone can be seen as starting at the level of the Low tone and ending at the level of the Mid tone. According to Pike, in a contour tone system the beginning and endpoints of a contour tone cannot be equated with level tones in the same system.

Additional evidence for the fact that these contours are analyzable as combinations of two level tones comes from the fact that our consultant is willing to treat the two pitches levels in the contour as if they are separate tones. When pronouncing contour tones slowly, he will pronounce the syllable with two adjacent level tones, rather than one smooth contour tone, as shown in Figure 4.

Notice in Figure 4 that there are two distinct portions of the word, each with a basically level pitch. The relatively lower pitch of the first portion corresponds to the relatively lower starting pitch in Figure 3, while the relatively higher pitch of the second portion corresponds to the relatively higher ending pitch in Figure 4.

The final bit of evidence that Chungli is a register tone system comes from the fact that contour tones can cross morpheme boundaries. For example, the final syllable of the final word in the elicitation frame in (1), *tʃîmpû* ‘speaking’, has a contour tone and

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8 Ao_MI_04Mar09_1_RR.wav; 13:12
contains segments from two morphemes. *tʃîmpî* is made up of *tʃîmp* ‘speak’\(^9\) (Ao_MI_19Sep08_7_RR.wav; 6:50) and the progressive suffix -ɹ with the contour tone occurring on the syllable containing material from both the root and the suffix. According Pike (1948:8), contour tones in contour tone systems cannot be interrupted by morpheme boundaries, while contour tones in register tone systems can.

In addition to having the same number of level tones, Chungli and Mongsen are alike in that they are both register tone languages that have at least one contour tone. In the case of Mongsen, there is only one contour tone and it is exceedingly rare, even more rare than the contour tones in Chungli. In Mongsen, there is just a falling contour tone and this tone only occurs on one word, *tə* ‘and’, and one suffix, the narrative converb -ə̂ɹ.

4. **Noun/verb differences**

With 3 levels of tone, there are 9 logically possible tonal combinations in disyllables in Chungli. As shown in Table 1, two of the possible combinations are unattested in our database and the seven attested combinations are not all equally likely.

Table 1. Tonal combinations in disyllables containing only level tones (329 total)

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL</td>
<td>20</td>
<td>6.1%</td>
</tr>
<tr>
<td>LM</td>
<td>28</td>
<td>8.5%</td>
</tr>
<tr>
<td>LH</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>ML</td>
<td>8</td>
<td>2.4%</td>
</tr>
<tr>
<td>MM</td>
<td>154</td>
<td>46.8%</td>
</tr>
<tr>
<td>MH</td>
<td>5</td>
<td>1.5%</td>
</tr>
<tr>
<td>HL</td>
<td>99</td>
<td>30.1%</td>
</tr>
<tr>
<td>HM</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>HH</td>
<td>15</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

\(^9\) For the purposes of this paper, I will not worry about why the first syllable of the inflected form, *tʃîmpî*, is Mid, while the first syllable of the bare form, *tʃîmp*, is High.
In Table 1, we see that MM and HL occur far more often than any other combinations. The other five attested combinations are quite rare, especially ML and MH, which make up less than 3% and 2% of the attested disyllables, respectively.

A closer look at the data reveals that lumping nouns and verbs together, as I have done in Table 1, is misleading. This is because nouns and verbs have considerably different patterns of tonal combination in disyllables. Compare the tables in Table 2 and Table 3.

Table 2. Tonal combinations in disyllabic verbs (179 total).

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>LM</td>
<td>3</td>
<td>1.7%</td>
</tr>
<tr>
<td>LH</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>ML</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>MM</td>
<td>85</td>
<td>47.5%</td>
</tr>
<tr>
<td>MH</td>
<td>4</td>
<td>2.2%</td>
</tr>
<tr>
<td>HL</td>
<td>73</td>
<td>40.8%</td>
</tr>
<tr>
<td>HM</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>HH</td>
<td>14</td>
<td>7.8%</td>
</tr>
</tbody>
</table>

Table 3. Tonal combinations in disyllabic nouns (128 total)

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL</td>
<td>20</td>
<td>15.6%</td>
</tr>
<tr>
<td>LM</td>
<td>22</td>
<td>17.2%</td>
</tr>
<tr>
<td>LH</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>ML</td>
<td>8</td>
<td>6.3%</td>
</tr>
<tr>
<td>MM</td>
<td>59</td>
<td>46.1%</td>
</tr>
<tr>
<td>MH</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>HL</td>
<td>19</td>
<td>14.8%</td>
</tr>
<tr>
<td>HM</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>HH</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

There are two differences between tonal combination patterns found in nouns and verbs. First, there is the difference in which of the patterns are completely unattested. Among
verbs, LL and ML never occur, while there are nouns with these combinations. Also, there are no HH nouns, but there are HH verbs. The second difference between nouns and verbs is in the rates of occurrence of the patterns that are attested. In both nouns and verbs, MM is the most common pattern, accounting for a bit less than half of disyllables of each type. Beyond that similarity, nouns and verbs differ completely in terms of rates of attestation of patterns. In verbs, HL is also very common accounting for more than 40 percent of the disyllables considered. This high rate of occurrence of HL among verbs is the cause of its relatively high rate of occurrence among all disyllables. In nouns, HL is not exceptionally frequent, making up only about 15 percent of the disyllables considered. Aside from HL and MM, the attested tonal combinations in verbs are very infrequent. LM and MH together account for less than 5 percent of the disyllables considered and HH accounts for less than 8 percent. Among nouns, the less common patterns occur far more frequently. LL, LM, and HL each constitute around 15 percent of the disyllables considered, while ML, the least frequent pattern, accounts for around 6 percent. Notice that even the least frequently occurring combination among nouns is considerably more common than the two least frequently occurring patterns among verbs.

With these differences in tonal combination patterns, Chungli is yet another language that exhibits a difference between the phonology associated with nouns and verbs. Perhaps the best known case of such a difference is English stress placement (Albright 2007; Chomsky and Halle 1968:Ch. 3; Liberman and Prince 1977; Burzio 1994; Hayes 1995). In verbs, the final syllable is stressed if it has a complex coda or a complex nucleus, while the final syllable is only stressed for nouns if the nucleus is complex. Perhaps as a result of this difference, disyllabic nouns and verbs have very different rates of initial stress. Disyllabic nouns are overwhelmingly initially stressed (>90%), while disyllabic verbs only bear initial stress about 60% of the time (Berg 2000). English is not the only language for which phonological differences between nouns and verbs have been reported. Differences in stress assignment have also been reported for Spanish (Smith 2001) and the Austronesian (South Vanuatu) language Lenakel (Hayes 1995). Differences in tonal and accentual assignment have been reported in Fukuoka Japanese (Smith 1999) and the Chadic language Hausa (Newman 2000). There is also the case of tone in the Tibeto-Burman (Southern Loloish) language Mpi (Matisoff 1978; Namkung 1996). In Mpi, there are six tones. Three of these tones appear on verbs and the other three appear on nouns. As a result, nouns and verbs have distinct tone inventories.
All of the differences mentioned so far have been related to stress, accent, and tone, but these are not the only types of phonological differences between nouns and verbs that have been reported. In addition to differences in stress placement and patterns, English nouns and verbs differ in average length (in syllables) and the likelihood that the tonic vowel is front or back (Berg 2000). In the Indo-Aryan language Sinhalese, hiatus is always resolved with glide insertion in nouns, but is usually resolved with deletion in verbs (Smith 2001). In Korean, vowel hiatus is avoided with verbal inflection, but not with nominal inflection, while cluster simplification and laryngeal feature neutralization occur with nominal inflection, but not with verbal inflection (Ko 2006). In Nivkh, a language isolate spoken on Sakhalin Island and in the Russian Far East, verb-initial fricatives change to plosives following a fricative or a nasal, but noun-initial fricatives do not (Shiraishi 2004).

With such a long and relatively diverse list of languages with reported differences between the phonology of nouns and verbs, it is clear that Chungli is by no means unique in having such a difference. However, it is important to note that while a lot of languages exhibit phonological differences between nouns and verbs, each of these differences is unique. Even among the differences associated with prosody, there is a good amount of variety. While English and Spanish show differences in primary stress assignment, Lenakel’s difference is in secondary stress assignment. And although Mpi and Chungli are both Tibeto-Burman languages that exhibit differences in tone, these differences could hardly be less alike. In Mpi, nouns and verbs have completely different tonal inventories, while Chungli nouns and verbs have the same tonal inventory, but show differences in the possibilities and rates of combination of the tones in that inventory. Given the uniqueness of each language’s particular difference, it is important to note the details of each newly encountered example, so that we can get a sense of the full range of possible phonological differences between nouns and verbs, in particular, and between word classes, in general.

5. Pitch data

Maddieson (1978) claims that the more levels of tone a language has, the larger a pitch range those tones will cover. In order to determine if Chungli offers a challenge to this
potential universal, I calculated average pitch differences between Low, Mid, and High tones\textsuperscript{10}. The results of these calculations are given in Table 4.

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Mid</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chungli</td>
<td>+0</td>
<td>+21</td>
<td>+40</td>
</tr>
</tbody>
</table>

The pitch range given in Table 4 (40 Hz) is relatively large for a language with three levels of tone. It is larger than all but one of the ranges that Maddieson reports for languages with three levels of tone. Although the tones in Chungli cover a relatively large range, they do not contradict Maddieson’s claim. The three tones in Chungli occupy a larger range than the tones in the two tone languages that Maddieson reports pitch data for and a smaller range than the tones in the four tone language that Maddieson reports pitch data for.

Unlike Chungli, Mongsen’s tones cover an extremely small range for a language that with three levels of tone. Compare the relative pitches in Mongsen (Table 5) to the relative pitches in Chungli (Table 4).

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Mid</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongsen</td>
<td>+0</td>
<td>+13</td>
<td>+23</td>
</tr>
</tbody>
</table>

The pitch range indicated in Table 5 (23 Hz) is smaller than any of the ranges that Maddieson reports for languages with three levels of tone. Even though the Mongsen range is small, it still does not challenge Maddieson’s proposed universal. This is because the range covered by Mongsen’s three levels is larger than either of the ranges that Maddieson reports for languages with two tonal levels.

6. **Remaining issues**

In this paper I have not discussed tone sandhi at all. For a discussion of sandhi effects with verbal morphology see Bruhn (2009). As for other tone alternations, there appear to be very few. One lexically specific effect is found with the word tùlà ‘shirt’, which

\textsuperscript{10}See the appendix for a description of how the pitch differences were calculated.
is normally Low-Low, but is realized as Ǉulà (High-Low) following ƙo ‘my’ and ƙo ‘your’ (sg.). More investigation is needed to find out if this alternation is unique or if there are other lexically specific effects in Chungli.

Another area that warrants further research is tonally unspecified prefixes. In Mongsen, there are prefixes that simply have the same tone as the syllable that follows them (Coupe 2007). So these tonally unspecified prefixes are Low before Low tones, Mid before Mid tones, and High before High tones. One of these prefixes is the relational prefix ƙə-, which goes on body part and kinship terms. In Chungli, the tone on this prefix is not always the same as the tone on the following syllable. However, it might still be appropriate to say that it is tonally unspecified because the tone of the prefix is predictable. When ƙə- precedes a Low tone it is High, otherwise it is Mid, as shown in (5).

(5) a. tə-pʰì (RL-lap) ‘lap’
    b. tə-maŋ (RL-body) ‘body’
    c. tə-mukuk (RL-knee) ‘knee’

We can account for the behavior of the relational prefix by saying that it is tonally unspecified if we make two assumptions. First, we need to assume that syllables are assigned Mid tones by default, which seems reasonable given that Mid tones are so much more frequent than either High or Low tones. Second, we need to assume that default Mids raise to High before Low as the result of dissimilation. Alternatively, we could simply say that the relational prefix carries a Mid tone and that Mids generally raise to High before Lows. This analysis has the advantage that it could potentially account for the fact that Highs are so much more common before Lows than Mids (see Tables 1-3). However, if this analysis is appropriate, it raises the following question: Why are Mids before Lows simply rare, not completely absent? For the purposes of this paper, I will not worry about this question, or about deciding which is the appropriate analysis of the relational prefix. Regardless of how the relational prefix is analyzed, more investigation is needed to see how the other suffixes that Coupe says are tonally unspecified in Mongsen (e.g. the non-relational prefix ƙ-) behave in Chungli. Do they behave like the relational prefix in Chungli? Or do they behave like the corresponding prefixes in Mongsen?

7. Conclusion
In terms of inventory and implementation of tones, the Chungli system is unexceptional. It is quite common for tone languages to have three levels of tone, especially in Northeast India. Additionally, the pitch range covered by the three levels of tone in Chungli is no larger or smaller than would be expected based on the pitch ranges reported for other languages with three levels of tone. One way that the system is exceptional though, is in the difference exhibited by nouns and verbs in terms of tonal combinations. While it is by no means unusual for a language to show differences in the phonologies associated with nouns and verbs, the details of each difference are unique. Although, the Chungli difference is not the first reported difference associated with tone, it is the first reported difference related to possible and likely combinations of tones. For this reason, the Chungli system is significant in that it tells us a bit more about how nouns and verbs (and word classes in general) can differ from each other in terms of their associated phonology.

Appendix – Pitch measurement methodology

I measured the pitch for 65 spoken target words. 54 of these words contained at least one Low and 41 contained at least one High. All of the target words were spoken in the frame given in (1). Pitch was measured for all of the vowels in the target word and all of the syllables in the words surrounding the target word, both of which contain only Mids. For each vowel, the average pitch over the middle 50% was taken. After the average pitch was determined for each syllable, the average pitch of all syllables of the same type in an utterance (e.g. the average pitch of all Lows) was calculated. Then the difference between average pitches of Highs and Mids and of Mids and Lows was determined for each utterance. Finally, the average differences between Highs and Mids and between Mids and Lows was calculated across all utterances.

References


