On Studying Tonal Sandhi

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The following method is helpful, when the problem of sandhi appears to involve nearly all the tones, for finding out which tone sequences are stable, which are not, and what general rules apply throughout.

1. Materials:

Text recorded on tape, transcribed, in a phonemic orthography, and marked with the phonemic tones. (The phonemic tones of the words are the tones which the words have when in isolation.) Number the paragraphs and/or sentences of the text for easy reference.

A lined notebook, (Our 100 page, 7 x 8 1/2" notebooks are good.) Index the notebook by cutting the edge of the pages, with a tab for each combination of two tones. For a language with six tones there are 36 combinations. If every tab can be seen when the notebook is closed, it will speed up the recording.

2. Aim:

The aim is to record the data in a form that will facilitate analysis. Rapid recording is desirable; therefore record all the necessary data the first time, but don't spend time writing any unnecessary data.

3. Procedure:

Listen to a sentence on tape. Then mark the relative tone levels on the written text, showing whether consecutive tones have the same level or if one is higher or lower. Perhaps you will need to listen to the sentence quite a number of times; in some cases only once or twice.

Then record every sequence of two tones into the notebook, recording the following on the left page:

- paragraph and/or sentence reference number
- phonemic tone of syllables immediately preceding and following the sequence under consideration
- the two syllables of the sequence, marked with their phonemic tone
- the relative pitch of the two syllables of the sequence (not of the preceding and following syllables)

Indicate by # if in utterance initial or final position. Indicate by a comma if there is a phrase break before, after, or in the middle of the sequence.

After awhile certain patterns will be seen at a glance.
As soon as there is adequate information to make a hypothesis, write it at the top of the page at the right. If there are gaps in the data (pertinent combinations which have not yet been found) when the hypothesis is made, note these gaps underneath the statement of the hypothesis, leaving room to fill in examples of them when examples are later found. For instance, if the preceding tone affects the sequence in some way, but you haven't yet recorded the sequence after every possible preceding tone, leave a space for that at the top of the page with the hypothesis.

Continue recording all examples of the sequence on the left page as before.

It is helpful to mark exceptions to the hypothesis with another color (on the left page) so that they may be readily located later on.

It isn't necessary to fill all the gaps in the data in order to make your summary and to see the general pattern. While making the summary check the exceptions to the hypothesis, for clues as to what else effects that sequence of tones: i.e. stress, phrase break, utterance final or initial position, etc.

4. Illustration of tonal sandhi from White Thai:

1. The effect of a preceding tone 2 or 3 (moving tones):
   a. They always make 6 higher, except after phrase break.
   b. They always make 4 higher if followed by 4 or 5.
   c. They may make 1 higher than usual if followed by 1, 4, or 5.
   d. They may make 2 higher than usual if followed by 4.
That is:

1-1 may change from _____ to _____!

1-4 " " " _____!_____ " _____ or _____!

1-5 " " " _____!_____ "

5-4 " " " _____ "

5-5 " " "

2-4 " " " _____!_____ "

4-4 always changes from _____ to _____!

6-6 " " " _____ "

6-1 " " " _____!_____ to _____!

6-2 " " " _____!_____ "

6-4 " " " _____!_____ "

6-5 " " " _____!_____ "

2. Tone two is always higher than preceding tones 1,2,3,4,5,6.

3. Tone 6 is always higher than preceding 2,3 (unless after phrase break)

4. Tone 1 is always lower than preceding tones 2,4, 5.

5. Tone 6 is always lower than preceding tones 1,4, 5.

6. Tone 5 is always lower than preceding tone 2.

7. Tone 3 before or after any other tone and itself is always a low dip
   (the lowest point of the dip is always lower than the tone of the
   adjacent syllable; adjacent to tone 1, the whole contour of the 3
   is sometimes lower than the 1). The only exception to this is
   3-3, where the first 3 is level. (In context there is often not
   much of a dip on tone 3.)

8. Reasons which cause exceptions to rules: (need further study)
   a) Phrase break (see 6-3, 2-6, 6-1, 6-4, 6-5, 4-1)
   b) Stress (2-6, 4-1, 6-5, 2-4)
   c) Utterance-final position tends to raise the second member of a
      level sequence. (1-5, 2-4, 4-4, 6-6)
   d) Sequences of identical tones (3-3-3, 6-3-3, 6-6-6) and 2-2-6-2,
      4-2-6-2).

(The original form of this paper has been edited slightly in order
   to fit the Workpapers format.)