

## The Comparative Fallacy in Tone Perception Studies

Yeu-Ting Liu

During the past few decades, linguists have been striving to investigate language-specific phenomena in addition to their efforts to construct a model of language processing in general. Psycholinguistic studies have been following the same trends by employing a comparative perspective in research on spoken-language processing by human listeners. The aim of this practice is to provide a unified account pertaining to all human listeners, and is therefore valid irrespective of the language which is listened to. It is true that universal characteristics of language processing can only be accurately observed cross-linguistically. However, Bley-Vroman (1983) warned that work aimed at classifying the development or the systematicity of learners' languages can be seriously sidetracked by a comparative approach or a reliance on the target language (TL) structure. Bley-Vroman contended that the interlanguage (IL) system "is worthy of study in its own right, and should not be taken just as a degenerate form of the target system" (p. 4).

The comparative fallacy was originally defined by Bley-Vroman as "a comparison of the TL in order to study the structure of the IL" (p. 4). It must be noted that a reverse reliance on IL to study systematicity in the use of a given target language form can also potentially constitute another form of the comparative fallacy. This point is illustrated here by a study on the perception of tone by L2 learners of Chinese.

In Culter and Chen's (1997) study, native Chinese speakers and non-native Chinese speakers whose native language (NL) was not a tonal language were asked to make homophone judgments on pairs of two-character words that were presented to them acoustically. In the mismatch condition, a two-character real word was quickly followed by a two-character nonword mismatch. The mismatched nonword item was created by altering one or more components of the second character of the nonword relative to the second character of the preceding real word (onset vowel, consonant, tone, or their combination). Homophone judgments by the native Chinese subjects were less accurate and slower when the only difference between a real word and its nonword mismatch was in tone, rather than in segmental information. Culter and Chen thus came up with a tentative assumption that tone and segmental information (vowel) differ in their *temporal availability* in language processing. The tonal information is available relatively late when compared to segmental information in a task where attention to meaning is not required (e.g., a homophone judgment task). Culter and Chen then examined the validity of the above assumption (i.e., tonal activation pattern) by comparing native Chinese speakers' homophone judgments to those of the non-native speakers. The fact that the speakers with no knowledge of Chinese tone (the non-native speakers group) produced exactly the same tonal activation pattern as that produced by the native speakers led Culter and Chen to negate their tentative assumption concerning the delayed temporal availability of tonal information in response to low semantic activation.

As far as Culter and Chen's results are concerned, we do not know if the observed NL structure (tonal activation pattern) is a result of different degrees of semantic activation, for semantic activation is not manipulated (using tasks requiring high and low semantic demand).

Furthermore, we do not know if the observed parallel tonal activation pattern in the non-native Chinese group may serve as valid evidence to verify the temporal availability assumption for native Chinese speakers, because the data was collected from two independent language groups. The comparisons between these two independent groups will therefore result in incorrect analyses of the target language form under investigation (tonal activation in Chinese) and invite the comparative fallacy. A more reasonable investigation of the tonal activation in Chinese must focus on the linguistic descriptions of the native speakers' data.

Accordingly, if we are to provide linguistic descriptions of learners' language development, we must avoid *relying* on the analyses developed for describing other languages or on the grammar/pattern observed in other language groups. This is not to say that comparative accounts do not play a role in understanding the nature of learners' language or that such an approach will always obscure the nature of the IL. As the following section will show, the quest for a comparative account can best be served and prove highly informative when the focus of a study is to examine the factors, mechanisms, or processes driving the production of a given language form. In such cases, if we simply look at the IL or NL data, we will probably lose sight of the universal principles underlying the processing of a given language form. On the other hand, if we simply subscribe to a general comparative account by looking at the overall perception pattern observed in native speakers and L2 learners, we are likely to look only at the processing of universal aspects and oversimplify the multiplicity of interacting principles guiding L2 learners' perceptual processing of tone. Perhaps we need to look at both accounts in order to get a more complete picture of tone processing. This point is illustrated in the following studies examining the underlying factors driving tone perception (e.g., Sun, 1997).

Of the four main tones in Mandarin Chinese, the first tone is high, and the third tone is low. The maximum salience between these two tones allows learners to perceive their tonal contrast easily. In contrast, the phonetic similarities between second and third tones make consistent categorical distinction among them difficult (Both tones consist of a rising contour). The considerable number of incorrect identifications of the second tone and a marked tendency to conflate it with the third tone (and vice versa) has been found both in FLA (e.g., King, 1981) and SLA contexts (e.g., Sun, 1997). A comparative approach would show that both native Chinese speakers and advanced L2 learners of Chinese had the most difficulty maintaining the second-third tone contrast and made more tone 2-tone 3 substitution errors in the perception of Mandarin tones. Despite the seemingly parallel perception pattern observed in tonal L1 speakers and atonal learners of L2 Chinese, a revealing discovery regarding different sources of difficulty guiding the seemingly identical tone perception pattern can be found if we take both the comparative approach and the group-specific data (NL or IL) into consideration. Sun's (1997) study provides an excellent example for the investigation of the tone perception process by American learners of Chinese.

Sun examined the results of the previous research on L1 Chinese speakers and L2 learners' common difficulty in perceiving the tone 2-tone 3 contrast. However, Sun found that for native Chinese subjects, tone 2-tone 3 substitution in one direction was significantly greater than in the other (i.e., relatively more and persistent substitution of tone 2 with tone 3, but not vice versa). On the other hand, the substitution pattern observed in the L2 learner group was bi-directional (i.e., the proportion of substitutions in one direction was close to that in the other), and was observed in all L2 learners in the study.

Looking at both the group-specific tonal perception data (one-way vs. bi-directional tonal substitution errors) and the comparison of the group-specific data, Sun identified different sources of perceptual difficulty underlying each group's perception of tone. Specifically, a third tone in Chinese changes to a high-rising second tone (the sandhi tone) before another third tone in on-line spoken word production (*Third Tone Sandhi*). Consequently, a tone 3-tone 3 lexical string will be phonetically identical to a tone 2-tone 3 lexical string in on-line production. Thus, native Chinese speakers who have acquired a stable mental representation of tone can quickly resolve the phonetic ambiguities between **tone 2**-tone 3 and **tone 3**-tone 3 lexical strings, and categorize the tone 3 allotonic variation (the sandhi tone) as tone 3 without confusing the sandhi tone with a tone 2. As a result, fewer errors confounding tone 3 with tone 2 will be observed. However, when asked to make a homophone judgment between tone 2-tone 3 and tone 3-tone 2 lexical strings, native Chinese speakers can no longer rely on their knowledge of the third sandhi rule and tonal phonology to resolve the phonetic ambiguities between these two lexical strings. Therefore, tone 2 (or the tone 2 allotonic variation) tends to be misinterpreted as a tone 3 if it cannot be held in working memory long enough to be interpreted both phonemically and phonetically. When native Chinese speakers can hold the perceived tone long enough in working memory, a mismatch between the retrieved underlying form and the allotonic form resulting from the tone sandhi rule can be resolved by using contextual information. Since this is not possible in a perceptual task that requires immediate responses, perceptual errors and the substitution of tone 2 with tone 3 occur. In sum, native Chinese speakers' tonal perception errors are simply related to the difficulty in maintaining the perceived tones long enough to retrieve the underlying forms of the tones.

On the other hand, the bi-directional pattern, as observed in advanced L2 learners of Chinese, suggests that the problem the L2 learners have is not just in maintaining the distinctive tonal features in working memory, but also in perceiving the phonemic nature of tone due to imperfect tonal representation. Consequently, bi-directional tonal perception errors result.

Accordingly, it is not the case that all comparative studies will obscure the structure of the language under investigation. The adequacy of taking a comparative approach is determined by the nature of the study. When development of learners' language is the issue under investigation, it is more reasonable to take the structure of the IL on its own terms. However, when the focus of a study is to understand the nature of the underlying factors or processes driving a given set of IL data, as is shown by Sun's study, the whole story of tone perception processing is only clear when we look at both aspects of the collected data. This paper argues that it is not the comparative approach that ruins the validity of our description of the learner's language, but rather our reliance on such an account that results in a comparative fallacy.

## REFERENCES

- Bley-Vroman, R. (1983). The comparative fallacy in interlanguage studies: The case of systematicity. *Language Learning*, 33, 1-17.
- Culter, A., & Chen, H. C. (1995). Phonological similarity effects in Cantonese word recognition. *Proceedings of the 13<sup>th</sup> International Congress of Phonetic Sciences*, 106-109.

- Peng, S. H. (2000). Lexical versus phonological representations of Mandarin sandhi tones. In M.B. Broe and J. B. Pierrehumbert (Eds.), *Acquisition and the Lexicon: Papers in Laboratory Phonology V* (pp. 152-167). Cambridge: Cambridge University Press.
- Sun, S. H. (1997). *The development of a lexical tone phonology in American adult learners of standard Mandarin Chinese*. Unpublished doctoral dissertation, University of Hawaii at Manoa.

Yeu-Ting Liu is currently a doctoral candidate in TESOL at Teachers College, Columbia University. His research interests include phonological awareness and its relationship to literacy, and spoken/written word recognition processes for L2 learners. Yeu-Ting is currently working on his proposal: Reading Chinese as a second language: A study of near-native American learners of Chinese.