

THE PERCEPTION OF WORD JUNCTURE CHARACTERISTICS IN THREE VARIETIES OF ENGLISH

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ABSTRACT

The subtle juncture cues in traditional English can be difficult for speakers of new English varieties to perceive. This preliminary study looks at the perception of word juncture characteristics in three varieties of English, British English (BE), Hong Kong English (HKE) and Singapore English (SE), amongst British and Hong Kong listeners in order to widen our understanding of English juncture characteristics in general. We find that, even though reaction time data indicates that listeners perform quickest in the variety they are most familiar with, not only are juncture differences in BE difficult for Hong Kong listeners to perceive, they are also the most difficult for British listeners. Juncture characteristics in HKE are the easiest to distinguish among the three varieties.

Keywords: juncture, perception, Hong Kong English, Singapore English, British English

1. INTRODUCTION

This study investigates the perception of juncture characteristics in three varieties of English: HKE, SE and BE. Juncture refers to ‘any phonetic feature whose presence signals the existence of a grammatical boundary’ [14]. In more general terms, it means the boundary between two syllables, e.g. *great eyes* versus *gray ties* (both phrases have the same phonemic representation, /greɪtaɪz/, but different word boundaries). Understanding connected speech demands that the listener identifies where words begin and end, but in fluent speech there is no obligatory gap between words to signal this information. However, people are usually able to understand speech and discern individual words using a combination of contextual information and subtle cues in the speech signal. Studies on juncture characteristics in traditional native varieties of English (e.g. British or American English) abound, but virtually no work has been done on new varieties of English in East Asia. This study compares the perception of

juncture boundaries in two new East Asian English varieties (HKE and SE) with a traditional one (BE) to investigate the perceptual differences in these accents.

1.1. Juncture characteristics

The seminal work on the production and perception of acoustic juncture cues in English was conducted by Lehiste [6]. She studied 25 pairs of words or phrases that are phonemically the same but have different juncture characteristics, e.g. *nitrate* versus *night-rate* (both phonemically /naɪtret/), and found that listeners could identify them correctly because there are different juncture cues to signal where the syllable boundaries fall. For instance, the /r/ in *night-rate* is voiced but it is almost completely devoiced in *nitrate*. She concluded that there are regular juncture characteristics correlating with word/syllable boundaries. Since then, many studies on the production and perception of juncture cues have been conducted in both English (e.g. [2, 8]) and other languages, for example, Swedish [4], French [10] Dutch [9]. Increasing amounts of research shows that fine phonetic detail like that found in juncture cues is systematic and provides useful linguistic information for the listeners (e.g. [5]).

Many acoustic juncture cues have been identified by the studies mentioned above. For example, laryngealisation before initial vowels, variation in segmental duration, final lengthening, allophonic variations, and differences in formant transitions. However, not all of these phonetic properties are employed equally by listeners in determining syllable boundaries. For instance, the presence or absence of formant transitions in synthetic speech does not significantly affect listeners’ judgment of syllable boundaries in English [2]. Therefore, in any study on the production of juncture, it is important to collect data on juncture perception.

The subtle juncture cues in traditional English can be difficult for speakers of new English varieties to perceive. A literature search suggests that there is virtually no study investigating the production and perception of juncture in new varieties of English. This study aims to fill this gap and to widen our understanding of English juncture characteristics in general.

1.2. Hong Kong and Singapore Englishes

The phonology of English spoken in Hong Kong as a new emerging variety only began to receive attention recently (e.g., see the bibliography compiled in [13]), as HKE still lacked an independent identity in the early eighties [7]. By comparison, studies on SE phonetics and phonology abound (e.g., see the bibliography compiled in [1]), as SE has been recognised as an established new variety of English. Both HKE and SE are heavily influenced by Chinese languages. Comparing juncture characteristics in two varieties with a similar linguistic background but different sociolinguistic status (emerging vs established) can provide new insights into both varieties. For example, Deterding, Wong and Kirkpatrick [3] found that, although HKE shares many phonological features with SE, it also contains features found only in BE but not in other Englishes in South-East Asia. They attributed such differences to the different developmental stages of the two English varieties. Therefore, it is quite possible that differences in juncture characteristics can also be found in the two varieties.

1.3. The present study

Our study investigates both the production and perception of juncture characteristics in HKE, SE and (Southern Standard) BE, but only preliminary perception data will be reported in this paper. It is hypothesized that juncture boundaries in BE will be most difficult to distinguish for listeners in all three varieties because of the subtle cues and greater linking between word boundaries reported in previous literature, but it is unclear whether HKE and SE differ in clarity of juncture boundaries. Also, Hong Kong and Singapore listeners may find juncture boundaries in their own variety easier to distinguish than the other variety, while it is unclear whether there is any difference between the two varieties for British listeners.

2. METHOD

2.1. Subjects

25 listeners for each variety were recruited in Reading, Hong Kong and Singapore respectively, altogether 75 subjects. However, only data from the British and Hong Kong listeners are reported in the present study as the Singapore data is still under analysis. Subjects were all university students with no speech or language impairment. The British listeners were all monolingual native English speakers. Some of them had limited exposure to foreign languages. The Hong Kong and Singapore listeners had not lived in an English-speaking country before, and had received all of their education in these two places respectively. Their accents are typical of the varieties they represent. The Hong Kong and Singapore subjects were paid to participate in the perception experiment, whereas the British subjects participated in the experiment as part of the optional module *English in the World* on their degree course.

2.2. Materials

24 juncture boundary pairs adapted from lists used in previous research [6, 11] were used in this study. 20 pairs involve a single consonant at the juncture boundaries (e.g. *wipe ink* vs *why pink*) while 4 pairs involve a consonant cluster (e.g. *my train* vs *might rain*). A female speaker of each English variety was recorded several times reading the 24 juncture pairs in a carrier phrase ‘HE writes _____.’ with emphatic stress falling on the word ‘He’ in order to minimize stress difference between the two target words in the juncture pairs. Subsequent careful auditory inspection was carried out to select the tokens with comparable degree of stress. These pairs were excised from the carrier phrase for the perception experiment.

2.3. Procedure

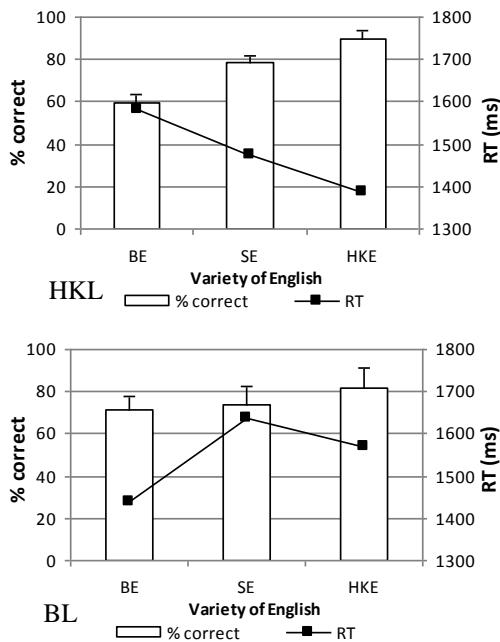
The perception experiment is an identification task carried out using the software DMDX with a laptop or desktop computer tracking both accuracy and reaction time (RT) data. The subjects heard a recording (e.g. *wipe ink*) and saw two sequences on the screen (e.g. *wipe ink why pink*). They made a decision by pressing the ‘z’ key for the sequence on the left of the screen or the ‘m’ key for the sequence on the right. The positions of the target sequences were counterbalanced. The reaction

time is tracked from the beginning of the sound file, and the time-out time was 8000 ms. Before the actual experiment, a practice session with 10 initial juncture pairs was given. The experiment was divided into three sections (one section for each variety), and each section was divided into four blocks. Rests were given between sections and between blocks. 96 tokens (24 pairs \times 2 target sequences \times 2 positions) were used for each variety, with 288 tokens (96 tokens \times 3 varieties) in total for the perception experiment. The tokens were randomized within blocks for each subject.

3. RESULTS

Figure 1 shows the average percentages of correct identification in the three varieties and the reaction times (RT) for Hong Kong and British listeners respectively. Both sets of listeners scored best on HKE, followed by SE, with BE as the most difficult variety. One-way ANOVAs and post hoc bonferroni tests (details not reported) confirm that the differences between varieties are all significant for Hong Kong listeners ($p < 0.05$), while British listeners only scored significantly better in HKE ($p < 0.05$) than the other two varieties. Although the RT data show that the listeners responded the quickest in their own variety, there is no significant difference in RT among varieties for either group of listeners.

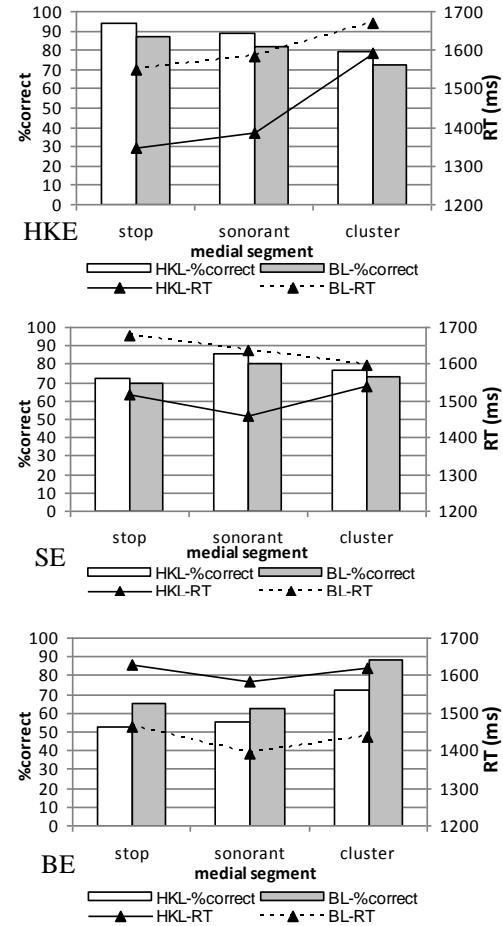
Figure 1: Percentage of correct identification and reaction time for the three English varieties by Hong Kong listeners (HKL, upper panel) and British listeners (BL, lower panel).



The British listeners outperformed the Hong Kong listeners on the BE task [$t(48) = -8.021$, $p < 0.001$], but the Hong Kong listeners outperformed the British listeners on both the HKE [$t(48) = 3.88$, $p < 0.001$] and SE [$t(48) = 2.374$, $p = 0.022$] tasks, and performed best overall on the HKE task, with 90% average correct. No subject scored lower than 51% on any one task.

In addition to the overall patterns, we also looked at the difficulty posed by different types of medial segments: stops (e.g. *key part* vs *keep art*), sonorants (e.g. *hoe maker* vs *home acre*) and clusters (e.g. *keep sticking* vs *keeps ticking*). Figure 2 gives the data in the three varieties.

Figure 2: Percentage of correct identification and RT for different medial consonants by the Hong Kong listeners (HKL) and British listeners (BL) in HKE (upper panel), SE (middle panel) and BE (lower panel).



It is interesting to note that the patterns of difficulty are remarkably similar for each of the listener groups across the three varieties; in HKE it is easiest to discriminate pairs with medial stops followed by sonorants followed by clusters,

whereas for BE the pattern is reversed, and in SE sonorants are easiest, followed by clusters, then stops. The Hong Kong listeners significantly outperform the British listeners in HKE in both accuracy and RT, whereas the British listeners did significantly better in BE in both accuracy and RT. Interestingly, the two groups of listeners do not differ significantly for SE in either accuracy or RT. The above differences are not confounded by the speech rates of the materials in the three varieties (details not reported here due to page limit).

4. DISCUSSION

We hypothesized that juncture boundaries in BE would be the most difficult for listeners in all three varieties. From these data, which are from Hong Kong and British listeners only, it can be said that this is true. We also hypothesized that Hong Kong and Singapore listeners may find juncture boundaries in their own variety easier to distinguish than in the other varieties, with no clear prediction for the British listeners. These data confirm that the Hong Kong listeners perform best on average on the HKE pairs, followed by the SE pairs and finally the BE pairs, and that their average reaction times match in terms of accuracy of response. The British listeners, however, performed worst on their own variety and best on HKE.

This leads us to conclude that, in terms of reaction time, accent background plays a part, as the listeners reacted more quickly to their own accent, if not (in the case of British listeners) more accurately. In addition, Hong Kong listeners outperformed the British listeners on both HKE and SE, which is probably because Hong Kong listeners were more familiar with accents with a strong Chinese influence. It will be interesting to see if Singapore listeners also outperform the British listeners on these two varieties.

Where juncture cues are concerned, HKE appears to have the most obvious ones, as this is the variety in which both sets of listeners performed best. However, it is interesting to note that the British listeners perform a full 15 percentage points better on BE pairs containing clusters at the juncture than their Hong Kong counterparts; we suggest that this may be because British listeners are more familiar with the subtle cues in clusters than the Hong Kong listeners, as clusters occur less frequently in HKE [12]. Nevertheless, the Hong Kong listeners still perform the best with clusters in BE. It is possible

that simply more juncture cues are contained in clusters than singleton pairs. Besides this, it is interesting to find that different types of medial segments posed varying difficulty in juncture perception in the three varieties. It will be useful to compare the perceptual differences with production data to explore what contributes to such differences in our future analysis.

Possibly the most heartening result from the study so far is that all subjects performed at above 50% correct in the identification of juncture pairs. This bodes well for international communication amongst speakers of these varieties of English.

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