

The alveolar fricative [s] in Mandarin ESL production

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Most studies on English-as-a-second-language (ESL) fricatives have focused on the interdental (Brannen, 2002; Brown, 1993; Chang & Rau, 2004; Dubois & Horvath, 1999; Deterding, Wong & Kirkpatrick, 2008; Gonet and Pietron , 2006; Hanul kov & Weber, 2010; Rau, Chang & Tarone, 2009; Schmidt, 1987; Smith, 1997; Wong & Kirkpatrick, 2008; Wong, 2005; Wu & Lin, 2018, to name a few). The underlying assumption appears to be that those other fricatives, such as the alveolar fricative [s] which has an equivalent counter part in the L1s, do not pose an acquisition problem. While it may be true that the interdental account for much of the fricative-induced English accent by non-native speakers, other English fricatives may be just as problematic even when they do have “(near) equivalent counterparts” in the L1s. Indeed, according to Speech Learning Model (Flege, 2005), if the difference is minute between a pair of L1-L2 counterpart segments, chances are that the L2 segment is not going to be learned. In this study, we conducted an experiment on the ESL fricative [s] produced by speakers of Mandarin which has an equivalent [s]. The goal was to see 1) if the ESL [s] is not produced the same as the native English [s], contributing therefore to the Mandarin speakers’ ESL accent, and 2) if it is not, whether the difference is due to L1 influence.

An experiment was conducted. Eleven Mandarin ESL speakers (7 male and 4 female) and a control group of 3 native English speakers (1 male and 2 female) were recruited. Their production of single CV syllables with [s] onset in three vowel environments [i, a, u] in both real and pseudo words was recorded. Among the stimuli were both English and Chinese words. The English words were read by both the Mandarin and English speakers while the Chinese words by Mandarin speakers only. Acoustic analysis was done on the recordings with the speech software Praat. The fricative [s] was segmented out of the syllable and measured on friction duration (FD) and center of gravity (CoG) averaged over the central three of five equally-spaced locations over the duration.

The results show that the average CoG of the native English [s] was consistently higher than the [s]s of the Mandarin ESL and the native Mandarin in all environments and word types. Looking more closely, vowel environment was found to play a role in one context—significant difference was found between the CoG values of native English and ESL [s]s in the [su] environment in pseudo word production ($p=0.021$). Like CoG, the mean FD of the native English speaking [s] was found consistently larger than that of either the Mandarin ESL or the native Mandarin [s]s in all environments and word types. Significant difference was also found between native English [s] and ESL [s] for friction duration in real word production ($p=0.008$). Other significant differences concerning FD were found when the vowel context and the type of words were factored in. In [a] context, significant difference is found among the three groups in pseudo word ($p=0.019$) as well as real word production ($p=0.048$). In [u] context, significant difference is found between the native English and the ESL [s]s in real word production ($p=0.034$).

The differences in both FD and CoG between the native and non-native English speakers are interpreted as that the ESL [s] is not identical to the native English [s] and is thus a contributing factor to the ESL accent of the Mandarin speakers. A high correlation has been found between the FD and CoG values of the ESL and the native Mandarin production, clearly implicating L1 transfer.

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