Co-articulation of native and non-native clusters: is there evidence for a universally unmarked pattern?

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Clusters of consonants are produced with a degree of overlap that differs between languages. Zsiga (2000, 2003) found that Russian speakers transfer their native pattern of low overlap to English, but also that English speakers produce Russian ones with the Russian pattern of low overlap, i.e. departing from the English high overlap pattern. The unbalance in transfer suggests that the low overlap pattern might be easier. Possible acoustic consequences of low overlap are an audible release of the first consonant, enhancing identifiability of this consonant, but also a schwa-like sound (ə) between consonants, which could make the cluster sound like two consonants separated by a vowel (although Davidson (2005, 2006) showed that a transitional schwa differs phonetically from a lexical one). To study whether low overlap is easier to produce and not harder to perceive, we recorded speakers with different native timing patterns using articulography (EMA).

Eight German and ten Georgian speakers repeated clusters produced by one of two audio models, one a native speaker of Georgian and the other of German. German participants did not speak Georgian; Georgian speakers had acquired German as a second language. Georgian is a low overlap difference with subtle differences between clusters (Chitoran, Goldstein, & Byrd, 2002), German has higher overlap. We presents data on imitations of /bl/, /gl/, /kl/, /gn/ and /kn/, all occurring in both languages. Subsequently, we compared the native and non-native imitations on consonant overlap, calculated as the constriction of the first consonant 'free' of the second gesture (lower values mean more overlap and values above 100% indicate no overlap and likely an audible schwa-like transition).

The Georgian model produced the clusters with lower overlap than the German model, generally with more than 100% of the first consonant being 'free'. Speakers also show lower overlap when imitating the German model ($B = 35.6, t(853.4) = 7.7, p < 0.001$***). However, this effect is smaller for Georgian speakers (interaction native × target language $B = -33.0, t(853.4) = -3.6, p < 0.001$***). The German speakers are reproducing the overlap difference between the models, while Georgian speakers do this to lesser extent, but they are better at more fine-grained differences between clusters. The Germans do not show these differences and therefore differ significantly from the model for /bg/ and /dg/ ($B = 27.5$, $t(301) = 3.2$, $p = 0.002$**). Georgian speakers imitate those clusters with more overlap than the Germans ($B = -61.3$, $t(301) = -5.1$, $p < 0.001$***). Georgians also produce more overlap than the model ($B = -46.30$, $t(17) = -3.51$, $p = 0.002$**). Nevertheless, Georgians show the same fine-grained differences between clusters as the audio model.

Lower overlap does not seem to be easier across the board. Georgian participants seem to use one pattern per cluster, without reference to the two timing patterns of the models, but not as little overlap as the Georgian model. On the other hand, German participants approach the models' overlap, copying the Georgian model with values near 100%, suggesting a role for either the audible release of the first consonant or the transitional schwa.

References

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