The pronounceability of Polish CC consonant clusters by native speakers of English – the role of sonority

Marek Radomski (e-mail: marek.radomski@umcs.pl)
Maria Curie-Skłodowska University in Lublin, Poland

When foreign words are borrowed by speakers of some language, they usually undergo a set of phonetic and/or phonological modifications in the process called loanword adaptation. The most frequent repair strategies in phonotactic loan nativisation, i.e. processes applied in order to bring non-native phonotactic structures into conformity with native phonology, are vowel epenthesis, consonant deletion and feature change. However, as pointed out by Kang (2011), while certain foreign items are invariably repaired, others enter the target language unadapted, a phenomenon called differential importation. To put it differently, given two foreign structures, one is allowed in the target language, whereas the other one undergoes consistent adaptation.

In this paper we focus on a similar phenomenon in online loanword adaptation (that is, in loanwords adapted in real time, here and now), namely the pronounceability of foreign structures, i.e. the relative ease or difficulty of imitating particular non-native sounds or sound sequences. In particular, we investigate how easy or difficult it is for native speakers of English to imitate Polish word-initial and word-final CC consonant sequences which are disallowed in their native language. To this end, we have conducted an experiment in which 30 native speakers of Standard Southern British English reproduced a set of Polish words containing initial and final CC consonant clusters unattested in English. The results of the experiment show considerable variation in the rates of successful reproduction of the structures under discussion. On the one hand, there are clusters which pose very little or no difficulty to native speakers of English, e.g. initial /ʂp/, /ɕp/, /ɕl/ and /tl/. On the other hand, certain CC sequences, such as initial /rt/, /wg/, /lv/ and /ln/, are clearly unpronounceable.

The main goal of the paper is to determine whether the sonority distance between C_1 and C_2 is a relevant factor which affects the ease or difficulty of cluster reproduction. More specifically, we attempt to establish if the sequences conforming to the Sonority Sequencing Principle (SSP) (Selkirk 1984) are easier to imitate than those violating this generalization. Another objective is to verify claims made by Davidson (2001) and Haunz (2007) who argue that sonority has no significant influence on the rate of successful reproduction of a cluster. In addition, we also briefly examine the role of other potentially relevant factors for targetlike realization of consonant clusters, such as the relative markedness of feature values in C_1 and C_2, especially those encoding voicing and the place of articulation.

We argue that the sonority profile of a CC sequence can be regarded as a global predictor of its successful imitation. The mean rate of targetlike responses for clusters consistent with the SSP is considerably higher than for those which violate this principle. This is true for clusters in word-initial (50.4% vs. 21.7% of targetlike responses) as well as in word-final position (68.2% vs. 39.3% of targetlike responses). The results of a t-test show that both differences are statistically significant ($p < 0.01$). In this respect, the results of our experiment run counter to similar studies, such as Haunz (2007) and Davidson (2001). We demonstrate that the apparent lack of impact of sonority in these studies is a consequence of the limited set of experimental stimuli.

In addition, we briefly describe other potentially relevant factors for targetlike realization of consonant clusters, such as the relative markedness of feature values in C_1 and C_2, especially those encoding voicing and the place of articulation. Our results reveal a general tendency for CC sequences where C_1 and/or C_2 contain an unmarked value of a given feature to be reproduced targetlike more frequently. As far as voicing is concerned, given the assumption that voiceless obstruents are unmarked with regard to voiced obstruents (e.g. Lombardi 1991), it might be predicted that CC clusters with the former will be successfully imitated more frequently than those with the latter, all else being equal. Our experimental results generally confirm this prediction. For instance, the mean rate of targetlike responses for initial voiceless obstruent + obstruent sequences is 57.6%, whereas for voiced ones 31.8% (the difference is statistically significant at $p < 0.01$). Similarly, initial obstruent + sonorant clusters with a voiceless C_1 are easier to imitate (53.3% targetlike) than those with a voiced C_1 (33.3% targetlike).

Another relevant factor is the place of articulation of C_1 and/or C_2. The results of our experiment exhibit a general tendency for CC sequences composed of segments with marked place feature values (i.e. non-coronal) to be reproduced targetlike less frequently than those with unmarked specifications, all else being equal. On the whole, the more marked feature values (encoding voicing and the place of articulation) a given segment in a cluster has, the less likely it is for this sequence to be imitated successfully. This relationship can be illustrated with a pattern of targetlike responses for initial plosive + plosive clusters below.

cluster	% targetlike	marked features
/#pt/	60%	labial C_1
/#db/	40%	labial C_2 + voiced C_1 and C_2
/#gb/	13.3%	dorsal C_1 + labial C_2 + voiced C_1 and C_2

Since the clusters under discussion are identical in terms of sonority (SD = 0), this factor cannot account for the differences between them in the rate of targetlike reproduction. These differences can be explained by reference to the relative markedness of the feature values of C_1 and C_2. Thus, /#pt/ is the easiest one because the only marked feature value is labiality in C_1. The cluster /#db/ is more difficult than /#pt/ due to its increased markedness incurred by the presence of voicing in both C_1 and C_2 as well as labiality in C_2. Finally, /#gb/ is the most difficult, because it has all the marked features of /#db/ plus dorsal C_1.

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