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Filtering out place assimilations in perception II: Length does matter

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Place assimilations contribute to the invariance problem in speech perception. Assimilated utterances as the Dutch word *tuin* ('garden') must be recognised even in the assimilated form as in *tuimbank* ('garden bench'). Gaskell and Marslen-Wilson (e.g., 1998) proposed a mechanism that handles this problem at an abstract phonological level. In contrast to this proposal, we (Mitterer & Blomert, 2002) provided evidence that the filter mechanism may be more aptly described as working at early, acoustic-phonetic stages of processing.

One difference between a phonological and an acoustic-phonetic filter is their sensitivity to subphonetic variations: An abstract phonological filter is not sensitive to subphonetic variations. Therefore, we manipulated the length of word-final nasals and used these tokens in a two-alternative forced-choice task (2AFC). Listeners tended to perceive a short /m/ followed by /b/ as an /n/ while showing veridical perception of place of articulation with longer /m/s. This result indicates that filtering may not be based on an abstract phonological code—then length should not matter—but also indicates how speakers might convey the place distinction for word-final nasals: An intended /m/ before /b/ as in the Dutch word /zʊɛmbɑd/ ('swimming pool') may have a longer duration than an assimilated /m/ as in /tœynbɑnk/ → [tœymbɑnk] ('garden bench'). This was confirmed using the spontaneous speech corpus collected by Ernestus (2000). Tokens from this corpus were then used in a 2AFC task. Results showed that intended labial nasals are less susceptible to (false) filtering—hearing *gun* in *gum bargain*—than assimilated coronal nasals.

In summary, these data suggest that place assimilation does not wipe out place distinctions. Instead, there might be sub-phonetic differences between labial nasals which become labial due to assimilation and labial nasals that are labial in the underlying form. These cues can be used by the listeners in order to distinguish an intended /m/ from an assimilated /m/. The existence and use of such cues provides strong evidence for the assumption of early, acoustic-phonetic context sensitivity that filters out the consequences of place assimilation in perception.

Gaskell, G., and Marslen-Wilson, W.D. (1998) Mechanisms of phonological inference in speech perception. *Journal of Experimental Psychology: Human Perception and Performance 24,* 380-396.

Ernestus, M. (2000) *Voice assimilation and segment reduction in Dutch.* Utrecht, The Netherlands: Landelijke Onderzoeksschool Taalwetenschap.

Mitterer, H. and Blomert, L. (2002) Filtering out place assimilations in perception I: Context-sensitivity at an acoustic/phonetic level. Presented at TIPS 2002, Aix-en-Provence, France. (This volume.)