

## **The contribution of acoustic and phonemic factors to native and non-native consonant identification in noise**

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The difficulty of spoken communication in a non-native language is compounded by the presence of everyday noise, even for speakers who consider themselves fluent. However, native speech perception also suffers in adverse conditions, presumably because listeners have difficulty in segregating the target talker from the background. Consequently, both low-level acoustic and higher-level linguistic factors might contribute to the frequently-observed difference in performance between natives and non-natives in noise [1,2,3]. Differential identification rates in clean conditions between natives and non-natives can be attributed to less well-developed phonemic categories in non-natives. A recent paper by Cutler et al [3] comparing Dutch and English listeners' identification of English VCVs in three levels of babble noise concluded that the effects of language background and noise did not interact, suggesting that natives and non-natives were equally affected by the noisy acoustics.

In this paper, we compare 61 Spanish and 21 English listeners' identification of a subset of the English consonants presented in a constant vowel context in clean and in 3 backgrounds: speech-shaped noise, a competing English talker, and a competing Spanish talker. Speech-shaped noise and competing talkers were chosen since they provide differing amounts of energetic and informational masking [4]. In common with previous studies, we find that Spanish listeners perform at a lower level than English listeners in clean and in all noise conditions. However, unlike [3], we find a significant interaction between noise type and listener background. This interaction is maintained when the Spanish listeners are divided into 3 groups based on proficiency in clean conditions. We also find a small but significant effect of informational masking for English listeners but no effect for Spanish listeners, probably because the latter group were familiar with the non-native language. Our results suggest that both acoustic and phonemic factors contribute to the difficulty experienced by non-native listeners in noise.

## References

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