The influence of musical abilities on the processing of contrastive focus prosody in an L2: An eye-tracking study

Nelleke Jansen[1,2], Hanneke Loerts[1], Eleanor Harding[2], Deniz Başkent[2], Wander Lowie[1]

[1]Department of Applied Linguistics, Center for Language and Cognition, Faculty of Arts, University of Groningen, Oude Kijk in 't Jatstraat 26, 9712 EK Groningen, The Netherlands
[2]Department of Otorhinolaryngology/Head and Neck Surgery, University Medical Center Groningen, University of Groningen, Hanzeplein 1, 9713 GZ Groningen, The Netherlands

In Dutch and English, contrastive focus is marked by a pitch accent, and native listeners use this cue in perception to anticipate upcoming information (Mulders & Szendrői, 2016; Perdomo & Kaan, 2021). However, eye-tracking evidence suggests Dutch adults have difficulty with using prosodic cues for anticipation in English (Ge et al., 2021), possibly due to small differences between Dutch and English focus cues and a higher demand on processing resources in L2 perception. Prosody perception abilities have been associated with individual differences in musical abilities (see Jansen et al., 2022). We investigated whether musical abilities influenced the processing of contrastive focus prosody by 45 Dutch adult L2 English users, using a visual-world eye-tracking paradigm. Participants listened to sentences with the particle *only*, which associates with the direct or indirect object that receives a focus accent, e.g. *I only gave a SPOON to the girl. I didn't give a FORK to the girl*. Meanwhile, they viewed pictures showing objects and characters mentioned. We investigated to what extent participants anticipated the focus alternative (*fork*) in the second clause, indicating they had correctly interpreted the accented word (*spoon*) as the contrasted element. We analysed anticipatory fixations and tested the influence of musical abilities based on the Short-PROMS (Zentner & Strauss, 2017). We hypothesised that L2 listeners with higher scores would show more anticipatory fixations on the focus alternative and fewer on the competitor image. Initial analyses using linear regression models support our hypotheses, indicating that individuals with stronger musical abilities show a faster interpretation of focus-marking pitch accents during L2 speech processing. These findings suggest that having stronger perceptual resources underlying both music and speech processing (e.g., Patel, 2011) can even influence prosody-to-meaning mapping in an L2.

References

Ge, H., Mulders, I., Kang, X., Chen, A., & Yip, V. (2021). Processing focus in native and non-native speakers of English: An eye-tracking study in the visual world paradigm. *Applied Psycholinguistics*, *42*(4), 1057-1088.

Jansen, N., Harding, E., Loerts, H., Başkent, D., & Lowie, W. (2022). The relation between musical ability and sentence-level intonation perception: A meta-analysis comparing L1 and non-native listening. In *Proc. Speech Prosody 2022* (pp. 713-717).

Mulders, I., & Szendrői, K. (2016). Early association of prosodic focus with *alleen* 'only': Evidence from eye movements in the visual-world paradigm. *Frontiers in Psychology*, *7*, 150.

Patel, A. D. (2011). Why would musical training benefit the neural encoding of speech? The OPERA hypothesis. *Frontiers in Psychology*, *2*, 142.

Perdomo, M., & Kaan, E. (2021). Prosodic cues in second-language speech processing: A visual world eye-tracking study. *Second Language Research, 37*(2), 349–375.

Zentner, M., & Strauss, H. (2017). Assessing musical ability quickly and objectively: Development and validation of the Short-PROMS and the Mini-PROMS. *Annals of the New York Academy of Sciences*, *1400*(1), 33-45.