The timecourse of toddlers' recognition for native-accented vs. non-native-accented speech

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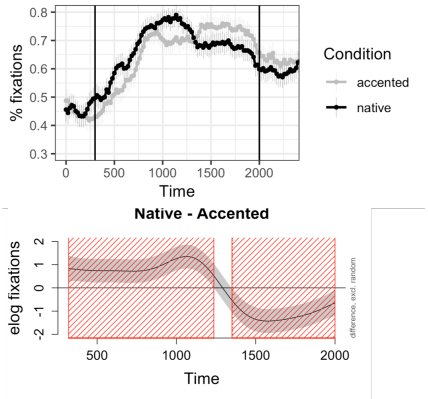
Learning words can be challenging, given how phonetic cues vary across speakers and different rates of speech. Furthermore, in multilingual contexts, children are exposed to a variety of accents. How children cope with accent variability during word recognition is still being discovered. For instance, word recognition is impacted when toddlers are asked to recognize words in an unfamiliar accent; however, the full development of these abilities is still unknown. Using a preferential looking study, we investigated word recognition in toddlers aged 18 to 30 months, while varying speaker accent (native-accented vs. non-native accented). We performed a statistical timecourse analysis to investigate at what point in real time toddlers recognize targets in native-accented and non-native-accented speech.

To date, 22 Canadian-English monolingual toddlers have been tested (M = 23.5 months old). Children heard a target, "e.g., Look at the cat" while being presented with images of a (target) *cat* and a (distractor) *duck*. All stimuli were presented in English: 8 targets in a native Canadian-English accent, and 8 in a non-native Canadian-French accent. We compiled fixations to targets in 20-ms time bins, and evaluated the impact of speaker accent (native accent VS. non-native accent) on fixation patterns using Generalized Additive Mixed-Effects Models (GAMMs). GAMMs enable one to model nonlinear curves through time, such as eye tracking data, considering and correcting for auto-correlation of time series.

We examined proportions of fixations to each image as well as the difference curve of interest using a GAMM, i.e., differences in fixations to the target in the native (black curve in the upper graph) minus non-native (grey curve) condition. In the lower figure, red areas represent significantly higher fixations to the target in the native condition (> 0), and significantly higher fixations to the target in the nonnative condition (< 0). The time window of analysis included fixations that occurred between 300 ms (considering the eye movement planning delay) and 2000 ms after target onset.



The raw fixation curves (upper graph) and results of the timecourse statistical analysis (lower graph) indicate that at the beginning of the trial (between 300 and 1250 ms), toddlers fixated to the target significantly more in the native accent condition. However, between 1350 and 2000 ms, toddlers fixated significantly more to the target in the non-native accent. In both speech conditions, toddlers were able to recognize the target; however, toddlers were faster at directing their gaze to the target in native accent vs. non-native accent.

By using a timecourse analysis, we found that toddlers were faster at reaching maximum fixations to the target when words were pronounced in a native-English accent than when they were French-accented. Toddlers also fixated on correct targets in the non-native accent with high accuracy. This indicates that lexical access is not fully compromised by non-native speaker accent. However, speed of lexical access depended on speaker accent. Ongoing data collection includes English monolinguals who are regularly exposed to Canadian-French-accented speech vs. other accented speech (e.g., Russian, Polish, Mandarin), in order to investigate the effect of accent exposure on word recognition. We expect this research to provide a more detailed picture of word processing abilities through development, in a variety of populations and acquisition contexts.