Infants’ use of phonological detail during foreign-accented word recognition

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Spoken language is replete with speaker-related variability. The pronunciation of words, for instance, can vary tremendously between accents. Although interacting with speakers from different language backgrounds typically entails additional processing demands, adults nonetheless recover fairly quickly and are swiftly able to contend with accents they have never heard before (Clarke & Garrett, 2004). Infants, by contrast, initially appear unable to recognize known words spoken in unfamiliar accents (Cristia et al., 2012). It is not until the months preceding their second birthday that children learn to cope with this type of deviation from their standard (Best et al., 2009; Mulak et al., 2013; Van Heugten & Johnson, 2014).

What could drive this developmental change? Some have proposed that infants recognize accented words by loosening their criteria for what counts as an acceptable pronunciation of a word (e.g., Schmale et al., 2012). Such a hypothesis predicts that children should be relatively insensitive to mispronunciations of familiar words spoken in unfamiliar accents. Others have argued that infants deal with accent variation by forming more precise signal-to-word mappings that are specific to the accent at hand (cf. Van Heugten & Johnson, 2014; White & Aslin, 2011). According to this latter view, children should detect mispronunciations of familiar words even when they are spoken in unfamiliar accents.

Here, we start addressing these two possibilities by testing English learners’ recognition of words, nonwords, and mispronunciations, all produced in a French accent. A foreign rather than a regional accent was used in this work to evaluate whether past findings using native English speakers of different dialects (Best et al., 2009; Mulak et al., 2013; Van der Feest & Johnson, in press; Van Heugten & Johnson, 2014; Van Heugten, Krieger, & Johnson, 2015) can be generalized to pronunciations produced by non-native speakers. For this reason, we first established, in Experiment 1, when children learn to recognize words produced by our French-accented speaker. Experiment 2 subsequently tested children on mispronounced versions of these words.

Using the Headturn Preference Procedure, monolingual Canadian-English-learning 15-, 18-, and 22-month-olds in Experiment 1 were presented, on separate trials, with lists containing known words (e.g., bottle, kiss) and lists containing nonsense words (e.g., bocky, lath) in a Parisian French accent. Word lists started playing once the child oriented towards a flashing light on one of their sides and continued playing until the child looked away for longer than two seconds. Word recognition in this procedure is observed by greater interest in (i.e., longer listening times for) known over nonsense words (Hallé & De Boysson-Bardies, 1994; Swingley, 2005; Vihman, Nakai, DePaolis, & Hallé, 2004). In line with previous studies using regional accents (Best et al., 2009; Van Heugten & Johnson, 2014), only the two older age groups demonstrated this preference (both ps < .035; see Figure 1). Thus, at least for the French accent used here, children learn to contend with foreign and regional accents around the same time, reinforcing the notion that the ability to recognize accented words becomes robust around age two.

Having established when infants learn to cope with our accented speaker, we then examined the specificity of foreign-accented word recognition. In Experiment 2, we thus tested Canadian infants’ sensitivity to vowel mispronunciations in French-accented English. That is, infants’ interest in known word forms (e.g., bottle, kiss) was compared to their interest in mispronounced versions of these items (e.g., bittle, koss). Both 18- and 22-month-olds showed longer listening times for the correct pronunciations over the mispronounced words (both ps < .05; see Figure 1), and no differences were observed between the two age groups. This suggests that children have not simply become tolerant of all vowel deviations when listening to accented speech. These results are consistent with the view that in the face of foreign accents, infants rapidly create signal-to-word mappings between the novel and their native accent, allowing them to recognize the accented words. Although the alternative—that infants relax their acceptance criteria for word access—cannot be fully ruled out, any loosening would have to be limited to small acoustic-phonetic changes. Future work should test whether such a relatively narrow relaxing strategy would be feasible. Nonetheless, irrespective of the outcome, the current experiments show that infants’ word recognition is simultaneously flexible and specific.
Figure 1: Orientation time in seconds (error bars indicate standard errors of the mean difference scores) to known and nonsense words in Experiment 1 and to known and mispronounced words in Experiment 2.

References


