# Difficulty in capturing a stable perception-production link in children

Margarethe McDonald[1]

[1]*University of Kansas*

Amongst individual differences that may affect phonetic imitation, the role of perception has been shown to have significant, but not robust effects (e.g., [2][4]). This link has important implications for children acquiring a first or second language since children may use phonetic imitation to acquire the local dialect and accents that they hear in their environment. Children have been shown to out-perform adults on phonetic imitation tasks [3]. Yet children do not exhibit adult-like speech perception until well into adolescence (e.g., [1]). This project aimed to examine the role of immature speech perception on phonetic imitation in children acquiring a second language. The current project presents an exploratory analysis of two datasets of bilingual children between ages 6-9 years old who performed phonetic imitation (production) and phoneme categorization (perception) tasks in their L2 (English). The perception-production link was explored in both datasets to examine the stability of the relationship in children.

L1 Korean children ($N = 34$) in South Korea acquiring English as a second language produced and perceived the /l-r/ contrast and L1 Spanish children ($N = 51$) in the US acquiring English as a second language produced and perceived three plosive contrasts (/b-p/, /d-t/, /g-k/). For the Korean dataset, the difference in F3/F2 ratio between each child's /l/ and /r/ productions were correlated with the slope of the identity curve of each child's perception of a continuum of /l/ to /r/. Both of these measures capture how well children differentiate /l/ and /r/, categories which exist in English but which collapse to one category in Korean. For the Spanish dataset, the average VOT of 'voiced' (/b,d,g/) and 'voiceless' (/p,t,k/) plosives were separately correlated with the VOT category boundary of each child's perception of the 3 plosive continuums. All of these VOT measures are typically higher in English than Spanish. In both datasets, children performed the perception and productions tasks after exposure to a native English speaker who canonically produced the phonemes, and after exposure to a language-matched foreign-accented English speaker who produced the phonemes with acoustics typical for the accent [i.e., with minimal F3/F2 ratio difference between /l/ and /r/ (L1 Korean) or shifted VOTs (L1 Spanish)].

Although the phonetic imitation tasks did not reveal strong differences following native vs. accented English exposure, the datasets provide multiple opportunities to test the perception-production link. Between the native and accented exposure conditions, children were consistent within their own perception (Korean: $r = .55$* Spanish: $r = .76$*) and production (Korean: $r = .87$*, Spanish: $r_{voiced} = .91$*, $r_{voiceless} = .76$*). However, within the same exposure condition, in only 1 of 6 tested instances did children's perception significantly correlate with their own production (Figure 1). The exploratory analysis indicates that stable perception-production links may be difficult to capture in children's L2, perhaps due to less robust phonological representations in children's developing L2 language systems.

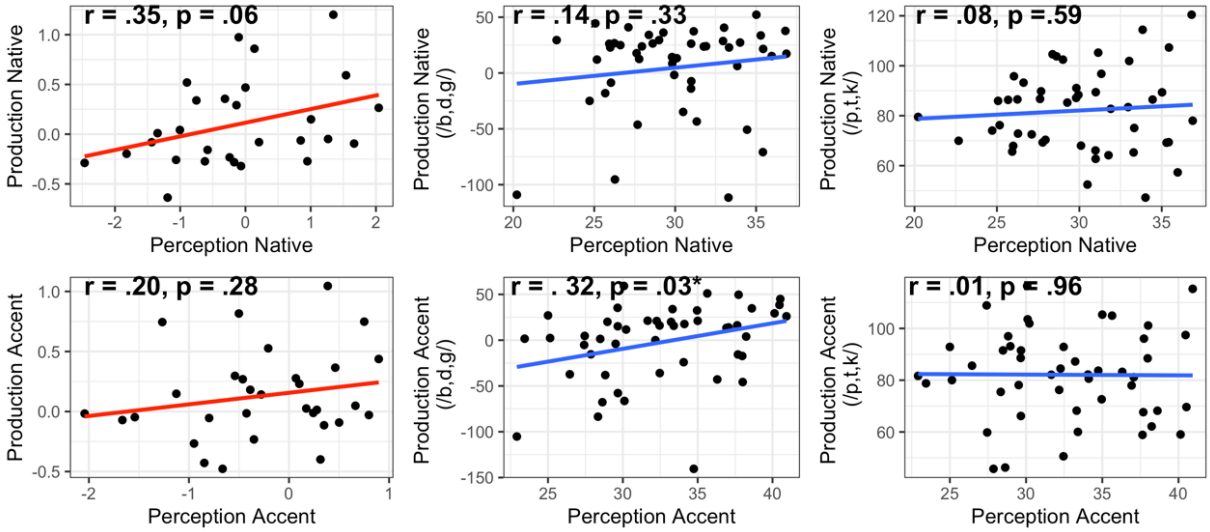


**Fig. 1.** Correlation between perception and production performance for L1 Korean (red) and L1 Spanish (blue) datasets. On the top are correlations after exposure to native English speech, and on the bottom are correlations after exposure to foreign-accented (Korean- or Spanish-accented) English.

**References**


[1] Bent, T. (2018). Development of unfamiliar accent comprehension continues through adolescence. *Journal of child language, 45*(6), 1400-1411.

[2] Mitterer, H., & Ernestus, M. (2008). The link between speech perception and production is phonological and abstract: Evidence from the shadowing task. *Cognition*, *109*(1), 168-173.

[3] Nielsen, K. (2014). Phonetic imitation by young children and its developmental changes. *Journal of Speech, Language, and Hearing Research, 57*(6), 2065-2075.

[4] Schertz, J., Adil, F., Kravchuk, A., Schertz, J., Adil, F., & Kravchuk, A. (2023). Underpinnings of explicit phonetic imitation: perception, production, and variability. *Glossa Psycholinguistics*, *2*(1).