The Role of Negative and Positive Evidence in Adult Phonological Learning

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This paper demonstrates that replacing positive evidence with negative evidence does not improve learning in adult second language learners of a novel phonotactic rule. One of the great mysteries of language development is how children acquire language so efficiently while adults are never able to reach the same level of proficiency. Adding to this mystery is that child learners rarely receive negative evidence regarding the nature of the grammatical structure of their language, but adults are more likely to receive and use such evidence (in classes, corrections, etc.) (Baker, 1979). Recent mathematical models of language learning (Perfors et al., 2010) have shown that negative evidence could actually add noise to the language learning process. Because learners can infer the grammatical space through positive evidence, negative evidence may provide data that serves not to clarify the hypothesis space, but to add to the memory load for the learner.

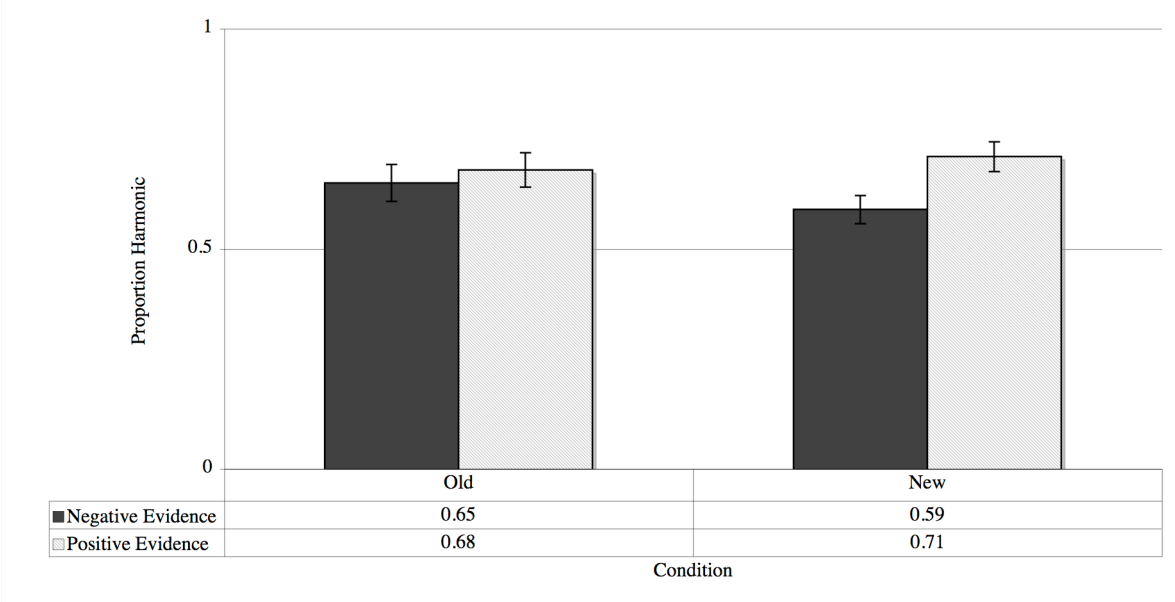
The present study tests the role of negative evidence in adult language learners. Adult language learners are ideal because they are most likely to use negative evidence in second language learning. 30 English-speaking adults were exposed to an artificial language characterized by round vowel harmony, a phonological process whereby vowels agree in the feature round (e.g., all vowels of the word contained all unround vowels [i, e] or all round vowels [u, o]). Words were of the form CVCV-mi/ CVCV-mu in which the final syllable alternated between [-mi] and [-mu] depending on the harmonic context (all CVCV 'stems' followed harmony, as in Table 1). All participants were exposed to 24 harmonic CVCV-mi/ CVCV-mu items (repeated 5 times each), recorded by an adult male speaker of English. A second (female) speaker recorded 12 of the 24 words. These 12 words were either harmonic (Positive Evidence) or disharmonic (Negative Evidence). In the Positive Evidence condition, participants were told that both voices belonged the language. In the Negative Evidence condition, participants were specifically told that the female voice spoke words not in the language. Following exposure, participants were given a 2-alternative forced-choice task in which participants were told to select the word that was in the language. Participants were given a harmonic item and a disharmonic item (presented in the male voice from the exposure phase). 12 test items were presented in training (Old) and 12 were not (New). While participants in both conditions learned the harmony pattern (Figure 1), participants in the Positive Evidence condition chose the harmonic option marginally more often than participants in the Negative Evidence condition; ($F(1, 38) = 3.45$, $p = 0.071$). Importantly, participants in the Positive Evidence condition were more likely to extend the harmony pattern to New Items compared to participants in the Negative Evidence condition ($t(38)=1.69$; $p<0.05$).

These results suggest that replacing positive evidence with negative evidence does not help learners form grammatical rules. In fact, positive evidence was more helpful to learners in forming a general harmony pattern. This may help explain why adult second language learners in naturalistic settings are less likely to follow grammatical regularities than child learners (Johnson and Newport, 1989). Future work will investigate the role of directed error correction in understanding how negative evidence might be useful in second language learning.

Table 1: Example Stimuli

Training	**Positive**	**Negative**
	gibemi	gibemu
	mutomu	mutomi
Test	**Harmonic**	**Disharmonic**
Old	gibemi	gibemu
	mutomu	mutomi
New	kipemi	kipemu
	mogomu	mogomi

Figure 1: Experiment Results



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