Why cross-linguistic frequency cannot be equated with ease of acquisition

Theoretical phonology has often assumed a biunivocal correspondance between ease of acquisition of phonological patterns and cross-linguistic frequency (Stampe, 1973; Tesar and Smolensky, 1998). For example, much research within Optimality Theory has assumed that infants have an initial ranking which reflects cross-linguistic tendencies (e.g., a high-ranking constraint against codas would explain why children do not initially produce them, mirroring the low frequency of closed syllables in languages across the world) (e.g., Barlow and Gierut, 1999). On the other hand, experiments on laboratory learning show that cross-linguistic frequency does not predict ease of learning in either infants or adults. In infants, Seidl and Buckley (2005) compared learning of phonetically grounded, widespread patterns (such as intervocalic voicing of stop consonants) with phonetically arbitrary, rarer patterns (such as intervocalic devoicing of stop consonants), and did not find a learning bias for the former. Similarly, Moreton (2006) tested adults' learning of cross-linguistically favored height assimilation of vowels (in which vowels in adjacent syllables agree in height) with an unattested, distant voice assimilation pattern, in which the initial consonants of adjacent syllables agree in voicing, and failed to find a bias for the former. These results strongly suggest that simple cross-linguistic frequency does not predict ease of acquisition.

It might be argued, however, that these two studies compared patterns that are favored by the physics of speech over others that are not, and that it stands to reason that learning in speakers and infants is not affected by these factors. We present evidence that shows that, even in the case of patterns that cannot be easily explained through phonetic factors, ease of learning is not predicted by cross-linguistic frequency. In particular, we tested seven-month-old infants on a phonotactic distribution in which nasals and fricatives patterned together in one condition, and nasals and stops did so in the other. In a large cross-linguistic sample of over 500 languages, Mielke (2004, 2005) found these two patterns to roughly equally frequent, which would predict both patterns to be learnable.

Our results strongly contradict this prediction, since infants in the nasals and stops condition were able to learn the phonotactic regularity, while infants in the nasals and fricatives condition did not. A control experiment confirmed that this was not caused by an inability to encode a phonotactic pattern with fricatives.

The results of these experiments are important not only because they remind us of the risk of assuming that cross-linguistic frequency implies ease of acquisition, but also because they suggest that the opposite is equally dangerous. Thus, although our infants found the nasals and fricatives pattern difficult to learn, this pattern is nonetheless frequent in languages across the world, and in each of these languages infants somehow succeed in acquiring that pattern. Thus, although it is true that some patterns are more learnable than others, and that some patterns are more widespread than others, there is mounting evidence against assuming that these two groups must converge. On the basis of present evidence, it can only be concluded that there is no simple relationship between ease of acquisition and cross-linguistic frequency.

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