Evidence of phonological features constrains on the acquisition of phonological dependencies

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During the past decades, many studies have shown how infant initial language-general abilities change into abilities that are attuned to the language they are acquiring. These studies have shown that infants became sensitive to different dependencies of their mother tongue, some holding between adjacent elements (Jusczyk et al., 1993b, 1994; Friederici & Wessels, 1993; Sebastián-Gallés & Bosch, 2002) and others holding between non-adjacent elements (Nazzi, Bijeljac-Babic & Bertoncini, 2009; Gonzalez-Gomez & Nazzi, submitted). To explore non-adjacent phonological sensitivity authors have used the Labial-Coronal bias (corresponding to the prevalence of LC structures over CL ones, such as bid over dib). This bias has been found both in early word production (MacNeilage & Davis, 2000), and in perception studies (Nazzi, Bijeljac-Babic & Bertoncini, 2009; Gonzalez-Gomez & Nazzi, submitted). These perception studies found that infants start preferring the LC words over CL words between 6 and 10 months, given that LC words are overall more frequent than CL words in many languages, including French, the language of the infants tested. When looking closely to frequencies in French lexicon the LC bias is clearly present for plosives and nasals consonants but not for fricatives (c.f. Figure 1). However, at present, the mechanisms and the level of generalization of these acquisitions remain unknown.

Figure 1 Cumulative frequency by manner of articulation of LC and CL French words according to the adult database Lexique 3 (New, Palier, Ferrand & Matos, 2001)

The Head-turn Preference Procedure was used to analyze whether infants generalized phonotactic rules by sound, by pairs or by natural features. This study explores whether 10-month-old-French-learning infants are sensitive to the frequency differences of the phonological dependencies, contrasting by articulation manner. Three experiments were conducted to explore this question (one for each class of consonants: plosives, fricatives and nasals). For plosives and fricatives, three different sub-experiments were conducted: the first one using a pair with a LC bias, the second one using a pair with a CL bias and a third one having a mix of the LC and the CL pairs. Given that in French there is only one pair of nasal consonants, the third experiment presents just a pair of nasals with a LC bias. Results show a CL bias for all fricative experiments, but a LC bias for plosives and nasals (c.f. Figure 2), suggesting that infant’s preference pattern is not guide by cumulative frequency on lexicon, but by phonological features.

These results are in line with several studies showing that infants are sensitive to natural class features and that they can use these features to find phonotactic regularities in language (Saffran and Thiessen, 2003; Cristia & Seidl, 2008; Seidl & Buckley, 2005). Given that phonological and phonotactic regularities are often governed by natural classes (Kuo, 2009),

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these results further show that phonological features can influence the acquisition of phonological and phonotactic regularities. In conclusion, the present study suggests that the acquisition of phonological and phonotactic regularities would be based on phonological features.

Figure 2 Mean orientation times (and standard error of the mean) to the LC and CL stimuli. Left panel presents the results for plosives: Mix with a LC pair (/p/-t vs t/-p/) and a CL pair (/b/-d vs d/-b/). A pair of plosives presenting a LC bias (/p/-t vs t/-p/), and a pair of plosives presenting a CL bias (/b/-d vs d/-b/). Middle panel shows the results for fricatives: Mix with a LC pair (/f/-s vs s/-f/) and a CL pair (/f/-s vs s/-f/). A pair of fricatives presenting a LC bias (/f/-s vs s/-f/), and a pair of fricatives presenting a CL bias (/f/-s vs s/-f/). Right panel shows the results for the pair of nasals presenting a LC bias (/m/-n vs n/-m/).

References