

Resources and mechanisms: Developmental clues to the evolution of language

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Abstract

Close study of the process of language development can offer insight into the evolution of language by indicating what is ‘easy’ for infants, or available from the earliest moments of life, and what is ‘hard’, or slow to develop. This talk will review contrasting aspects of early phonological and lexical development from this perspective. Thus, *acute speech perception* (speech sound discrimination) is observed from early infancy while *speech production* is notably slow to develop and change (canonical babbling is available from about 6-8 months [Oller, 2000], but babbling increases in complexity and differentiates by ambient language only very gradually [Davis et al., 2005]). Similarly, *prosodic patterning* is salient to infants from the first six months and provides the first basis for distinguishing between languages (Nazzi, Bertoncini & Mehler, 1998) while *segmental patterning* holds infant attention only after canonical babbling is in repertoire (Vihman & DePaolis, 2000). Thus the slow pace of *increases in resources or skills* on the production side appears to serve as a constraint that channels and shapes phonetic development in the first years of life.

Implicit, procedural or distributional learning (Saffran, Aslin & Newport, 1996), available from the first months of life (Rovee-Collier, Hayne & Colombo, 2001), goes a long way toward accounting for incipient infant learning of ambient language patterns within the first year, including adaptation in production to adult prosodic patterning, vowel quality and use of consonants (Vihman, 1996) and word form recognition without explicit training or contextual support (Hallé & Boysson-Bardies, 1994; Vihman et al., 2004). However, a single learning mechanism is insufficient to account for the advance from passive attention to the input signal and context-based word production to flexible word recognition and use. The mechanism of procedural learning must be supplemented by the *declarative or ‘explicit’ learning of arbitrary sound-meaning links* – based on (a) attention to both sound patterns and their referents as well as on (b) an *intention* to gain knowledge of the ‘names for things’ (and events) – before flexible access to a productive lexicon of symbolic words can emerge (McClelland, McNaughton & O’Reilly, 1995). Decontextualized comprehension of untrained words is seen in the absence of priming only after such a lexicon has begun to be established (Friedrich & Freiderici, 2005). Also, the mastery of phonological contrasts – e.g., iambic vs. trochaic rhythm, rising vs. falling pitch, or long vs. short consonants – depends on such prior lexical learning. Once a symbolic or referential lexicon is established and word learning accelerates, providing the child with greater experience of own-word-patterns, we see the generalization of sound patterns from broadly imitated (‘accurate’) first words to ‘projected’ or ‘adapted’ word forms (based on extension of the motor patterns underlying the production repertoire) – again reflecting the automatic activation of distributional learning (Vihman & Croft, in press).

What are the implications for evolution of these observations about development? What are ‘old’ (available from birth or soon after) are both perceptual resources (cf. Hauser, 1997) and procedural learning mechanisms. Evidently ‘new’ in humans are both the speech production mechanism and our capacity for symbolic learning and reference (Donald, 1991;

Deacon, 1997). The support afforded by our speech production mechanism for symbolic learning and thought (McCune & Vihman, 2001) – i.e., the boost to working memory gained by access to a range of phonetic patterns – may thus be a critical factor in the move to flexible, referential human language.

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