

Sensitivity to noun-phrase syntax in 11-month-olds

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Abstract

Previous research has shown that young children are sensitive to the well-formedness of spoken sentences with regards to function morphemes such as articles, auxiliaries, and verb inflections (Gerken, 1994; Gerken & McIntosh, 1993; Gerken, Landau, & Remez, 1990). This is suggested by converging evidence from the performance of two-year-old children in picture identification tasks and sentence imitation tasks. At this age, children point more frequently to a named target picture if the name is preceded by a grammatical article (e.g., *the*) than by an ungrammatical function morpheme (e.g., *was*) or a nonsense syllable (e.g., *qub*), or if the article is suppressed altogether (Gerken & McIntosh, 1993). Interestingly, a similar differential sensitivity is found in 3- to 5-year-old SLI children who frequently fail to produce grammatical morphemes (McNamara, Carter, McIntosh, & Gerken, 1998). Two-year-old normal children also fail to produce function morphemes spontaneously. When asked to imitate short sentences, they omit English functors more frequently than (nonsense) non-English functors (Gerken et al., 1990), suggesting, as Gerken proposes, that children analyzed English functors "...as morphemes but treated nonsense functors as part of the adjacent content words." Possibly then, children might recognize many function morphemes in their language and might correctly segment, for instance, article+noun clitic groups.

Another line of research has shown that newborn infants can distinguish between function and content words extracted from natural speech (Shi, Werker, & Morgan, 1999). By 6 months of age, infants attend preferentially to content words over function words (Shi & Werker, 2001). This is striking since the occurrence of function words is high in the spoken language at large as well as in the (child-oriented) adult speech to which infants are exposed. The preference, however, seems not to reflect lexical word recognition but, rather, the intrinsically different acoustic quality of function morphemes such as articles and auxiliaries. Across the world's languages, function words are acoustically less salient than content words as they tend to be shorter, to have more reduced vowels and less marked prosodic contours (Shi, Morgan, & Allopenna, 1998). Function words, as it were, are not salient enough to attract 6-month-old infants' attention when compared to content words.

At 13 months, however, children prefer listening to phrases with real functors (e.g., *the*, *his*) over phrases with nonsense functors (e.g., *kuh*) (Shi, Werker, & Cutler, 2003). At 11 months, but not at 10 months, a differential in ERP amplitude is found for sentences with unmodified function morphemes versus prosodically and segmentally altered function morphemes (Shafer, Shucard, Shucard, & Gerken, 1998). This set of results suggest that infants process function words differently from content words from very early on. By 11-13 months of age, they might begin to be sensitive to the grammaticality of function words.

One possible account is that articles are in fact well detected and processed by children but only to the extent they are part of a minimal syntactic group, the clitic group. Children would

“accept” a well-formed combination consisting of `article+known-word` and reject any ill-formed combination containing either a non-article or a non-word (that is, a word unknown to them). This account assumes that 11-month-olds, who already recognize a few word-forms (Hallé & de Boysson-Bardies, 1994), are able to perform a minimal parse of `article+noun` clitic groups. A different view holds that children are not sensitive to clitic group well-formedness per se but, rather, recognize the clitic groups as holistic familiar forms. For example, “le canard,” would simply be a variant form of “canard,” and treated as a whole. The idea of initial holistic forms larger than a word is supported by a number of synchronic and diachronic facts pointing towards some fuzziness, in speaker/listeners’ minds as to where content words should begin. Child errors such as “le nouns,” prosthetic /la/ or /le/ in adaptations of French words in Creole languages as in “*un gro lapli*” (‘une grosse pluie’), “*mon lépié*” (‘mon pied’) (Chaudenson, 1974: 652-654), examples of diachronic changes (deglutination as in English *adder* < OE *nadder*, *orange* < Persian *narang*; agglutination as in French *lierre* < Latin *hedora*) all indicate that “correct” boundary location between article and noun is not something easy to learn and may even change as languages evolve.

The study reported here is an effort to empirically tease apart the two accounts described above. We started from the previous work showing that the emergence of receptive lexicon is located at around 10-11 months (Hallé & de Boysson-Bardies, 1994; Vihman, Sakai, dePaolis, & Hallé, 2004). At 11 months, but not at 9 months, infants prefer listening to (untrained with) familiar words over unfamiliar words (e.g., “ballon” vs. “félin”). Using the Headturn Preference Procedure, we first checked that 11-month-old French infants would recognize `article+familiar-word` combinations. When the articles (*le*, *la*, *un*, etc.) are substituted with monosyllables matched with the real articles in both phonetic structure and phonotactic probabilities, recognition of familiar words is inhibited: *ré ballon* is not preferred over *ré félin*. This does not support a holistic view whereby infants should be tolerant to variant forms. At the same time, this shows that “ballon” is not recognized when preceded by *ré* instead of *le*. It is proposed that the occurrence of a non-article blocks further recognition of the target word (or creates a ‘lexical garden path’ situation), whereas the occurrence of a real article would leave the possibility open. Further experiments, in which real and pseudo articles are directly compared in the context of identical content words (varied across experiments in terms of length and familiarity) indicate that combinations with real articles tend to be preferred over those with pseudo articles, even with unfamiliar monosyllabic words. Overall, these results suggest that 11-month-olds already perform a basic analysis of clitic groups rather than treating them as whole units.

References

- Chaudenson, R. (1974). *Le lexique du parler Créole de la Réunion*. Paris: Honoré Champion.
- Gerken, 1994). Sentential processes in early child language: Evidence from the perception and production of function morphemes. In H. Nusbaum & J. Goodman (Eds.), *The development of speech perception: The transition from speech sounds to spoken words* (pp.271-298). Cambridge, MA: The MIT Press.
- Gerken, L.A., Landau, B., & Remez, R. (1990). Function morphemes in young children's speech perception and production. *Developmental Psychology*, 27, 204-216.
- Gerken, L. & McIntosh, B. (1993). Interplay of function morphemes and prosody in early language. *Developmental Psychology*, 29, 448-457.
- Hallé, P., & de Boysson-Bardies, B. (1994). Emergence of an early lexicon: Infant's recognition of words. *Infant Behavior and Development*, 17, 119-129.
- McNamara, M., Carter, A., McIntosh, B., & Gerken, L. (1998). Sensitivity to grammatical morphemes in children with specific language impairment. *Journal of Speech, Language, and Hearing Research*, 41, 1147-1157.

- Shafer, V., Shucard, D., Shucard, J., & Gerken, L. (1998). An electrophysiological study of infants' sensitivity to the sound patterns of English speech. *Journal of Speech, Language, and Hearing Research*, 41, 874-886.
- Shi, R., Morgan, J., & Allopenna, P. (1998). Phonological and acoustic bases for earliest grammatical category assignment: a cross-linguistic perspective. *Journal of Child Language*, 25, 169-201.
- Shi, R., & Werker, J. (2001). The basis of preference for lexical words in 6-month-old infants. *Developmental Science*, 6, 484-488.
- Shi, R., Werker, J., & Cutler, A. (2003, August). Function Words in Early Speech Perception. In *Proceedings of the 15th ICPHS, Barcelona*.
- Shi, R., Werker, J., & Morgan, J. (1999). Newborn infants' sensitivity to perceptual cues to lexical and grammatical words. *Cognition*, 72, B11-B21.
- Vihman, M., dePaolis, R., Nakai, S., Hallé, P. (2004). The role of accentual pattern in early lexical representation. *Journal of Memory and Language*, 50, 336-353.