

The Role of Input in Young Children's Production in Onset and Coda Positions

There are two major theories of language acquisition. The first theory is Universal Grammar (Chomsky, 1981; Jakobson, 1968; Zamuner, 2003), which argues that the acquisition of linguistic system is mediated by innate properties. Based on this hypothesis, some linguistic structures will be acquired earlier than others, for example, children's early words are mostly open syllables, rather than closed syllables (Demuth & Fee, 1995), which may be the result of innate pressures for the universally preferred onsets over codas. The second theory is Input Hypothesis (Olmsted, 1966; Zamuner, 2003), which proposes that language is acquired based on the patterns in the ambient language. Prior studies suggested that the influences of input are mirrored in children's speech production on segmental (Edwards & Beckman, 2008; Edwards, Beckman, & Munson, 2004; Munson, 2001; Zamuner, 2003; Zamuner, Gerken, & Hammond, 2004), prosodic (Demuth, 2001; Gennari & Demuth, 1997; Levelt, Schiller, & Levelt, 1999), as well as word levels (Lleo & Demuth, 1999; Naigles & Hoff-Ginsberg, 1998). The aim of current study is to explore two questions. First, do infants produce more segments in onset than in coda position? Second, do children's early production of onsets and codas reflect, in part, the frequency characteristics of the input to which they are exposed?

In order to address these questions, we examined 5 mother-child dyads' production of fricatives from the Providence Corpus (Demuth, Culbertson, & Alter, 2006), which are part of the CHILDES English corpora database (MacWhinney, 2000). There are 44 to 88 sessions for each mother-child dyads with a total of 300 hours recording. To calculate positional probabilities, we first counted the number of times each fricative occurred in onset and coda positions for both the mother and the child for each session. Once the frequency of all the fricatives was calculated, it was then divided by the total number of segments produced by either the mother or the child. We then took the log of the ratio. Paired t test with position (onset vs. coda) as the within-subject factor, and with session (303 sessions) as between-subject factor indicated that children produced more fricatives in onset than in coda position, $t(302) = 9.31$, $p < .001$. Then we submitted data to two simple linear regression analyses (one for onset and the other for coda) with mother's frequency count as independent variable, and with child's frequency count as dependent variable. The results indicated that children's production is correlated to the input in both onset position, $t(302) = 4.04$, $p = .045$, and coda position, $t(302) = 7.77$, $p = .006$.

These findings suggest that children's production is biased toward onset position; second, the input indeed affects children's production; and this effect is seen in both onset and coda positions. This study provides support to the Universal Grammar that onset is privileged over coda; further, it sheds light on the role of input in children's acquisition of syllable onset and coda.

(492 words)

References

- Chomsky, N. (1981). *Lectures on government and binding*: Foris Publications.
- Demuth, K. (2001). Prosodic constraints on morphological development. In J. Weissenborn & B. Höhle (Eds.), *Approaches to bootstrapping: Phonological, syntactic, and neurophysiological aspects of early language acquisition* (Vol. 2, pp. 2-21). Amsterdam: John Benjamins.
- Demuth, K., Culbertson, J., & Alter, J. (2006). Word-minimality, epenthesis, and coda licensing in the acquisition of English. *Language and Speech*, 49, 137-174.
- Demuth, K., & Fee, E. J. (1995). *Minimal prosodic words in early phonological development*. Unpublished manuscript. Brown University, Providence, RI and Dalhousie University, Halifax, Canada.
- Edwards, J., & Beckman, M. E. (2008). Some Cross-Linguistic Evidence for Modulation of Implicational Universals by Language-Specific Frequency Effects in Phonological Development. *Language Learning and Development*, 4(2), 122-156. doi: 10.1080/15475440801922115
- Edwards, J., Beckman, M. E., & Munson, B. (2004). The Interaction Between Vocabulary Size and Phonotactic Probability Effects on Children's Production Accuracy and Fluency in Nonword Repetition. *J Speech Lang Hear Res*, 47(2), 421-436. doi: 10.1044/1092-4388(2004/034)
- Gennari, S., & Demuth, K. (1997). *Syllable omission in Spanish*. Paper presented at the Proceedings of the 21st Annual Boston University Conference on Language Development, Somerville, MA:.
- Jakobson, R. (1968). *Child Language Aphasia and Phonological Universals*: Mouton.
- Levelt, C. C., Schiller, N. O., & Levelt, W. J. (1999). The Acquisition of Syllable Types. *Language Acquisition*, 8(3), 237-264. doi: 10.2307/20011491
- Lleo, C., & Demuth, K. (1999). Prosodic constraints on the emergence of grammatical morphemes: Cross-linguistic evidence from Germanic and Romance languages. Somerville, MA: Cascadilla Press.
- MacWhinney, B. (2000). *The CHILDES Project: Tools for analyzing talk. Third Edition*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Munson, B. (2001). Phonological pattern frequency and speech production in adults and children. *J Speech Lang Hear Res*, 44(4), 778-792.
- Naigles, L. R., & Hoff-Ginsberg, E. (1998). Why are some verbs learned before other verbs? Effects of input frequency and structure on children's early verb use. *Journal of Child Language*, 25(1), 95-120.
- Olmsted, D. L. (1966). A Theory of the Child's Learning of Phonology. *Language*, 42(2), 531-535. doi: 10.2307/411708
- Zamuner, T. S. (2003). *Input-based Phonological Acquisition*. New York: Taylor & Francis.
- Zamuner, T. S., Gerken, L., & Hammond, M. (2004). Phonotactic probabilities in young children's speech production. *Journal of Child Language*, 31(03), 515-536. doi: 10.1017/S0305000904006233