The Role of UG in the Initial State of the Phonological Grammar

Paula Reimers
University of Essex
pmreim@essex.ac.uk

Keywords
UG, the internalised rhythm, the basic syllable

Abstract

Although it has long been recognized that perception plays the important role of providing the foundation for learning the sound pattern of a given language, most UG-based models of first language phonological acquisition tend to equate the onset of speech production with the initial state of the grammar coupled with the assumption that Universal Grammar (UG) equips the infant with all the universal phonological features and prosodic structures.. However, since a valid theory of phonological acquisition should contain a description of the initial state and perception is an absolute prerequisite for language learning, the initial state of the phonological grammar must be earlier than the onset of speech and the earliest perception data must be taken into consideration.

The vast amount of infant perceptual studies has not only shown that the newborn infant is able to perceive phonetic contrasts, acoustic details, phonological units, and linguistic rhythm, but also corroborated the innate ability of infants to discriminate contrasts in any potential human language. However, starting with a study by Kuhl & Miller in 1975, which showed that chinchillas are capable of discriminating "phonemes", subsequent studies confirmed that certain non-human species are just as capable as human infants in the categorical processing of human speech. A study of the perceptual and neurobiological mechanisms of human newborns and cotton-top tamarin monkeys by Ramus *et al* in 2000 showed that sound boundaries perceived by monkeys occur in the same place as in humans. Furthermore, the neural lateralisation in the left hemisphere of the brain, which was thought to be specific to humans in language processing, was also found to be the case for signal processing in Japanese monkeys by Petersen *et al* (1978) and in adult rhesus monkeys by Hauser & Andersson (1994). Moreover, a study of celebral specialisation in four-month-old infants by Dehaene-Lambertz (2000) showed that there is no greater left hemisphere involvement in phonetic processing than in acoustic processing during the first months of life.

Thus, under the assumption that UG guides the infant in perception from birth (or even before birth), the investigation of perceptual studies leads us to postulate that the initial state, which can be witnessed in the linguistic ability of the newborn infant and which distinguishes the human infant from other non-human species, does not contain any segments, but only the sense of rhythm. What the infants and non- humans show in discrimination tasks of segments in perceptual studies must be interpreted as *the ability to perceive phonetic differences*, which is not specific to humans. The role played by UG in the acquisition of segments is to provide the learner with a mechanism to internalise or phonologise the phonetic representations, but at a later stage.. Since newborns are capable of distinguishing between stress-timed, syllable-timed, and mora-timed languages (e.g. Mehler *et al* 1988), but there seems to be no evidence for a UG default setting (trochaic or iambic) of the internalised rhythm, the role played by the basic syllable is extremely significant by virtue of it being the rhythm-bearing unit.

Based purely on typological studies and transcriptions of infant productions, the CV-syllable is enshrined as the basic syllable. However, it is logically not possible for the infant to distinguish all three linguistic rhythm classes from birth if CV is the basic unit in the initial

prosodic hierarchy consisting of only syllables and unbounded feet. There will be two steps between the basic CV syllable and distinguishing the three rhythm classes. The distinction between the mora-timed rhythm (with almost only CV syllables) and the stress-timed rhythm (with complex CVC syllables) must be the first step, before the syllable-timed rhythm (with simpler CVC syllables, but more complex than CV syllables) can be discriminated. Thus, this paper suggests that the basic syllable given by UG is CVX, consisting of a nucleus, an onset, and a coda constituent, X, which can accommodate either a consonant or a vowel.

The plausibility of postulating CVX as the basic syllable is explored through various observations. In terms of perception, the basic CVX syllable provides a better continuum than the CV syllable in terms of sonority profile of running speech as well as a straightforward account for fuzzy syllable boundaries in young infants. Support for the basic CVX-syllable is also found in the explanations of immature physiology and neuro-motor control of young infants. Linguistic evidence for the basic CVX syllable can be found in cross-linguistic data of children's earliest productions.. The basic CV syllable would predict all early utterances to consist solely of CV syllables, before other syllable shapes may appear, depending on the syllable structure of the ambient language. However, the data show that infants produce a large variety of syllables, from monosyllables to polysyllables containing all syllable shapes. The basic CVX syllable, on the other hand, can account for the earliest words containing V, CV, VC, CVC, as well as geminates, CV-language acquiring infants producing CVCs for CV target words, acquisition of consonant extrametricality, and even predict the inability of newborns to distinguish the three rhythm classes if the stimuli consisted of only CV syllables. Thus, the paper concludes that it is more plausible to assume that the basic syllable given by UG in first language acquisition contains a coda constituent.

References:

Dehaene-Lambertz, G. 2000: Celebral specialization for speech and non-speech stimuli in infants. *Journal of Cognitive Neuroscience 12 (3)*, 449-460.

Hauser, M.D. & Andersson, K. 1994: Left hemisphere dominance for processing vocalizations in adult, but not infant rhesus monkeys: Field experiments. *Proceedings of the National Academy of Sciences 91*, 3946-3948.

Kuhl, P.K. & Miller, J.D. 1975: Speech perception by the chinchilla: Voiced-voiceless distinction in alveolar plosive consonants. *Science 190*, 69-72.

Mehler, J., Jusczyk, P., Lambertz, G., Halsted, N., Bertoncini, J. & Amiel-Tison, C. 1988: A precursor of language acquisition in young infants. *Cognition 29*, 143-178.

Petersen, M.R., Beecher, M.D., Zoloth, S.R., Moody, D.B. & Stebbins, W.C. 1978: Neural lateralization of species-specific vocalizations by Japanese macaques. *Science 202*, 324-26.

Ramus, F., Hauser, M. D., Miller, C., Morris, D. & Mehler, J. 2000: Language discrimi-nation by human newborns and by cotton-top tamarin monkeys. *Science 288*, 349-351.