

Phonetics of first language acquisition

Mary E. Beckman

In the first two years of life, most children develop the phonetic scaffolding that is needed to acquire a first language. They learn to perceptually parse the sound patterns of the words and longer utterances that are being said in their hearing, and they learn to respond to phatic utterances that are said to them, practicing a perception-production feedback loop until their vocalizations have enough semblance to the sound patterns of the ambient language that they can begin to communicate with their caretakers using speech. Over the subsequent 10 to 15 years, they fine-tune these phonetic capacities until their speech is reliably intelligible to conversational partners outside of their earliest social circles, and their perception and production patterns indelibly mark them as members of the larger speech communities in which they are growing up. How does all this happen?

This is a time-honored question in the phonetic sciences, with several important themes sounded already in Jespersen [1922] and echoed fifteen years later in two papers at the 2nd ICPHS – one on “Speech development in childhood: The function of babble” [Norman, 1936] and the other on “Baby language, the infant’s approach to the forms of adult speech” [Lewis, 1936]. The theme of Norman’s paper is that children use babbling to exercise the rhythms of the ambient language and that this supports their development of motor control for sounds in words. Her description differs from Jakobson’s [1941] account of an abrupt discontinuity between babbling and first words. It accords instead with Jespersen’s account, which emphasised the role of adults’ (mis)perception of babbling in terms of the sound shapes of their own words and how this (mis)perception becomes part of the infant’s perception-production loop to promote the transition from “muscular exercises pure and simple” into the imitative exchanges that are “the foundation for the child’s later acquisition and command of language” [Jespersen, 1922: 104-105]. This theme of the continuity between babbling and word production and the interaction between children’s motor development and adults’ word shapes characterises one strand of subsequent theorising [see, e.g., Ferguson & Farwell, 1975; Vihman et al. 1985]. Lewis’s paper echoes a second theme in Jespersen’s account of language development when he describes generalisations in the sound substitution patterns observed across children and follows Jespersen in calling them “sound laws” after the Neogrammarian term for diachronic sound changes. This terminological choice continued in a different strand of subsequent theorising when Jakobson recast the early cache of generalisations as “phonological universals” that differentiate the toddler’s gradual mastery of the contrasts needed in word production from the “merely phonetic” exercise of babbling [Jakobson, 1941]. Lewis’s own use of the term, however, was more cautious. He is described (in a report by an Australian delegate) as having “pointed out that the number of careful observations in this field is extremely limited, not more than half a dozen” before he “specially commended to married delegates” the need for more diary studies [Taylor, 1936: 85]. The challenge of how to enlarge the body of “careful observations” is a third perennial theme.

These themes are echoed again in the presentations in this session, which were chosen to illustrate the rich diversity of approaches to the phonetics of first language acquisition that are being developed today. For example, Loevenbruck and colleagues respond to the challenge in the third theme by using a picture-prompted word-repetition task to elicit many productions of target consonants in a controlled set of vowel environments from more than 200 child speakers of French or Dreu. They analyse transcribed accuracy rates to show how biomechanically-motivated “sound laws” are modulated by feedback from the CV rhythms of the ambient language lexicon, as assessed by type frequencies in child-directed speech corpora. Nicholson and colleagues also assess the role of the ambient language lexicon in modulating the effect of

“sound laws” on young children’s word productions elicited in a picture-prompted word-repetition task. They show that children’s vocabulary size is a better predictor than age of transcribed accuracy and also that productions that are transcribed as accurate differ acoustically between children with smaller versus larger vocabularies. McAllister Byun and colleagues also develop finer-grained measures of young children’s accuracy using perceptual ratings from adult listeners obtained by crowd-sourcing. Finally, Zharkova and colleagues describe how fine-grained measures of tongue shape and position can be derived from Ultrasound images to assess how the motor control required for adult-like coordination of consonant and vowel gestures continues to develop well after the age when most children’s productions are transcribed as error free.