

Building speech sounds through scaffolding: The case of motherese

Krisztina Zajdó

Széchenyi István Egyetem, Hungary

Sundberg (1998) hypothesized that the acoustic/phonetic properties of caregiverese change with the child's increased speech performance. Rather than producing hyperarticulated vowels, mothers may model vowels that teach the child about different aspects of vowel production as the child's level of speech performance increases. This process may make it challenging for children to build unambiguous phoneme categories.

To test Sundberg's hypothesis, a study was carried out examining the production of the Hungarian corner vowels /i:/, /u:/ and /a:/ in eight boys at the ages of 2;0, 2;6, 3;0, 3;6 and 4;0 years (n (children) = 40) and their mothers (n (mothers) = 40) as mothers were modeling pV(:)1p1V(:)1 structured tokens to their children and as the children used these words in conversation. A band filtering analysis of the vowel spectra at 50 randomly selected measurement points in each corner vowel category identified the space within the vowel triangle occupied. Mapping labeled vowel measures onto the reference plane suggests that children organize the acoustic space differently at different ages. In particular, while the positioning of the vowel /a:/ remains relatively constant in the speech of children at 2;0, 2;6, 3;0, 3;6 and 4;0 years, the other two corner vowels are positioned in different areas of the vowel space as the children get older. The vowel /u:/ is positioned as an increasingly higher back vowel, being fronted significantly in 4;0 years old children. The vowel /i:/ starts out by being positioned into a relatively high but centralized area of the vowel space at 2;0 years, followed by an increasingly higher and more frontal area of the acoustic vowel space in older children.

The positioning of the mothers' corner vowels within the acoustic vowel space also changes as mothers talk to older (as opposed to younger) children with more accurate speech sound production skills. In general, mothers position their corner vowels differently, depending the age of children they talk to. When modeling vowels to 2;0 years olds, mothers produce relatively low /a:/ vowels, high-central /i:/ vowels and /u:/ vowels that are back vowels but are not positioned very high. When talking to 2;6 and 3;0 years old children, mothers front their /i:/ vowels, thereby occupying a more compact area of the acoustic vowel space, and position their /u:/ vowels in a higher position. When talking to the oldest children, mothers produce the most fronted vowels, which positioning is closest to adult-like vowel qualities.

Overall, mothers guide their children towards the production of more accurate and more adult-like

vowels, by taking into account the articulatory limitations (e.g., an initial inability to produce rounding in high vowels) their children are challenged with. However, these acoustical changes in phonological vowel categories in the input may challenge children as they are trying to build unambiguous phoneme representations. Potential explanations will be explored about the way children may take into consideration the relationship between their own acoustic vowel qualities as opposed to those produced by their mothers during the years towards developing more adult-like phoneme representations.

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