

The Development of Consonant-to-Consonant Coarticulation

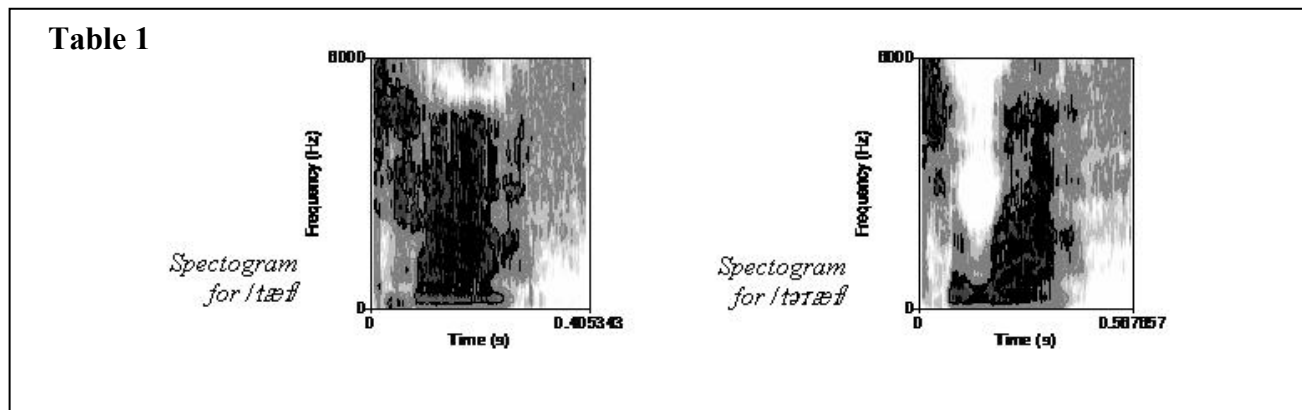
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The identity of a child's first units of speech is an unsettled issue within language acquisition. Some researchers suggest that syllables or words are the first units of speech production (Nittrouer & Whalen 1989; Nittrouer, Studdert-Kennedy, & McGowan 1989, but cf. Kent 1983; Katz, Kripke, & Tallal 1991). In one study, Nittrouer *et al.* (1989) found greater levels of sound overlap in child speech than in adult speech. Only within-syllable measurements of coarticulation were made, however, and the determination of whether a child's first units of production are syllables or words was left for future research.

A prediction of a syllable theory of child productions is that, while sounds may overlap within a syllable, they should overlap less across syllables. If syllables are the units of speech children first come to produce, we would expect children to produce syllables with little overlap. As they mature, adult levels of cross-syllable overlap would eventually be achieved. The present study tests this prediction by comparing the amount of syllable overlap in child and adult speech.

Syllable overlap may be seen in between the onsets of two adjacent syllables. This overlap is called consonant-to-consonant (C-to-C) coarticulation. Coarticulation is the overlap of segments in a fluid speech stream, and C-to-C coarticulation is that overlap specific to two or more consonants. In adult speech this overlap is found across the consonants in a consonant sequence, such as a voiceless stop followed by /r/. When followed by /r/, the average frequency of the aspiration drops, a measure called the centroid frequency. Table 1 presents two exemplary spectograms. The effects of /r/ on the preceding /t/ can be seen in /tæf/, as a dip in the third fricative formant not present in /tæf/.



Children and adults participated in a naming task (Prather, Hedrick & Kern 1975; Ohala 1999). Pictures of make-believe animals and a nonsense word that "named" that animal were presented to subjects in a computer slide show. Subjects were asked to repeat the name of the animal, and their response was recorded and analyzed. A measurement of the difference between the centroid frequency of the stop and the stop before /r/ was obtained for each subject, and an average of this measurement is compared across child and adult subject groups. For adults, the difference between the centroid frequency of the /t/ in /tæf/ and the /t/ in /tæf/ was expected to be large. Children were not expected to show the centroid frequency difference as predicted by the syllable theory.

Preliminary results suggest that centroid frequency measurements for children are not comparable to those of adults. These results support the syllable-first theory of a child's first speech productions. Final results will be presented and conclusions will be discussed in terms of articulatory and phonological development.