Token to Token Production Inconsistency: Speech Disorder or Typical Development?

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BACKGROUND

Intra-word variability/inconsistency
- Intra-word variability is defined as variable production of individual words from one token to the next (e.g., vacuum produced as [vækju] and [dækju])
- This type of variability is well-documented in young, typically developing children [1,2]
- Intra-word variability has also been associated with speech disorder, specifically Childhood Apraxia of Speech (ASHA 2007)and Inconsistent Phonological Disorder [3]
- Variable production associated with speech disorder is often referred to as ‘inconsistency’ rather than ‘variability’
- One study [4] concluded that typically developing children older than age 3 displayed very little variability and that inconsistent production is not a characteristic of typical speech development
- Other studies, however, have identified relatively high rates of variability in older children [5]

Goals of the Current Study
1. To investigate rates of intra-word variability in typically developing children to determine at what age production variability is no longer present
2. To investigate variability in relation to word length to determine the effect of word length on production variability in typically developing children

RESULTS

Overall rates of variability
The mean proportion of words produced variably for all children was 68% (range 32-92%; s.d. = .17), indicating that an average of 17 out of 25 words were produced with some variability.

Rates of variability by age
The youngest group of children displayed the most variability (77%) while the oldest children had the least variability (57%). One-way ANOVA indicated a significant effect of age on variability, F(2, 31) = 5.73, p = .01, and post-hoc testing showed that the youngest group was significantly more variable than the oldest group, but the middle group did not differ from the other 2 groups. A significant negative correlation (r² = -.48, p = .004) between variability and age showed that variability decreased with age.

RESULTS (continued)

Rates of variability by word length
Rates of variability were greatest for 4-syllable words and lowest for 1-syllable words. Paired samples T-tests adjusted for multiple comparisons (p<.008) for data from all children indicated that 4-syllable words were significantly more variable than all other words and 1-syllable words were more stable than all other words, but variability did not differ for 2 and 3-syllable words. The pattern was similar for all 3 age groups

METHODS

Participants
34 children (16 male, 18 female) in three age groups: 2;6-2;11 (n=14), 3;0-3;5 (n=8); 3;6-4;2 (n=12)

Participant information:
- monolingual English speakers
- maternal education: 4+ years college (n=29), 1-3 years college (n=4), completed high school (n=1)
- no significant developmental or health concerns
- no parental concerns about hearing status
- expressive (EVT M = 116) and receptive vocabulary (PPVT M = 114) within normal limits
- articulation (GFTA M = 107) within normal limits

Procedures
- Children participated in 2 hour-long data collection sessions in a university clinic therapy room
- Sessions were audio and video-recorded; audio was recorded using a high-quality wireless microphone in a vest worn by the child
- Intra-word variability was assessed using the inconsistency Assessment (IA) (Holm et al, 2007): 25 words varying in length from 1 to 4 syllables are produced by the child 3 times (see handout for word list)
- Consensus broad phonetic transcription of words was conducted by 2 graduate student clinicians and words were coded as variable or consistent (any differences in vowel or consonant transcription between the 3 productions was considered variable)
- IA score (proportion of words produced variably out of 25 words) was calculated for each child

DISCUSSION & CONCLUSIONS

- Hypothesis 1 was partially supported: variability did decrease with age, however the oldest children in the study continued to demonstrate very high rates of variability (an average of 14 out of 25 words produced variably by the oldest children)
- Hypothesis 2 was supported: 4-syllable words were highly variable (on average, over 90% of 4-syllable words were produced variably) while 1-syllable words were relatively stable (50% of 1-syllable words produced variably) and the effect of word length on variability was similar for all age groups
- We were not able to answer our main research question (i.e., at what age variability is no longer present), because even the oldest children had very high rates of variability
- High rates of variability and greater variability when producing longer words are common characteristics of typical speech development; thus, the presence of these characteristics alone should not be interpreted as indicative of speech disorder
- Further research that looks carefully at the nature of the variability displayed by children with and without speech disorder is needed so clinicians can distinguish between typical and atypical variability

REFERENCES