Childhood Stuttering, MLU, and Word Class Effects: Preliminary Findings

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ABSTRACT

The purpose of this study was to examine stuttering on function and content words in relation to utterance length and complexity in preschool-age children who stutter (CWS). Results indicate that while function words are more likely to be stuttered than content words, utterance length relative to a child's MLU neither influences the distribution of function and content words across an utterance nor does it influence whether a function or a content word is stuttered. Findings were taken to suggest that the influence of MLU on stuttering is relatively independent of the influence of word class on stuttering, but that other "third-order" variables, for example, word position within the utterance, may better tie together these two seemingly independent influences on childhood stuttering.

BACKGROUND

It has been consistently shown that, contrary to adults who stutter, young children who stutter exhibit a greater number of disfluencies on function than on content words (Bernstein, 1981; Bloodstein & Grossman, 1981; Buhr & Zebrowski, 2007; Graham, 2004; Howell, Au-Yeung & Sackin, 1999). This finding is strengthened by converging cross-linguistic data from Spanish-speaking children who stutter (Au-Yeung, Gomez & Howell, 2003; Watson, 2002). Howell et al. (1999) hypothesized that speech disfluencies on function words occur as a delaying strategy that young children who stutter use to allow time for subsequent semantically-laden content words to be encoded.

In addition to word type, utterance length has also been shown to influence speech disfluencies (e.g., Bernstein-Ratner & Sih, 1987; Logan & Conture, 1995; McLaughlin & Cullinan, 1989; Zackheim & Conture, 2003; Yaruss, 1999). In general, empirical findings indicate that increases in utterance length are associated with increases in speech disfluencies. One concern with some of these findings, however, is that absolute utterance length was considered rather than utterance length relative to the child's mean length of utterance (MLU). For this reason, Zackheim and Conture (2003) examined the influence of utterance length relative to each child's mean length of utterance (MLU) on stuttering-like disfluencies in young children who do and do not stutter and found that utterances above children's MLU account for approximately 70% of all speech disfluencies.

It is unclear, however, whether the distribution of function versus content words changes in utterances above and below a child's MLU and whether such changes would influence the frequency of stuttering on function versus content words. While one might reasonably assume that the distribution would remain the same, it is possible that the frequency and nature of grammatical operations above a child's MLU tips the scales in favor of more stuttering on function than content words. Therefore, the purpose of this study was to examine how CWS's utterance length, relative to MLU, influences the percentage of stutterings on function versus content words.

METHOD

Participants

- Participants were 15 male preschool-age children divided into three age groups (5/age group): 3-year-olds (3;0-3;6), 4-year-olds (4;0-4;6), and 5-year-olds (5;0-5;6).

- *Inclusion criteria*. To be included in the present study children had to (a) score at or above the 16th percentile rank on all of the speech and language standardized tests for their age group, (b) pass a hearing screening, (c) exhibit three or more stuttering-like disfluencies (part-word repetitions, single-syllable word repetitions, sound prolongations, blocks and tense pauses) per 100 words of conversational speech (Yairi & Ambrose, 1992) and (d) receive a total overall score of 11 or above (a severity equivalent of at least "mild" for preschool children) on the *Stuttering Severity Instrument* – 3 (SSI-3; Riley, 1994).

Procedure

- *Parent-child conversational interaction*. All participants participated in a parent-child interaction to permit analysis of utterances and disfluencies. These parent-child interactions lasted approximately 15 min and were transcribed. Abandoned, interrupted, and unintelligible utterances, as well as utterances not containing a subject and a verb, were eliminated from the transcription, resulting in approximately 60 utterances to be used for final analysis for each participant.

Dependent variables

- *Word type*. Each word of every utterance that was analyzed was categorized as either a function word (pronouns, articles, prepositions, conjunctions, auxiliary verbs) or a content word (nouns, main verbs, adverbs, adjectives).

- *Instances of stuttering.* For utterances containing SLDs, the individual word(s) stuttered was categorized as a function or content word and subsequently the percentage of function versus content words with SLDs was calculated. Similar procedures were implemented for the fluent utterances (utterances containing no stutterings or non-SLDs).

- *Utterance length*. Each child's mean length of utterance (MLU) was calculated based on 60 intelligible utterances and in accordance with Brown's (1973) morpheme selection rules. Predicted means and standard deviations were obtained from Miller and Chapman (1979). Based on quartile (i.e., 25th, 50th, etc.) rankings of each child's utterance lengths across all utterances, those utterances within the 76th to 100th (*upper*) and 0 to 24th (*lower*) quartiles were assessed to determine the relationship between stutterings on function versus content words within utterance below versus above each child's MLU.

NOTES:

RESULTS

Figures 1-3 illustrate the percent of function words per total words as well as the percent of function words per stuttered words at both the lower and upper MLU quartiles for each of the three age groupings (3-, 4- & 5-year-old) of preschool-age CWS.

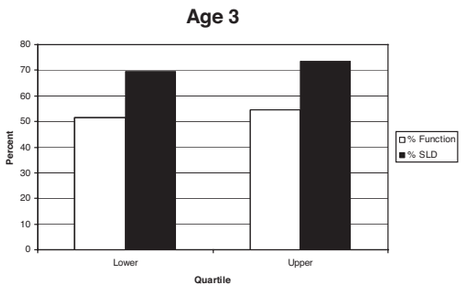

Figure 1. The percent of function words per total words and the percent of function words per stuttered words for the 3-year-old CWS group (n=5).

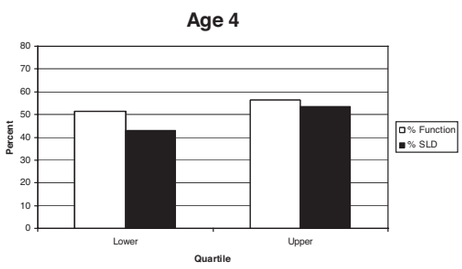

Figure 2. The percent of function words per total words and the percent of function words per stuttered words for the 4-year-old CWS group (n=5).

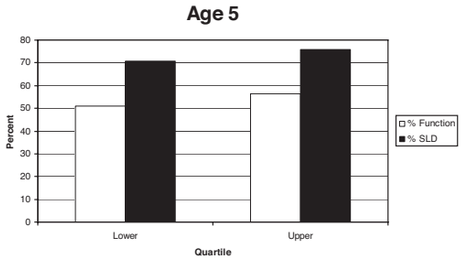

Figure 3. The percent of function words per total words and the percent of function words per stuttered words for the 5-year-old CWS group (n=5).

Results lead to three main findings:

Main Finding #1 Influence of age on the distribution of content and function words (i.e., word class) and on the relation between word class and stuttering: Between-Group Analysis. There was no significant between-group difference in the percent of function words per total words at either the upper ($F = 0.010$, $p = 0.995$) or the lower ($F = 0.875$, $p = 0.646$) MLU quartiles. Likewise, there was no significant between-group difference in the percent of function words per stuttered words at the lower quartile ($F = 2.060$, $p = 0.357$). However, there was a significant between-group difference at the upper quartile ($F = 6.523$, $p = 0.038$) with the 4-year age group being less apt to stutter on function words than the 5-year age group ($F = 6.455$, $p = 0.011$).

Main Finding #2: Influence of MLU quartile on the distribution of content and function words (i.e., word class) and on the relation between word class and stuttering: Within-Group Analysis. For each of the three (3-, 4- and 5-year-old) groupings of children who stutter (n = 5/group), there were no significant differences (p- values ranging from 0.079 to 0.480) between the lower and upper MLU quartiles in the percent of function words per total words. Likewise, for each of these three groupings, there were no significant differences (p-values ranging from 0.602 to 0.719) between the lower and upper MLU quartiles in the percent of function words per stuttered words.

Main Finding #3: Influence of content and function words (i.e., word class) on the occurrence of stuttering: Within-Group Analysis. For the 3-year age group, the percent of function words per stuttered words was significantly greater than the percent of function words per total words at both the upper ($p = 0.06$) and the lower ($p = 0.06$) MLU quartiles. For the 4-year age group, there were no significant differences between the percent of function words per stuttered words and the percent of function words per total words at the lower ($p = 0.472$) nor the upper ($p = 0.443$) MLU quartiles. Finally, for the 5-year age group, the percent of function words per stuttered words was significantly greater than the percent of function words per total words at both the upper ($p = 0.042$) and the lower ($p = 0.002$) MLU quartiles.

DISCUSSION

As mentioned above, the study resulted in three main findings:

The **first main finding** was that there were no significant between-(age) group differences in the percent of function words per total words at either the lower or the upper MLU quartiles. However, the percent of function words that were stuttered was significantly greater for both the 3- and 5-year age groups relative to the 4-year age group at the upper quartile. This finding suggests that 4-year-old CWS, when compared to 3- and 5-year- old CWS, are less apt to stutter on function words, a tentative finding, we believe, until more participants and their data are analyzed.

The **second main finding** was that the percent of function words per total words as well as the percent of function words per stuttered words did not differ across the lower and upper quartiles of a child's MLU for each of the three age groups. This finding suggests that utterance length in morphemes relative to a child's MLU does not appreciably influence the distribution of function and content words within an utterance, nor does it influence the likelihood that stuttering will occur on a function versus a content word.

The **third main finding** was that for the 3- and 5-year age groups, the percent of function words per stuttered words was significantly greater than the percent of function words per total words at both the lower and upper quartile. This difference, however, was not found for the 4-year age group. This finding suggests that, at least for the 3- and 5-year-old children, stuttering is significantly more likely to occur on function words than content words.

CONCLUSIONS

Present findings indicate that while stuttering is more apt to occur on function words for preschool CWS, particularly for 3- and 5-year old CWS, utterance length relative to a child's MLU does not appreciably influence the distribution of function and content words across an utterance, nor whether a function word or a content word is stuttered.

Thus, based on these preliminary findings, the influence of MLU on stuttering (e.g., Zackheim & Conture, 2003) appears relatively independent of the influence of word class on stuttering. Perhaps other "third-order" variables, for example, position within the sentence where stuttering occurs, may better tie together these two seemingly independent influences on the stutterings of preschool-age children who stutter.

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References available upon request.
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