Does Syntactic Complexity Affect the Disfluency Frequency in School-Age Children?

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Introduction

It is well established that syntactic complexity affects the speech fluency of preschool-aged children with typical fluency and children who stutter. Preschoolers who stutter and preschoolers with typical fluency are more likely to produce stutter-like disfluencies on utterances containing relatively many grammatical constituents (Logan & Conture, 1997; Logan & LaLelle, 2003). The effect size is large, and independent of the number of syllables in an utterance. Others have reported that children produce more stutter-like disfluency on late-developing sentence types (e.g., embedded relative clauses) vs. early-developing sentence types (e.g., Bernstein Ratner & Sh, 1987). Such sentence types, however, inherently lead to increases in the numbers of words and words per utterance—variables which also affect preschoolers’ fluency as well (Logan & Conture, 1997).

Studies with adolescents and adults suggest that the effect of syntactic complexity on fluency diminishes or is more subtle with age:

- Silverman and Bernstein Ratner (1997) presented a sentence imitation task to adolescents and found no effect for syntactic complexity on frequency of stutter-like disfluency for typical speakers or speakers who stutter. Logan (2001) reported similar results for a sentence repetition task with adolescents and adults who stutter.

- Tsantoulis and Cairns (2009) reported that adults who stutter exhibited slower speech initiation times than fluent speakers; or “disfluent” (i.e., those containing only IRs – repetitions, prolonging, or blocking on the first three words of an utterance). (See Figure 1)

Structured Conversation Results

**Method**

- **Participants:** 34 children who stutter, 34 with typical fluency
  - All spoke English with native competence.
  - 30 males, 4 females per group
  - Ages: M = 8.2 years (SD = 1.6); Range: 5.6-10.7
  - Stutter severity: 16 mild, 13 moderate, 7 severe.

- **Data Collection:**
  - Audio-recorded speech samples using experimental variations of the Test of Childhood Stuttering (TCS; Gillam et al., 2009).
  - TOCS Structured Conversation (child responded to standard requests about an 8 picture-story sequence; 13 responses analyzed per child).
  - TOCS Modeled Sentences (sentence generation task; 18 responses analyzed per child).

- **Data Analysis:**
  - **Fluency analysis:** Responses transcribed; disfluent segments classified into two broad categories:
    - Repetitions/Prolongations/Blocks (RPs): repeated sounds, syllables, parts of words, whole words; prolonged speech sounds; physically tense speech sounds;
    - Interjections/Revisions (IRs): semantically unproductive speech (e.g., “um”) or speech that was subsequently revised, with no RPBs.
  - Utterances were coded as “fluent,” “stutter-like” (i.e., those containing RPs); or “disfluent” (i.e., those containing only IRs — not used in present study).

- **Utterance complexity analysis:**
  - Number of syntactic constituents per utterance:
    - Noun phrases: word(s) that function as subjects or objects within utterance
    - Verb phrases: word(s) that function as predicate
    - Adverbials: word(s) that modify verb phrase
    - Complement: word(s) that follow copula verbs and modify subject noun phrase.
  - Number of words and syllables per utterance (excluding repeated or revised speech, interjections).

- **Comparisons:**
  - Fluent utterances were compared to utterances that contained “stutter-like” disfluency for the number of words, syllables, and syntactic constituents they contained.
  - Stutter-like utterances were limited to those containing repeating, prolonging, or blocking on the first three words of an utterance. (~70% of all SLDs occurred w/in 3 words of utts.)

Discussion

**Results**

- Results provide support for the idea that stutter-like and fluent utterances are distinguishable on the basis of syntactic structure in school-aged children.

- Stutter-like utterances contained significantly more syntactic constituents than fluent utterances in both fluency groups during a sentence production task (but only approached significance during a conversational task).

- Syllable and word measures distinguished between the utterance types also.

**Additional research with larger samples is needed to contrast fluent and stutter-like utterances that are matched for the number of syllables/words within.**

Selected References