



Influence of Syntactic Complexity on the Stuttering of Spanish-Speaking Children

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Abstract

This study examined the influence of syntactic function and structure on stuttering in the speech of young monolingual, Spanish-speaking children. The fluency of longer and shorter utterances during spontaneous speech was examined with results indicating that length rather than syntactic function and form appears to influence the child's ability to maintain fluency.

Background

- Studies have demonstrated that for some young English-speaking children, increased utterance length and/or syntactic complexity, are associated with increased stuttering (e.g., Bernstein Ratner & Sih, 1987; Gaines, Runyan & Meyers, 1991; Logan & Conture, 1995, 1997; Weiss & Zebrowski, 1992; Yaruss, 1999; Zackheim & Conture, 2003).
- Some reports suggest that certain syntactic structures (e.g., function) may be related to increased stuttering (e.g., Weiss & Zebrowski, 1992; Yaruss, 1999). Results as to whether or not utterance length contributes to these effects have been equivocal.

- Limited studies have been completed examining the linguistic characteristics of stuttered speech in languages other than English (e.g., Au-Yeung, Gomez & Howell, 2003; Carias & Ingram, 2006; Jayaram, 1983; Ratner & Benitez, 1985; Watson, Byrd, & Carlo, 2007).
- This report is one of a series of studies (e.g., Watson, 2005; Watson & Byrd, 2006; Watson, Byrd & Carlo, 2007, 2008) that have examined the characteristics of stuttering in monolingual children who speak Spanish. This study asked, when controlling for utterance length, are there fluency differences in spontaneous speech utterances when using different syntactic functions and structures?

Method

Participants

- Participants were 11 children (7 boys and 4 girls), 2;11 to 5;3 ($M=4;3$).
- All were monolingual Spanish-speakers, born and raised in Puerto Rico.
- SSI-3 Scores ranged from 10 to 37 ($M= 19.9$; $SD= 7.76$), with mean age of stuttering onset of 31.55 ($SD = 15.15$).
- Parents of four children reported a family history of stuttering.
- All participants had skills in sound production, voice, language, and hearing within normal limits based on criterion referenced norms for children from Puerto Rico.

Data Collection

- Video-taped spontaneous speech samples were obtained while the child interacted with and described pictures to a Puerto Rican, Spanish-speaking clinician.
- Samples contained a total of 5420 words, ranging from 300 to 651 words and a total of 6856 syllables, ranging from 356 to 835 ($M = 623.27$; $SD = 144.86$).
- Each speech sample, including both the clinician's and child's utterances, was orthographically transcribed verbatim by bilingual (Spanish-English) research assistants.
- Transcripts were reviewed and corrected by a Puerto Rican, Spanish-speaking researcher familiar with the dialectal variations of Spanish spoken in Puerto Rico.
- Once corrected, each transcript was transferred to the computerized language analysis system, *Systematic Analysis of Language Transcripts (SALT)* (Miller & Iglesias, 2006).

Data Analysis

- Utterance segmentation was independently completed by two bilingual research assistants and compared to resolve any discrepancies, yielding 100% agreement in segmentation for all samples.

- An utterance was defined as a series of words separated by a pause, conveying an idea, and bound by a single intonational contour (Logan, 2003; Meyers & Freeman, 1985, Yaruss, 1999). To account for the highly inflected verb system in Spanish (Anderson, 2007; Gutierrez-Ciellen, 2000), a single word was considered an utterance if it was a verb plus a subject and/or object (whether or not it was conjugated correctly).
- A total of 1044 utterances (49 to 124 utterances per child; $M = 94.9$; $SD = 21.0$) was included in the analyses.
- An utterance was classified as stuttered if it contained sound, syllable, and/or monosyllabic word repetitions, blocks, and/or prolongations (Ambrose & Yairi, 1999). An utterance was classified as fluent if it contained no disfluencies, including no revisions, interjections, unfinished or broken words, and/or phrase or polysyllabic word repetitions. A total of 246 stuttered utterances and 717 fluent utterances were examined.
- Utterance length was determined by counting the number of syllables (excluding repetitions) in each utterance. In order to address possible length effects, the 50 percentile of syllable numbers was identified for each child and used to determine the relative utterance length for each participant. Utterances were then divided as shorter or longer and analyzed separately.
- Grammatical function and syntactic complexity (e.g., simple, complex) were determined for each utterance. In addition, a variety of syntactic forms were examined.

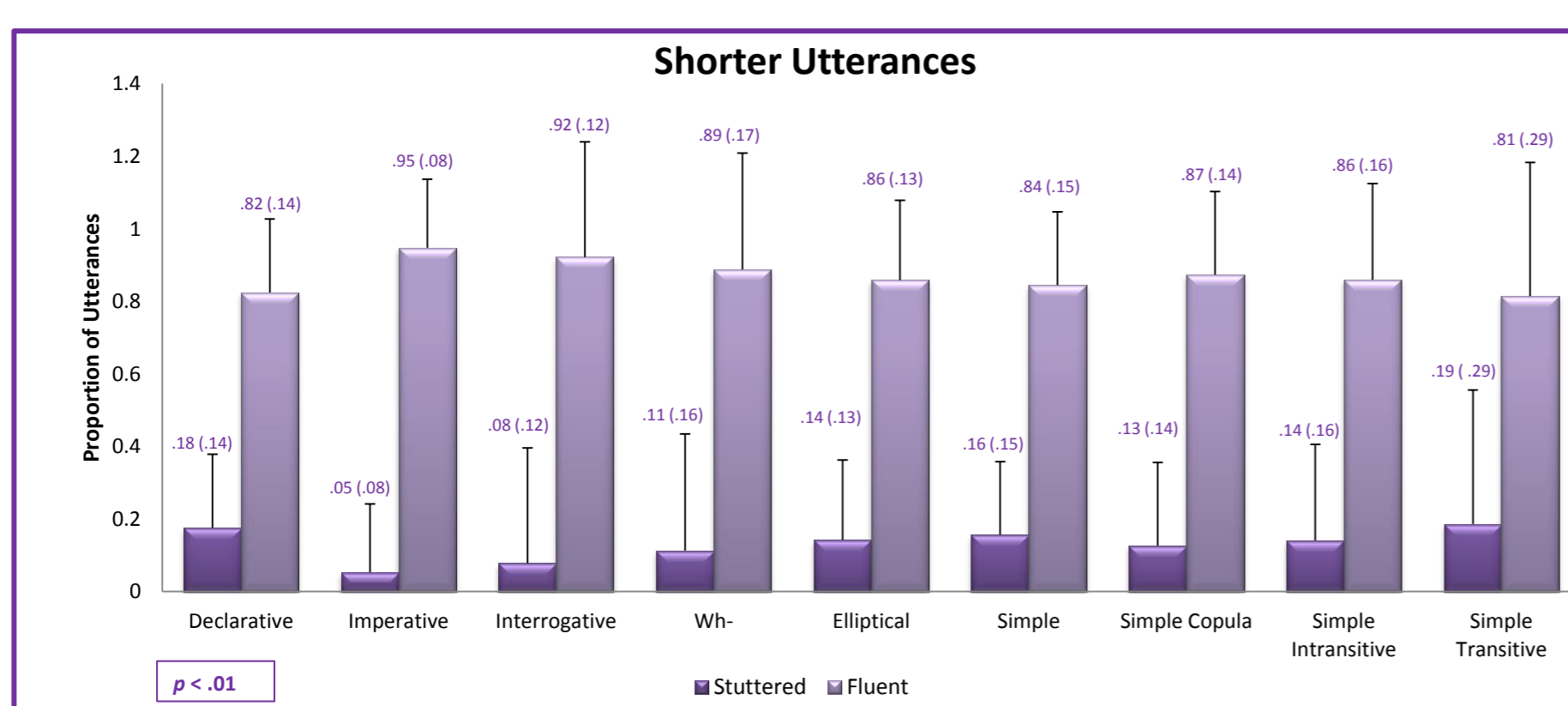
Reliability

- Inter- and intra-rater reliability estimates based on two randomly selected participants yielded Cohen's Kappa coefficients of .965 and .982 for fluency categorization and Pearson correlation coefficients of .991 and .993 for syllable counts.
- Function and structure features were identified by 2 Spanish-speaking researchers from Puerto Rico. Utterances that did not result in 100% agreement and/or were ambiguous were excluded from the analyses.

Results

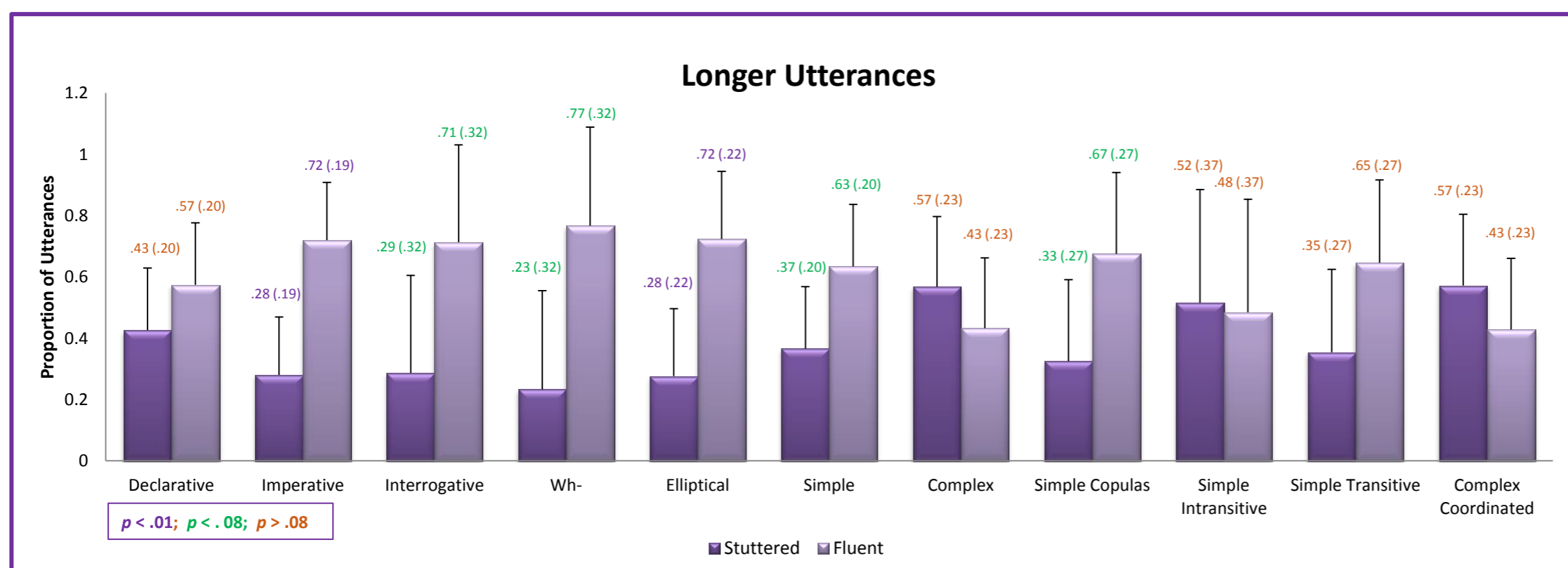
Functions and Structures Examined	
Function	Declarative, Imperative, Interrogative, Desiderative¹ , Admiring , Doubting
Question Forms	Wh- (i.e., qué, quién, dónde, cuál, cómo, cuándo, por qué, con qué, con quién, para qué, para quién, para dónde, cuánto.), Yes/No , Tag
Utterance Structure	Elliptical, Simple, Complex
Simple Forms	Copula, Intransitive, Transitive, Reflexive , Impersonal , Passive , Reciprocal , Unipersonal
Complex Forms	Coordinated, Subordinated
Coordinated Forms	Juxtaposed , Copulative , Disjunctive , Opposing , Causal , Consecutive
Subordinated Forms	Substantive , Adjectival , Adverbial

¹Functions and forms in color did not meet the inclusion criteria (i.e., present in at least 5% of the utterances ; used by at least 9 participants) and were excluded from further analyses.



Finding 1 (Shorter Utterances):
In the shorter utterances, significantly more fluent utterances than stuttered utterances were observed in all functions and forms used by the participants.

Finding 2 (Longer Utterances):
In the longer utterances, there were significantly more fluent utterances than stuttered utterances when imperatives and elliptical responses were used. In addition, there was a trend for more fluent than stuttered utterances when participants used interrogatives, Wh- questions, simple utterance structures, and copulas in simple structures.



Finding 3 (Longer Utterances):
In the longer utterances, no significant differences between stuttered and fluent utterances were noted when the participants used declaratives, complex utterances, intransitives, transitives, and coordination, suggesting increased stuttering in utterances containing these functions and forms. For the declaratives, intransitives and transitives, more stuttering was observed in longer but not shorter utterances. Inadequate occurrences of complex structures and coordination in shorter utterances did not allow for examination of the influence of length with these structures.

Conclusions and Discussion

Finding 1: In shorter spontaneous utterances of this sample of Spanish-speaking children, the use of specific syntactical functions and forms was not related to increased stuttering.

The use of specific grammatical functions (i.e., declaratives, imperatives, interrogatives) and structures (i.e., wh- question forms, simple forms, and copulas, intransitives and transitives in simple structures) did not appear to disrupt the child's fluency when produced in utterances that were short for that child.

Findings 2 and 3: In longer spontaneous utterances, stuttered and fluent utterances containing declaratives and select simple and complex forms were statistically equivalent, indicating more stuttering when they were used by the child. However, when these function/forms were present in both longer and shorter utterances,

increased stuttering was noted only in the longer utterances. This outcome suggests that utterance length, rather than form and function, may have a stronger impact on fluency.

This exploratory study examined specific syntactical functions and forms used by preschool Spanish-speaking children. Additional studies investigating these as well as other functions and forms while controlling for length are needed to confirm these outcomes. Moreover, longer samples collected in a variety of contexts, inclusion of additional participants, and use of experimental along with naturalistic paradigms may enhance support for these current findings. Further, systematic study of the influence of age, the child's proficiency in function and form use, and potential dialectal differences (e.g., Mexican versus Puerto Rican Spanish) is needed.