Title: Characterization of Dysfluencies in Speech Flow in Males with Fragile X Syndrome

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Introduction: Fragile X Syndrome (FXS), the leading inherited cause of intellectual disability, is caused by a mutation in a single gene on the X chromosome. Individuals with FXS demonstrate impairments in multiple aspects of expressive language, including particularly high rates of atypical linguistic behaviors. For example, dysfluencies in the flow of connected speech, such as a revision (e.g., “he, I mean she”), are observed at higher rates in individuals with FXS relative to those with other neurodevelopmental disorders and typically developing individuals of similar nonverbal cognitive levels. Dysfluencies in speech flow, particularly when at high rates, are likely to negatively impact intelligibility and communicative success. Importantly, these types of dysfluencies can result from a number of linguistic and non-linguistic factors. In the present study, we sought to: (1) characterize the pattern of dysfluencies in speech flow (revisions, repetitions, filled pauses) in male youth with FXS and (2) elucidate the factors (nonverbal cognitive ability level, syntactic maturity, working memory, anxiety, and autism symptomatology) contributing to these dysfluencies.

Method: Participants were 34 males with FXS, ranging in age from 10.17 - 16.01 years (M=12.82; SD= 1.77). All participants, based on parent report, demonstrated regular use of at least two-word phrases and occasional use of three-word phrases. Language dysfluencies (i.e., revisions, repetitions, filled pauses) were assessed during a semi-structured 10-minute conversation task with a trained examiner. The following types of dysfluency were coded: (a) revisions – modification of an immediately preceding utterance; (b) repetition – a linguistic unit that is repeated verbatim; and, (c) filled pauses – a hesitation/interruption in the speech stream which includes a filler such as “uh” or “um”. In addition, for each participant, data was collected on nonverbal cognitive ability (Leiter-R), syntactic maturity (mean length of utterance in morphemes during conversation task), working memory (Working Memory Test Battery for Children Digit Recall), and anxiety (CBCL).

Results: Comparable rates of occurrence were observed across the different dysfluency types: revisions (M = 9.91, SD = 9.82), repetitions (M = 11.32, SD = 14.41), and filled pauses (M = 11.91, SD = 16.13). Furthermore, the different dysfluency categories were significantly correlated with one another (rs > .59, ps < .001). When considering the factors associated with dysfluency, increased syntactic maturity was associated with lower occurrences of all dysfluency types and increased anxiety was associated with a greater occurrence of all dysfluency types. Working memory was observed to be positively associated with higher rates of revisions and filled pauses. Finally, nonverbal IQ was positively associated with the occurrence of revisions. Results from regression models indicated that working memory was the strongest unique contributor to the occurrence of both revisions and filled pauses.

Discussion: Findings from this study suggest that, in males with FXS, different language dysfluency types (revisions, repetitions, and filled pauses) occur at comparable rates and are associated with one another, suggesting some shared mechanism(s). Although there was some variation in the factors associated with dysfluency types, our data indicate that both linguistic and nonlinguistic factors are associated with all types of language dysfluencies. Increased rates of revisions and filled pauses appeared to be best predicted by better working memory capacity. It may be that as youth are demonstrating increases in their working memory capacity, they are attempting more complicated utterances but are encountering difficulties organizing and planning their linguistic productions. Data analyses are ongoing to consider if the occurrence of dysfluencies is impacted by expressive language sampling context (conversation versus narration). Theoretical implications will be discussed.
References/Citations: