



Linguistic Maze Production by Children with ADHD

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Introduction

- Linguistic mazes are disruptions in speech flow that do not add content to the speaker's message. There are four main maze types:

Pauses	Filled: "I (uh) went shopping." Silent: "I... went shopping."
Repetitions	"(We) we went to the store."
Revisions	"(My brother, I mean) my sister said I could go."
Orphans	"I went to the... Tomorrow is Friday."

- Maze use is associated with weaknesses in language and executive functioning, and occurs more frequently in linguistically challenging contexts (Leadholm & Miller, 1992; Thordardottir & Weismer, 2002).
- Each maze type is likely to have a different underlying cause.

Revisions	Filled Pauses	Repetitions
Reflect development of an external monitoring route used to repair inaccuracies between intended message and speech output (Rispoli et al., 2003; 2008).	Linked to metalinguistic and pragmatic skills; used to indicate that the speaker is "holding the floor." (Thordardottir & Weismer 2002)	Indicative of a processing conflict during speech production (Leadholm & Miller, 1992).

- Children with attention deficit hyperactivity disorder (ADHD) have elevated rates of maze use, possibly due to deficits in executive functioning (Redmond, 2004), but little is known regarding their production of different maze types in different language sampling contexts.

Research Questions

- Do children with ADHD produce revisions, filled pauses, and repetitions at different rates?
- Does maze use by children with ADHD differ based on sampling context (i.e., conversation vs. narration)?

Participants

	Children with ADHD (n = 26)		
	Mean	Min-Max	SD
Age (yrs)	9.75	5.83-12.67	1.84
NVIQ ^{a,b}	96	75-117	11.94
MLU	4.92	3.2-6.8	.9

^aStandard score with Mean = 100, SD = 15; ^bBased on the DAS-II

Method

As part of a larger study (Bishop, Huerta, & Lord, in preparation), participants completed a full ASD diagnostic assessment, including language and cognitive testing:

- Autism Diagnostic Observation Schedule (ADOS; Lord et al., 2000),
- Clinical Evaluation of Language Fundamentals (CELF-4; Semel, Wiig, Secord, 2003), and
- Differential Ability Scales-II (DAS-II; Elliott, 2007).

Research assistants transcribed video recordings of the ADOS using Systematic Analysis of Language Transcriptions (SALT; Miller & Chapman, 2000) conventions, including maze notations.

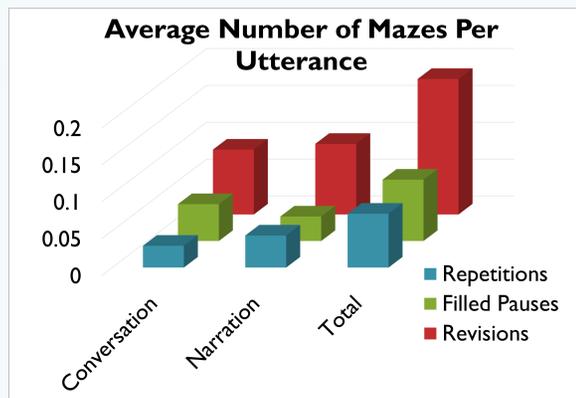
Transcription started at the beginning of the assessment and ended once 100 utterances that contained an overt subject and verb were transcribed.

For contextual analysis, we classified all subtests of the ADOS as either conversational (i.e., construction task, joint interactive play, make believe play, and conversation) or narrative (i.e., demonstration task, description of a picture, telling story from book, cartoon, creating a story) language.

Results

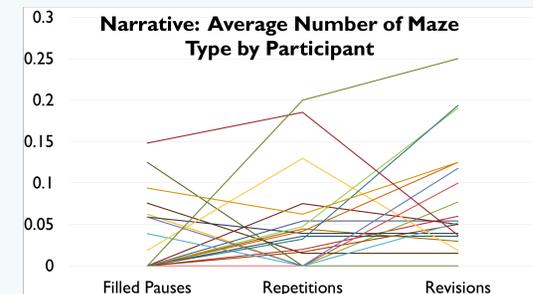
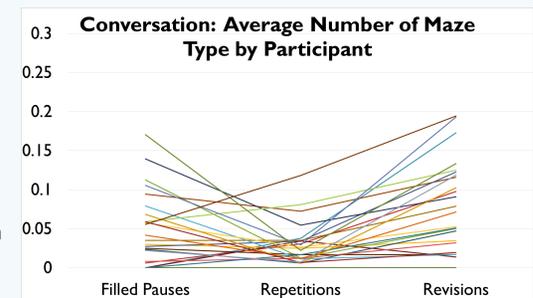
Question 1: Linguistic Maze Profile of Children with ADHD

- We used Wilcoxon signed-rank tests to compare maze type productions.
- Children used significantly more revisions than repetitions and filled pauses ($p = .01$, $p < .01$).
- We found no significant differences between use of filled pauses and repetitions ($p = .22$).



Question 2: Maze use and context

- Children used significantly more filled pauses in conversation than narration ($p < .01$).
- No other significant differences across contexts were found.
- A general pattern across individuals emerged in the conversation context, with fewer repetitions than filled pauses and revisions.



Conclusions

- Children with ADHD in this study used more revisions than filled pauses and repetitions in both conversation and narrative contexts. This suggests children with ADHD have relatively strong external monitoring systems of speech output.
- Context comparisons revealed that conversation contained significantly more filled pauses than narration. This could be because during narrative production, there is less demand for the speaker to indicate that they "hold the floor."
- To gain a better understanding of this population's linguistic profile, future analysis should examine the relationship between maze use and individual characteristics such as age, IQ, and language ability.