

## Introduction

- Metalinguistic awareness is the ability to think about and reflect on language. Children with strong metalinguistic abilities tend to have strong language skills, and vice versa (Bialystok, 1988; Fujiki, Brinton, & Dunton, 1987; Kamhi, Lee, & Nelson, 1985; Redmond & Rice, 2001).
- Little is known about the course of metalinguistic development for children with developmental disabilities, including those with autism spectrum disorder (ASD).
- Increased knowledge of metalinguistic development in children with ASD is important to better understand the co-development of cognitive and language skills and improve how language is taught to this population.
- This longitudinal study examined changes in metalinguistic abilities over one year (between Time 1 and 2), and compared growth in children with ASD and those with typical development (TD). Specifically, our research questions were:



## Participants

- The ASD group included seven 6- to 9-year-old children with ASD who were involved in a longitudinal study designed to evaluate the use of language sampling as an effective outcome measure.
- The TD group included seven age-, sex-, and ethnicity-matched TD children who were part of another longitudinal study investigating typically development of metalinguistic skills.

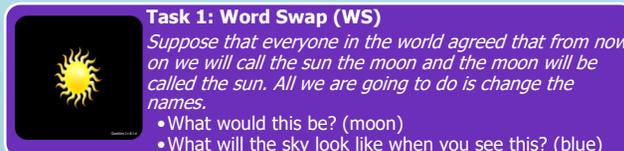
	ASD	TD
Age (Year : Month)	6:2 - 9:8	6:2 - 9:11
Sex (Male : Female)	5:2	5:2
Ethnicity (White: Hispanic)	6:1	6:1

	ASD	TD	<i>P</i> ( <i>d</i> )
Nonverbal IQ SS <sup>a</sup>			
Range	84-125	76-117	0.71
Mean	102.14	105.14	(0.19)
SD	15.86	14.37	
Expressive Language SS <sup>b</sup>			
Range	6-16	7-17	0.88
Mean	11.14	10.86	(0.07)
SD	3.76	3.34	
ASD Symptom Severity <sup>c</sup> (Moderate : High)	4:3	N/A	N/A

<sup>a</sup>Nonverbal IQ SS = Nonverbal IQ Standard Score; for ASD group, based on the Stanford-Binet Intelligence Scales- Fifth Edition (Roid, 2003); for TD group, based on the Kaufman Brief Intelligence Test- Second Edition (Kaufman & Kaufman, 2004). <sup>b</sup>Expressive Language SS = Expressive Language Scaled Score from the Clinical Evaluation of Language Fundamentals- Fourth Edition (Semel et al., 2003); for ASD group, based on the Formulated Sentences subtest; for the TD group, based on the Recalling Sentences subtest. <sup>c</sup>ASD symptom severity was determined by the Autism Diagnostic Observation Scale- Second Edition (Lord et al., 2012).

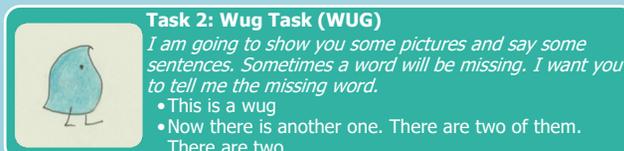
## Procedures and Statistical Analysis

- At two time points that were one year apart, all participants completed a metalinguistic probe that consisted of the following three tasks:



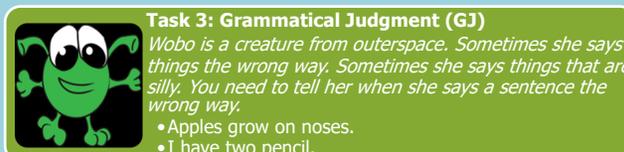
**Task 1: Word Swap (WS)**  
*Suppose that everyone in the world agreed that from now on we will call the sun the moon and the moon will be called the sun. All we are going to do is change the names.*

- What would this be? (moon)
- What will the sky look like when you see this? (blue)



**Task 2: Wug Task (WUG)**  
*I am going to show you some pictures and say some sentences. Sometimes a word will be missing. I want you to tell me the missing word.*

- This is a wug
- Now there is another one. There are two of them. There are two \_\_\_\_\_.



**Task 3: Grammatical Judgment (GJ)**  
*Wobo is a creature from outer space. Sometimes she says things the wrong way. Sometimes she says things that are silly. You need to tell her when she says a sentence the wrong way.*

- Apples grow on noses.
- I have two pencil.

- For Research Questions 1 and 3, we conducted a series of non-parametric t-tests with two tails for each task and overall performance. For Research Question 2, we employed non-parametric paired t-tests with one tail (assuming growth after a year) for each task and overall performance.

## Results

	ASD	TD	<i>p</i> ( <i>d</i> )
Time 1 (T1)			
WS	0.60	0.69	0.50 (0.38)
WUG	0.54	0.63	0.54 (0.33)
GJ	0.78	0.76	0.82 (0.12)
Overall	0.63	0.69	0.61 (0.32)
T2-T1			
WS	<b>0.32</b>	-0.07	<b>* &lt;0.01</b> (2.68)
WUG	<b>0.31</b>	<b>0.18</b>	0.31 (0.59)
GJ	0.02	0.01	0.85 (0.06)
Overall	<b>0.22</b>	<b>0.07</b>	0.05 (1.12)

### Research Question 1 (ASD vs. TD at T1)

- No significant differences between groups on any tasks (all *p*'s > 0.49).

### Research Question 2 (T1 vs. T2 for each group)

- For ASD, significant differences were found based on WS ( $t = -5.35, p < .01$ ), WUG ( $t = -3.01, p = .01$ ), and overall performance ( $t = -3.72, p < .01$ ).
- For TD, significant differences were found based on WUG ( $t = -2.36, p = .03$ ) and overall performance ( $t = -2.01, p = .04$ ).

### Research Question 3 (ASD vs. TD: T2-T1)

- Significant difference in growth was found based on WS ( $t = 7.78, p < 0.01$ ) between ASD (M = 0.32, SD = 0.16) and TD (M = -0.07, SD = 0.14).

## Conclusions

- The metalinguistic skills of children with ASD and children developing typically are not significantly different.
- Both groups of children demonstrated overall growth in metalinguistic abilities over a 1-year time period, which was likely driven by changes in performance on the Wug Task. This task may be sensitive in measuring metalinguistic development for children within this age range.
- The ASD group had greater gains on the Word Swap task than the TD group, suggesting that children with ASD may have a greater advantage in metalinguistic abilities than their TD peers.

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