

## Introduction

- Metalinguistic skills, the ability to think about and reflect on language, is related to language development such that children with strong metalinguistic abilities tend to be children with strong language skills (Bialystok, 1988).
- Knowledge of metalinguistic development is important to better understand the co-development of cognitive and language skills to improve how language is taught to children with language-learning weaknesses.
- Little is known regarding the development of metalinguistic skills in young children.
- This study examines longitudinal changes in metalinguistic ability and its relationship to language and cognitive ability in typically developing children.

## Research Questions

- Are the metalinguistic tasks used in this study sensitive to developmental changes in metalinguistic ability in 3- to 8-year-old children over the course of one year?
- Are there differences in metalinguistic growth across age groups?
- What is the relationship between metalinguistic awareness, cognitive abilities, and language abilities of typically developing children?

## Method

- At the 2014, 2015, and 2016 Minnesota State Fair, we recruited approximately 750 typically-developing children aged 3- through 8-years and their parents to complete our assessment battery.
- Children completed the Matrices subtest of the Kaufman Brief Intelligence Test, 2<sup>nd</sup> Edition (KBIT-2; Kaufman & Kaufman, 2004), Recalling Sentences subtest of the Clinical Evaluation of Language Fundamentals (CELF; Semel, Wiig, & Secord, 2006), and a metalinguistic awareness probe.
- Metalinguistic probe comprised tasks used by other researchers to evaluate vocabulary and morphology metalinguistic skills.
- Over the 3-year period, 31 participants returned the next year. In this study, we analyzed these participants' performance over time using within-subject analyses.

Many thanks to the children and families who participated in this study.

## Participants

Characteristic	AGE GROUP			
	3 n = 8	5 n = 9	6 n = 8	7 n = 6
Age (mo)				
Mean	41.7	65.11	76.75	89.83
SD	4.23	3.33	3.69	3.17
Gender				
Male:Female	4:4	5:4	5:4	3:3
Race				
White:Other	6:2	8:1	5:3	3:3
Income				
< \$50k	1	1	0	0
\$50-\$100k	1	4	4	2
>\$100k	6	4	4	4
CELF-4 Recalling Sentences <sup>a</sup> (SS)				
Mean	12	12.29	10.86	11.5
SD	2.65	1.96	2.03	2.17
Min-Max	9-14	10-16	8-14	8-14
KBIT Nonverbal IQ <sup>b</sup> (Age 3: raw, Age 5-7: SS)				
Mean	11.63	105	105.6	106.5
SD	5.71	9.82	15.63	16
Min-Max	4-20	92-121	83-127	76-120

<sup>a</sup>Scaled score with Mean = 10, SD = 3 based on the CELF-4 - Recalling Sentences subtest. <sup>b</sup>Raw Score for Age 3, Standard score for Ages 5, 6, & 7 with Mean = 100, SD = 15 based on the Kaufman Brief Intelligence Test-2 - Matrices subtest.

## Metalinguistic Tasks



**Task 1: Word Manipulation**

- My friend and I are making up a new language. Could this be a gok? Yes it could. What is this?
- Can you eat a gok?
- Do goks have wheels?



**Task 2: Word Swap**

- 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 3: Wug Task**

- 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 4: Grammatical Judgment**

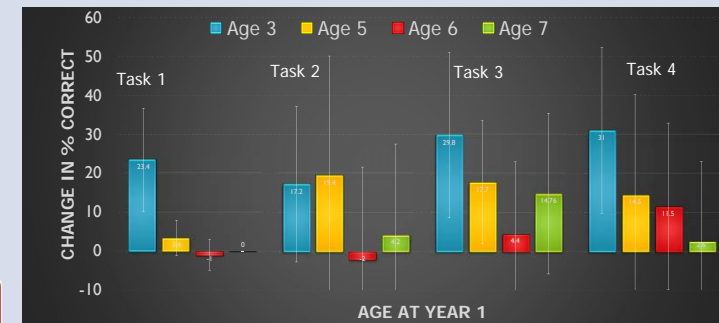
- Wobo is a creature from outer space. Sometimes she says things the wrong way. Sometimes she says things that are silly. You need to tell her when she says a sentence the wrong way.
- Apples grow on noses.
- I have two pencil.

## Results

- Question 1:** Overall, paired samples t-test collapsed across age groups revealed significant increases in performance across each of the metalinguistic tasks.
 

<b>Task 1</b> n = 31	<b>Task 2</b> n = 31	<b>Task 3</b> n = 31	<b>Task 4</b> n = 27
• Mean Y1: 88% • Mean Y2: 95% • t = -3.1 • p < .01*	• Mean Y1: 62% • Mean Y2: 72% • t = -2.3 • p = .03*	• Mean Y1: 45% • Mean Y2: 62% • t = -4.62 • p < .01*	• Mean Y1: 58% • Mean Y2: 72% • t = -3.02 • p < .01*

  - Nonparametric Wilcoxon Signed Rank Tests revealed:
    - ✓ Age 3 participants significantly improved performance on Tasks 1, 2, and 3 ( $p < .05$ ).
    - ✓ Age 5 participants significantly improved on Task 4 ( $p = .02$ ).
- Question 2:** ANOVA comparing mean % change indicated significant group differences for Task 1 ( $p < .01$ ).
  - Post-hoc paired comparisons revealed that for Task 1, the Age 3 participants had greater mean % change than the age groups.



- Question 3:** Paired Samples Correlational Analysis indicated no significant relationships between task performance from Y1 to Y2 and cognitive and language measures.

## Conclusions and Limitations

- Overall, the mean performance on all tasks increased over the course of one year, but results were not significant for 5-, 6-, and 7-year-olds when analyzed separately. This is likely due to the small sample size within age groups and large overlap in SDs.
- A significant limitation was an n of 1 for our Age 4 group. We did not include that participant in our analyses, and could not make inferences on the change in 4-year-old children.
- The study probe has the potential to successfully evaluate metalinguistic development in typically developing children, especially younger children (ages 3-5); however, future research needs to include a larger sample size that includes 4-year-olds and potentially more difficult tasks for older children.