

The authors have no financial or nonfinancial relationships to disclose.

Background

- Metalinguistic skills reflect the knowledge that language is made up of grammatical, semantic, and morphological properties, as well as the ability to process these features.
- Previous research has shown that children with lower language abilities also demonstrate lower metalinguistic skills; however, there is limited evidence across a battery of tasks and ages.
- The current study aims to evaluate the **relationship between language and metalinguistic skills in 3- to 8-year old children** of typical development and children with low language abilities across tasks that assess both knowledge of linguistic features and the ability to process them.

Participants

- Participants were recruited at the 2014-2018 Minnesota State Fairs in a university sponsored research building.
- 48 children were identified with low language abilities using expressive language assessment.
- Children were included in the low language group if they received a scaled score of 6 or lower on the Recalling Sentences of the CELF-4/P.
- Children with low language abilities were matched with typically developing peers based on age, gender, ethnicity, and household income.

Characteristic	3- & 4-Year Olds		5- & 6-Year Olds		7- & 8-Year Olds	
	TD (n = 15)	LL (n = 15)	TD (n = 17)	LL (n = 17)	TD (n = 16)	LL (n = 16)
Age (months)						
Mean	49.44	50.44	74.18	74.71	94.56	94.06
SD	6.22	7.13	6.2	6.29	6.98	7.31
Min-Max	38-59	37-59	61-83	68-83	85-106	84-104
Language¹ (standard score)						
Mean	11.33	4.47	11.65	5.29	11.69	4.75
SD	2.47	1.81	2.32	1.36	2.92	1.57
Min-Max	7-16	0-6	7-16	1-6	7-18	1-6
Nonverbal IQ² (scaled score)						
Mean	13.40*	9.80*	108.35	92.24	110.30	94.63
SD	4.34*	3.49*	7.39	13.17	9.62	14.01
Min-Max	5-21*	2-15*	96-120	64-121	88-129	73-116
Gender						
Female:Male	10:6	10:6	5:12	5:12	9:7	9:7
Race						
White:Other	15:1	12:4	14:3	11:6	14:2	14:2
Household Income (USD)						
\$0-\$50,000	4	3	3	5	2	4
\$50,001-\$150,000	9	10	12	10	10	8
\$150,001+	3	3	2	2	4	4


Clinical Evaluation of Language Fundamentals (CELF-4; Semel, Wiig, Secord, 2003), Recalling Sentences (RS) subtest; Kaufman Brief Intelligence Test (KBIT-2; Kaufman & Kaufman, 2004), Matrices subtest; *Based on raw scores

Procedure

- Tasks included an expressive language assessment, a nonverbal cognitive assessment, and a metalinguistic probe.
- Assessments were administered by trained research assistants in 30 minute sessions.


Tasks

- Clinical Evaluation of Language Fundamentals* (CELF-4; Semel, Wiig, Secord, 2003), Recalling Sentences (RS) subtest: assesses expressive syntax and morphology.
- Kaufman Brief Intelligence Test* (KBIT-2; Kaufman & Kaufman, 2004), Matrices subtest: assesses nonverbal cognitive abilities.
- Metalinguistic Probe*: evaluates ability to analyze and manipulate vocabulary and grammatical forms. See description of tasks below.



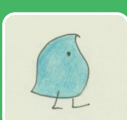
Task 1: Word Manipulation

- 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.
- 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 ____.



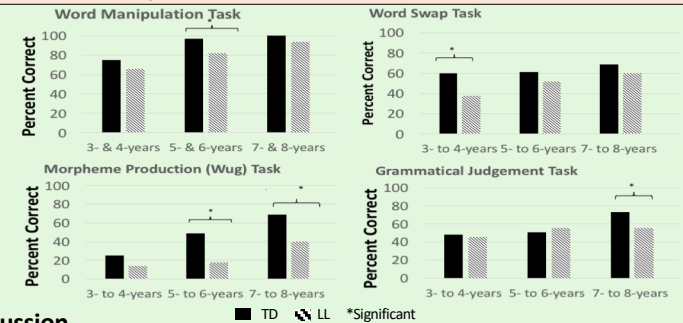
Task 4: Grammatical Judgment

- Wobo is a creature from outer space. Sometimes she says things the wrong way. Sometimes she says things that are silly.
- Apples grow on noses.
- I have two pencil.

Results

- Results from ANOVA indicated large significant effects for age ($F(8, 132) = 8.43, p = .001$) and language abilities ($F(4, 66) = 6.93, p = .001$).
- A nonsignificant interaction between age and language was also identified ($F(8,132) = 1.85, p = .07$).
- T-tests revealed the following significant differences between the typically developing and low language groups:

Metalinguistic Task		Age Group					
		3- & 4-Year Olds		5- & 6-Year Olds		7- & 8-Year Olds	
		TD	LL	TD	LL	TD	LL
Word Manipulation	Mean	75.00	66.25	97.32	81.67	100.00	93.75
	SD	20.46	21.50	72.37	22.96	< 0.01	10.99
	p		0.26		0.02*		0.07
	d		0.42		0.29		0.80
Word Swap	Mean	60.00	38.33	61.76	52.21	69.53	60.16
	SD	22.76	19.17	17.38	19.38	20.90	16.59
	p		0.01*		0.14		0.17
	d		1.03		0.52		0.50
Morpheme Production	Mean	25.04	13.82	48.67	18.13	69.75	40.07
	SD	20.82	20.07	17.10	18.84	18.91	27.02
	p		0.09		< 0.01*		< 0.01*
	d		0.55		1.70		1.23
Grammatical Judgement	Mean	48.19	44.69	51.00	56.28	73.00	56.21
	SD	12.46	17.54	13.07	11.65	20.66	14.35
	p		0.47		0.25		0.01
	d		0.23		0.43		0.94



Discussion

- Results support a relationship between language abilities and metalinguistic skills. Results indicate that children with higher language abilities outperform children with lower language abilities on metalinguistic tasks.
- Performance varied by task. For example, younger children performed higher on semantic versus syntactic tasks.
- Results further support how metalinguistic skills may be used to better understand language development and target language skills in children with low language abilities to promote increased language outcomes.
- Further research will help to develop how metalinguistic skills can be utilized for language intervention.