

Predictors of Individual Differences in Productive Vocabulary and Their Ability to Identify Late Talking Toddlers

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Late Talkers

Early delay in productive language (Rescorla 1989)

Identified between 18-35 months (Bishop et al., 2012)

Absence of any other developmental delays (Bishop & Edmundson, 1987)

No delay in receptive language (Rescorla, 2011)

Perform within normal range on non-verbal measures (Moyle et al., 2007)

Prevalence between 10% - 18% of toddlers- depending on criteria (Zubrick et al., 2007)

Language

Late talkers are typically identified on the basis of their productive vocabulary alone

Little research has been conducted on late talkers at the time of classification

Many late talking toddler's language skills eventually catch up to within the normal range

- There are no known methods for distinguishing which children will spontaneously catch up and which children will need interventions
(Bishop et al., 2012)

Predicting Outcomes

Most research focuses on later language skill of children with a history of language delay

But this focus is on children with persisting language impairments

STRONG

Speed of processing familiar words
(Fernald & Marchman, 2012)

Mean length of utterances (Rescorla et al., 2000)

Phonological skills (Thal et al., 2005)

POOR

Earlier late talking status

- Productive vocabulary at 24 months (Dale et al., 2003)

Research Questions

1. How well do other measures of language abilities predict individual differences in vocabulary at 24 months?
2. Can these measures be used to successfully identify children with a delay in productive vocabulary?

Sample and Design

Participants

- The Language 0-5 Project
- 79 Children
- 24 month productive vocabulary

Grouping

- Identified language ability based on productive vocabulary scores at 24 months
 - Bottom 25th percentile
 - Bottom 10 and middle 10 (MLU)

Analysis

- Regression analysis
- Receiver Operating Characteristic curve: Sensitivity and specificity

Predictors

18 month productive and receptive vocabulary

- Research shows mixed results predicting later language impairment from earlier vocabulary scores

(Duff et al., 2015)

Gestures

- Earlier use of gestures is associated with later vocabulary

(Rowe et al., 2008)

Non-word repetition

- Phonological memory has shown to correlate with vocabulary

(Gathercole & Adams, 1993)

Mean length of utterances

- MLU has been shown to relate to earlier language skills

(Rescorla et al., 2000)

Quality of input

- Rate of child directed speech is associated with expressive vocabulary

(Weisleder & Fernald, 2013)

Measures

UK-CDI

- Measures early language skills
- 18 month productive and receptive vocabulary, and gesture scores

Non-word repetition

- 25 month non-word repetition scores

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- Quality of input from 18-21 months
- Conversational Turn Count and Adult Word Count

Mean Length of Utterances

- Symbolic play sessions recorded and transcribed for the bottom and middle 10 participants
- Correlation between lab and home play sessions $r=.965$

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Correlations

	18 Month Productive Vocabulary	18 Month Receptive Vocabulary	Conversational Turn Count	Adult Word Count	Non-Word Repetition	Gestures 8 Months	Gestures 9 Months	11 Month Gestures	12 Month Gestures	15 Month Gestures	16 Month Gestures	18 Month Gestures
24 Month Productive Vocabulary	$r=.67$ ***	$r=.65$ ***	$r=.34$ **	$r=.19$	$r=.50$ ***	$r=.13$	$r=.17$	$r=.32$ **	$r=.29$ *	$r=.40$ ***	$r=.41$ ***	$r=.45$ ***

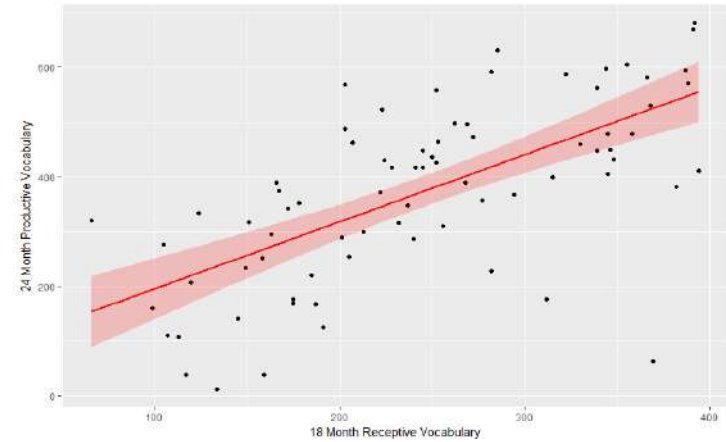
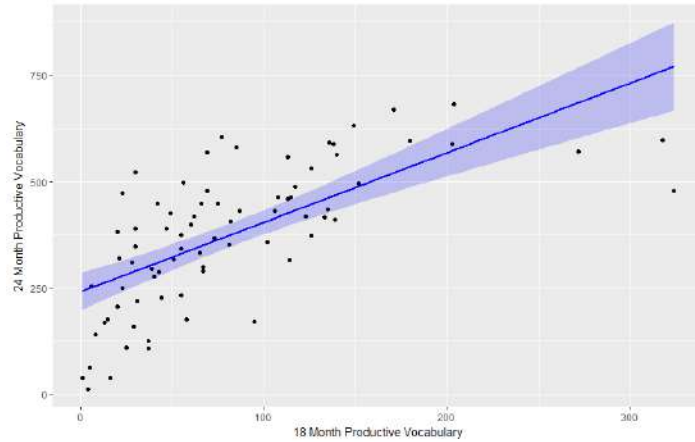
p values: * $<.05$ ** $<.01$ *** $<.001$

Retained	Removed
18 Month Productive Vocabulary	Adult Word Count
18 Month Receptive Vocabulary	Gestures 8 Months
Conversational Turn Count	Gestures 9 Months
Non-Word Repetition	Gestures 11 Months
Gestures 12 Months	Gestures 15 Months
Gestures 18 Months	Gestures 16 Months

Variables that correlated significantly were retained

Gesture variables checked for multicollinearity

Results



Predictor	Adjusted R^2	B	SE	t	p
18 Month Productive Vocabulary	0.45	1.63	0.21	7.89	***<.001
18 Month Receptive Vocabulary	0.55	0.75	0.17	1.3	***<.001
Non-Word Repetition	0.58	2.67	1.29	2.07	*.044
12 Month Gestures	0.51	-0.55	1.8	-0.31	.751
18 Month Gestures	0.55	1.62	1.98	0.82	.417
Conversational Turn Count	0.55	0.03	0.04	0.62	.540

p values: *<.05 **<.01 ***<.001

Sensitivity and Specificity Results

Sensitivity and specificity of MLU comparing the bottom 10 and median 10 participants

Predictor	Area	Significance	Cut-off	Sensitivity	Specificity
MLU	0.910	$p=0.02^{**}$	1.56	90%	80%

p values: * $<.05$ ** $<.01$ *** $<.001$

Sensitivity and specificity comparing the bottom 25th percentile and remaining participants

Predictor	Area	Significance	Cut-off	Sensitivity	Specificity
18 Months Productive Vocabulary	0.893	$p\leq.001^{***}$	46	84%	80%
18 Months Receptive Vocabulary	0.805	$p\leq.001^{***}$	206	84%	77%
Non-Word Repetition	0.830	$p\leq.001^{***}$	30	85%	73%

p values: * $<.05$ ** $<.01$ *** $<.001$

Successful Measures

Productive Vocabulary at 18 months

- Area under the curve = .893
- Best cut-off score= 46
- Sensitivity 84%, Specificity 80%

Receptive Vocabulary at 18 months

- Area under the curve = .805
- Best cut-off score: 206
- Sensitivity 84%, Specificity 77%

MLU at 24 months

- Area under the curve = .910
- Best cut-off score: 1.56
- Sensitivity 90%, Specificity 80%

Non-word Repetition

- Area under the curve = .830
- Acceptable sensitivity 84%
- Poor specificity 73%

Considerations and Future Research

Language 0-5 Project

- There are very few late talking toddlers in this group
- Speed of processing, family history, gender, and difference between receptive and expressive vocabulary
- Use regression results with the sensitivity and specificity results to establish risk factors

Recruiting late talking toddlers

- Toddlers will be identified at ~`18 months as late talking
- Working on the UK-CDI project's data to establish a cut-off for identification

Thank you for
listening

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