Linking Input and Vocabulary in Infancy to Preschool Language Skills

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BACKGROUND

- Correlates of early language abilities:

  - word quantity/quality and variety in the input (tokens & types) (e.g. Hurtado, et al. 2008; Weisleder & Fernald, 2013)

  - reading (Whitehurst, et al., 1988; Debaryshe, 1993)

  - demographic variables, incl. maternal education (e.g. Cohen & Beckwith, 1976) and gender (e.g. Huttenlocher, et al., 1991; Kimura, 1999)

What's missing?

- Longitudinal data from infancy

  - Input + early production

- Follow-up in preschool

- <u>Within</u> participants

DOES NOUN INPUT IN INFANCY PREDICT LATER LANGUAGE SKILLS?

RESEARCH QUESTIONS

1. **Validation of new preschool language measure**

   - Relation to infant and concurrent language measures

2. **Which aspects of early language input relate to preschool language skills, controlling for demographic influences?**

SEEDLINGS CORPUS

Longitudinal study of infants 0;6 → 1;6 and 3;6

Infant measures (0;6 – 1;6)
- Language input & production

Preschool measures (3;6)
- Language & cognitive assessments

n=37/44 children
- 84% completed 3;6 follow-up
- 19 girls, 97% white, 76% mothers have BA+
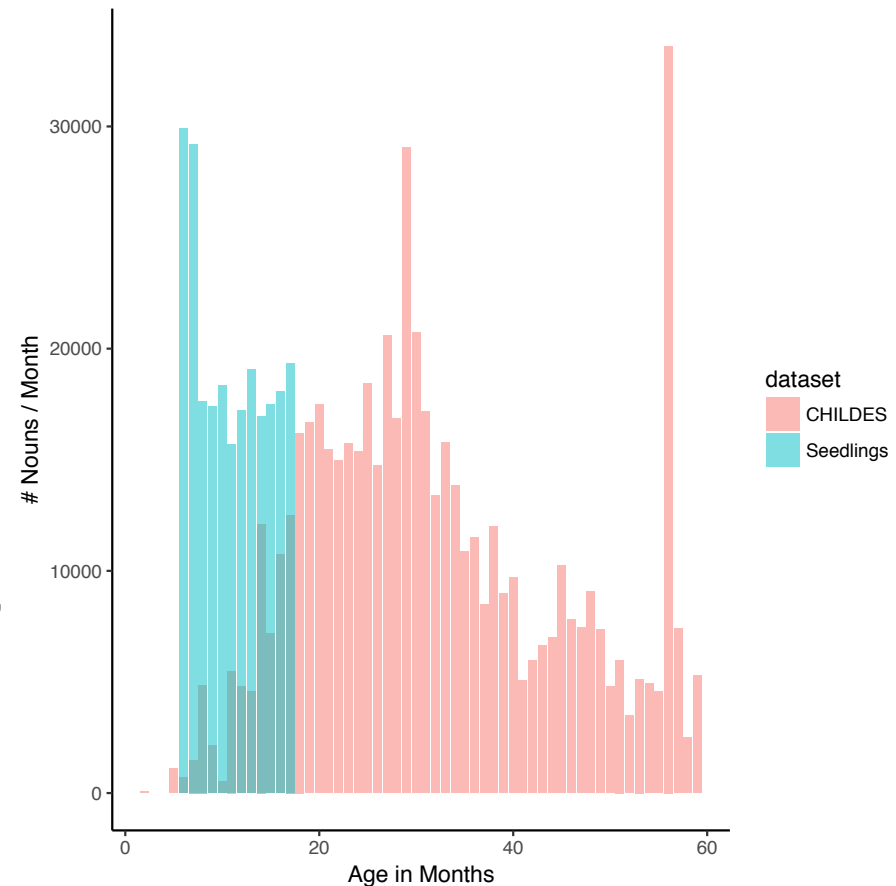- Missing data not random (ask me more)

INFANT MEASURES (0;6–1;6)

- Monthly daylong audio recordings (*n*=12/child)

- Monthly hourlong video recordings (*n*=12/child)

- **>500 audio recordings, >500 video recordings, ~9,000 hours**

Focus on concrete nouns

  - Dominant in early lexicon (Dale & Fenson, 1996) & linked to grammar development (Bates & Goodman, 1997)

INFANT LANGUAGE INPUT (0;6–1;6)

- Annotated *child-directed object words*

  - type of utterance (e.g. questions, reading, short phrases)
  - object co-presence (is the referent present & attended to)
  - speaker

- "Top" 3 audio hours + video hour each month per child

  - ~50 hours per kid
  - Compiled into child-level means across age for analysis

INFANT VOCABULARY (1;5)

- **Observed noun productions** in at-home recordings

- **Parent-reported comprehension & production** via vocabulary checklist (MCDI; Fenson, et al., 1994)

PRESCHOOL MEASURES (3;6)

Battery of standardized assessments between 3;6 – 4;0 (*M*=3;7)

Language

- Quick Interactive Language Screener (QUILS; Golinkoff, de Villiers, Hirsh-Pasek, Iglesias, & Wilson, 2017)
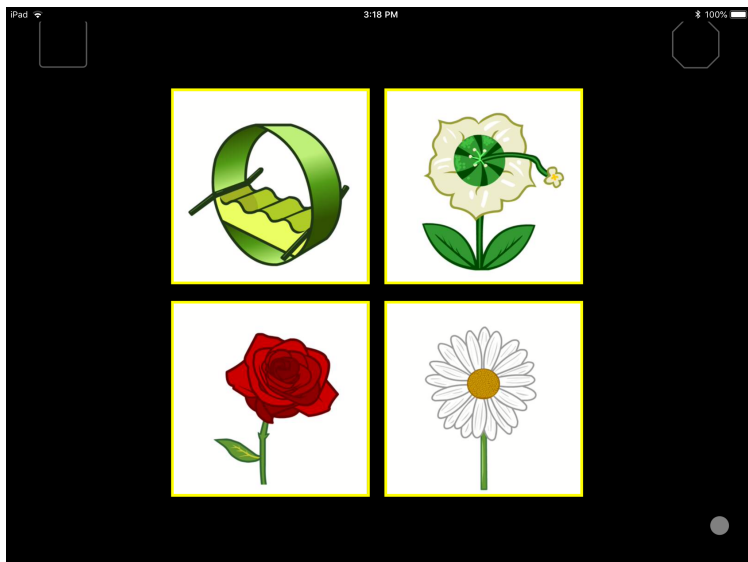- Picture Vocabulary Test (PVT; Weintraub, et al., 2013)

Non-verbal cognitive

- Executive function (Minnesota Executive Function Scale; Carlson & Zelazo, 2014)
- Working memory (Picture Sequence Memory Test; Weintraub, et al., 2013)
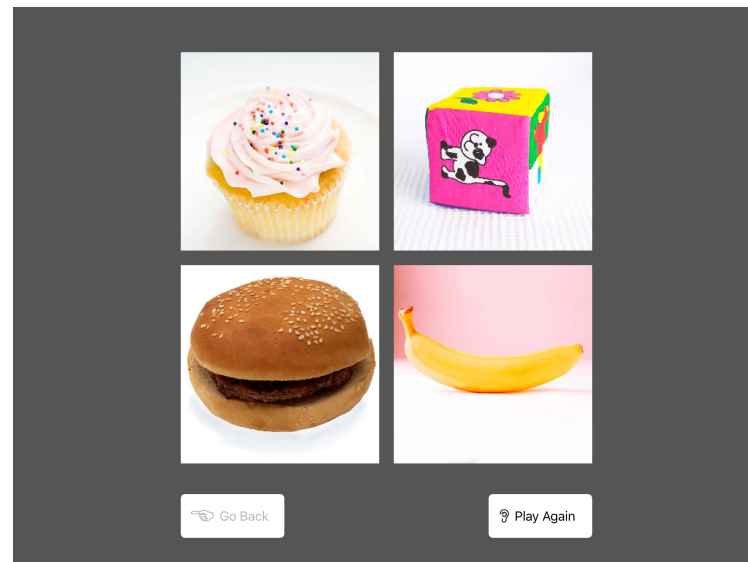
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PRESCHOOL LANGUAGE (3;6)

Quick Interactive Language Screener (QUILS; Golinkoff, et al., 2017)

Subscores: vocabulary, syntax, process

"A taff is a type of flower.
Show me a taff." (process)

Picture Vocabulary Test (PVT; Weintraub, et al., 2013)
from NIH Toolbox

"Banana"

HYPOTHESES

AsPredicted
Pre-Registration made easy

We predicted that higher preschool language scores would be related to infant:

Measures:

Object words

Object presence

Utterance types

Speakers

Vocabulary

Demographics

+ word type- and token-counts

+ object presence

+ prop. reading

- prop. short-phrase utterances (prev. SEEDLingS work)

+ receptive & productive vocabularies in infancy

+ maternal education

female gender

RESEARCH QUESTIONS

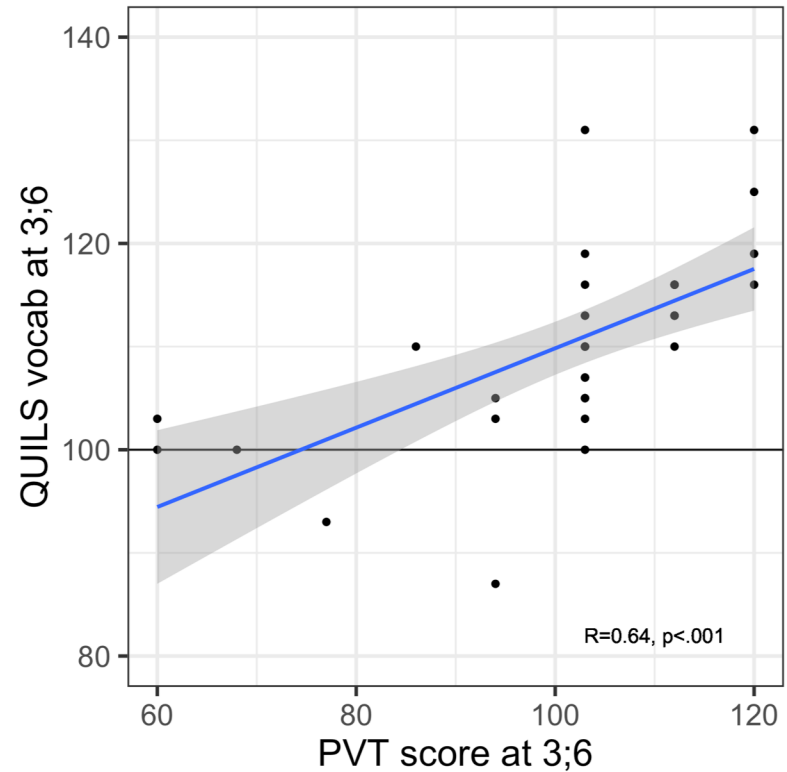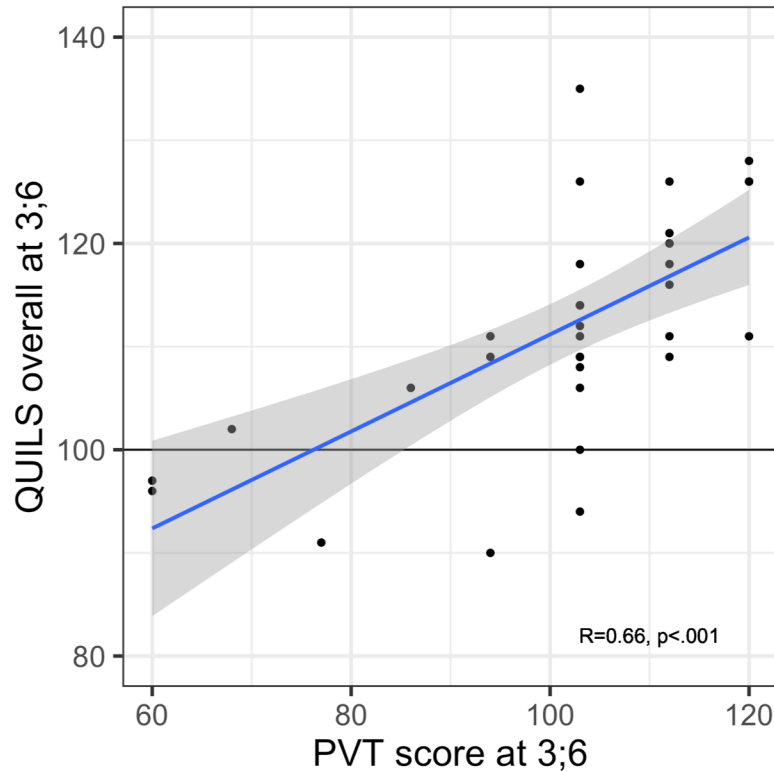1. **Validation of new preschool language measure**

   ▪ Relation to infant and concurrent language measures

   N.B. We were not paid by the QUILS creators for what follows.
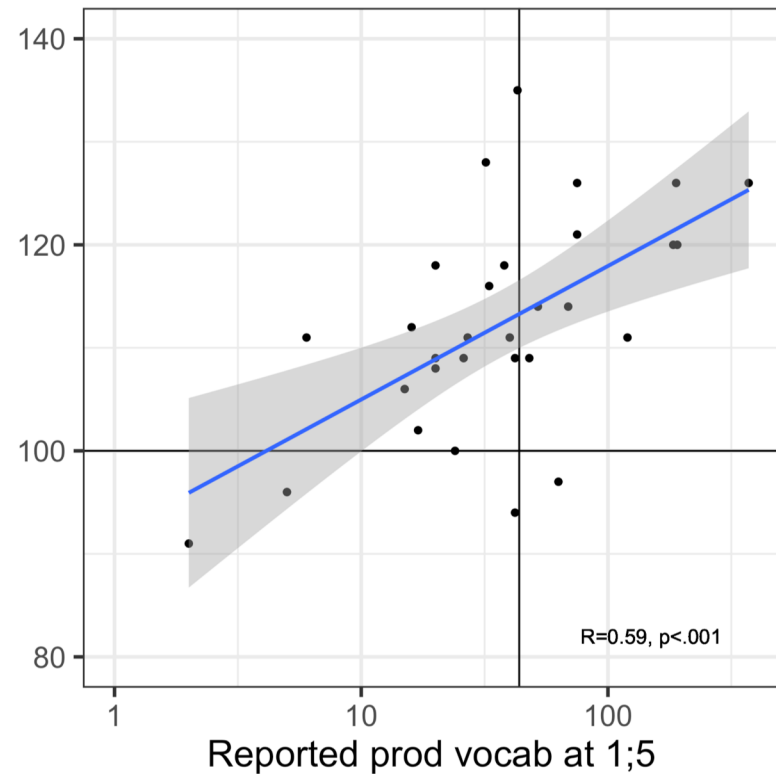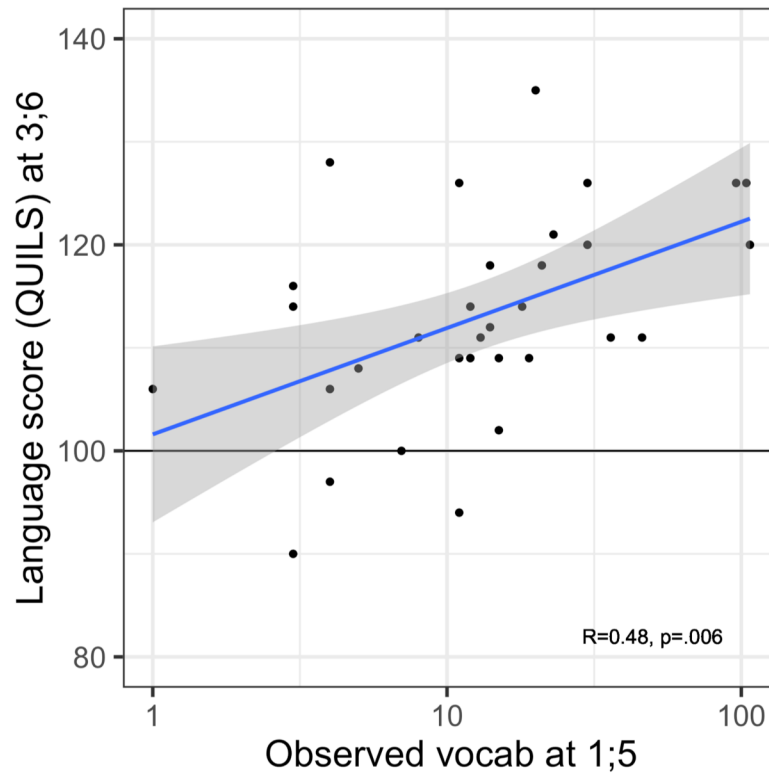
2. **Which aspects of early noun input relate to preschool language skills, controlling for demographic influences?**
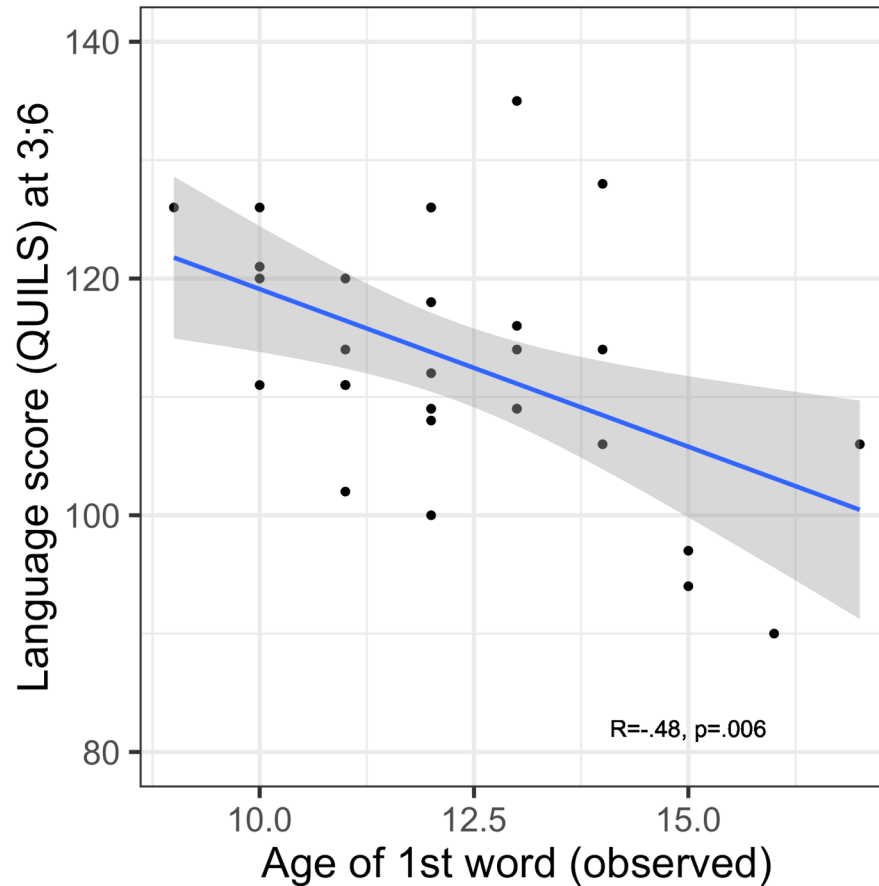
QUILS CORRELATES WITH CONCURRENT PVT @ 3;6

similar to original validation for QUILS #replication

QUILS @ 3;6 CORRELATES WITH INFANT VOCAB @ 1;5

*PVT shows same pattern, but slightly weaker

QUILS @ 3;6 CORRELATES WITH AGE OF TALK ONSET

VALIDATION OF NEW PRESCHOOL LANGUAGE MEASURE

- Positive correlations:

  - Concurrent PVT & QUILS @ 3;6

  - QUILS @ 3;6 & infant vocabulary at @ 1;5

- Negative correlations

  - QUILS & age at talk onset

    - i.e. younger talkers = higher QUILS toddlers

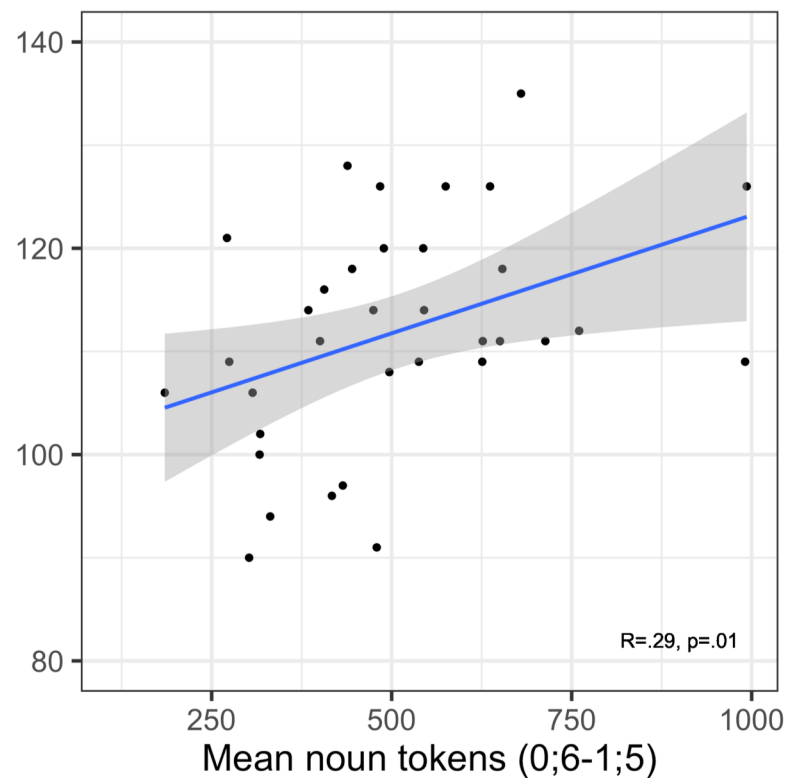N.B.: Reported comprehension (CDI) only weakly tied to PVT or QUILS

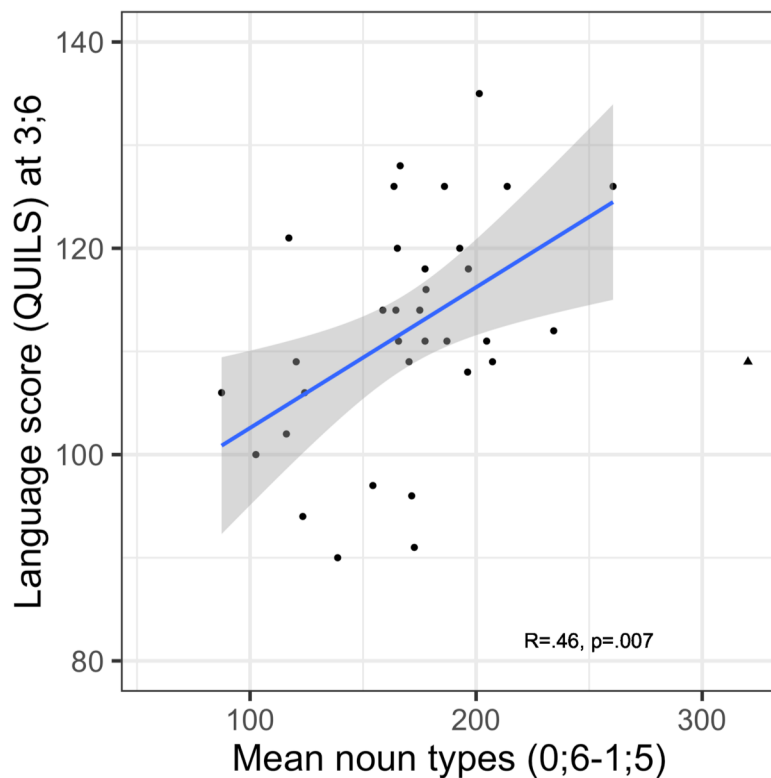# RESEARCH QUESTIONS

1. **Validation of new preschool language measure**

   - Related to infant and concurrent language measures

2. **Which aspects of early noun input relate to preschool language skills, controlling for demographic influences?**

INPUT TYPES & TOKENS @ 0;6–1;5 CORRELATE WITH LANGUAGE @ 3;6

Predicting 3;6 language with demographics (sanity check) **+ input** (new and exciting)
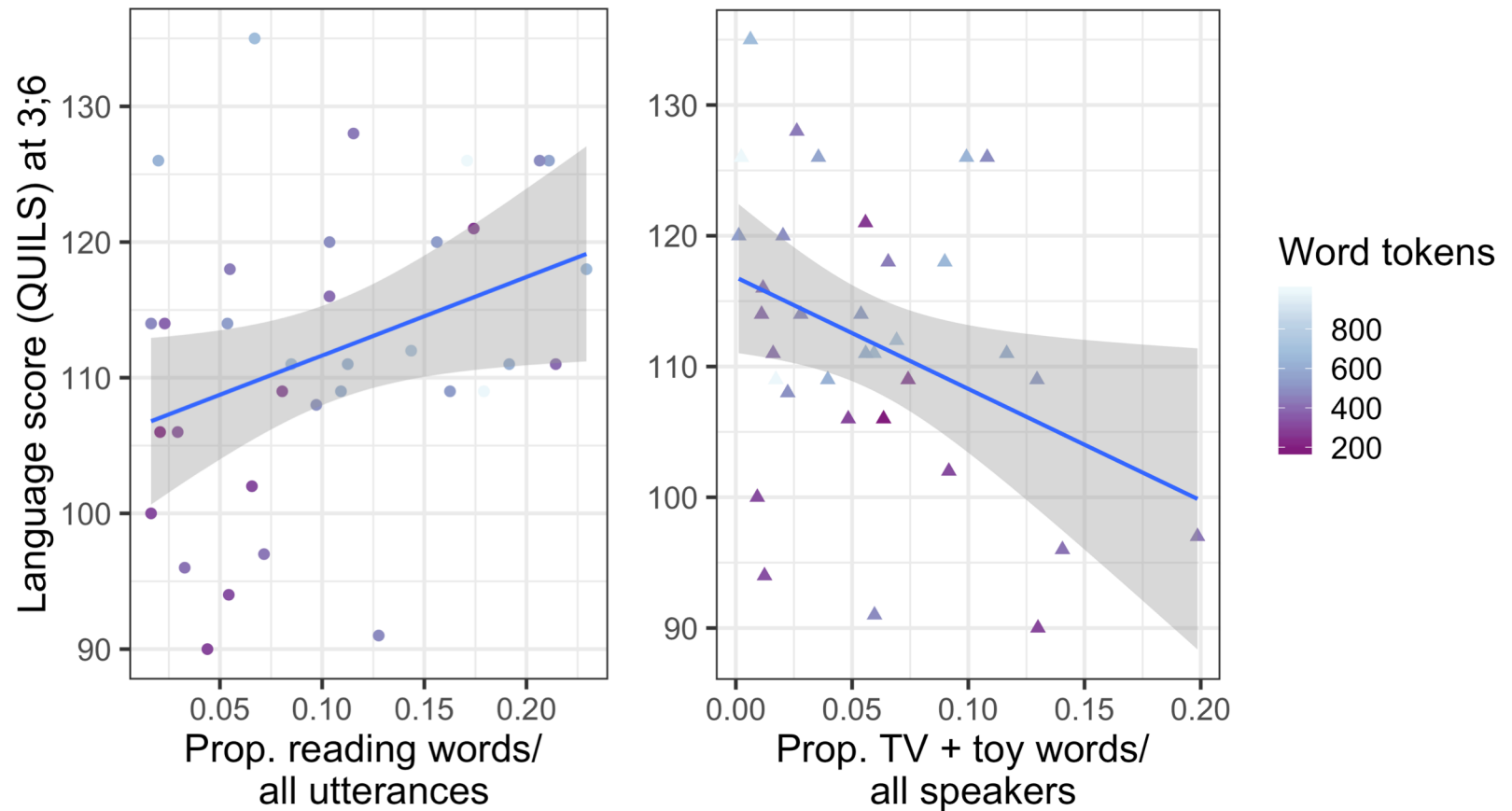
DEMOGRAPHICS

Maternal education and **child gender**
predict preschool language scores.

adjusted-R^2 = 0.26, $F(2,31)=6.85$, $p = 0.003$

INPUT (0;6-1;5)

More noun tokens,
relatively more nouns in reading, and
relatively fewer words from TV & toys
predict higher language scores at 3;6.

NOUN INPUT IN INFANCY PREDICTS PRESCHOOL LANGUAGE

adjusted-R^2= 0.22, $F(3,30)$=4.12, p=0.01

DEMOGRAPHICS + INPUT

<u>Higher</u> maternal education, **<u>female</u> gender,**
<u>more</u> word tokens, and **<u>relatively fewer</u> words from TV & toys**
predict higher language scores at 3;6.

adjusted-R^2=0.35, F(4,29)=5.35, p=0.002

DISCUSSION

What didn't work?

- Half of our preregistered hypotheses

  - Short-phrases, object presence in input
  - Comprehension MCDI (or at least not robustly)
  - Non-verbal measures (ask me more)

What did work?

- Tying infant input & knowledge to toddler language skills

CONCLUSIONS

1. **Validation of new preschool language measure**

   - First longitudinal validation of QUILS
   - Parent-reported (CDI) and observed data (recordings)

2. **Which aspects of early noun input relate to preschool language skills, controlling for demographic influences?**

   - **<u>More</u> noun tokens**
   - **<u>Relatively fewer</u> nouns from TV & toys**

   - 50 hours of naturalistic data across 1 year per child!
     - ~1.4% of their waking hours that year → 35% of variance

THANK YOU!

- Elika Bergelson

- SEEDLingS/BLAB staff, especially Shaelise Tor

- SEEDLingS RAs at U. Rochester & BLAB RAs at Duke

- Funders:

  - NIH Early Independence Award (EB)

  - SLD, BUCLD, & Charles Lafitte Foundation Travel Awards (SD)

- Our amazing SEEDLingS families!