



# Why Do Female Infants Say More Words? An Input/Output Analysis of Talking Status & Gender

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## BACKGROUND

- Language differences in infancy persist (Elliott, et al., 1989)
- Girls learn language faster than boys (Kimura, 1999; Fenson et al., 1994)
- Language delays/deficits disproportionately affect boys (Shriberg, et al., 1999)
- Gender-based lang diffs are generally examined pre- or post-talk onset, not both (e.g. Huttenlocher et al, 1991, Johnson et al, 2014).
- Here we *combine input and production data longitudinally*.

### Research Questions:

- 1) Do male and female infants produce different quantities of words?
- 2) Does infants' input vary by gender and whether they've begun talking?

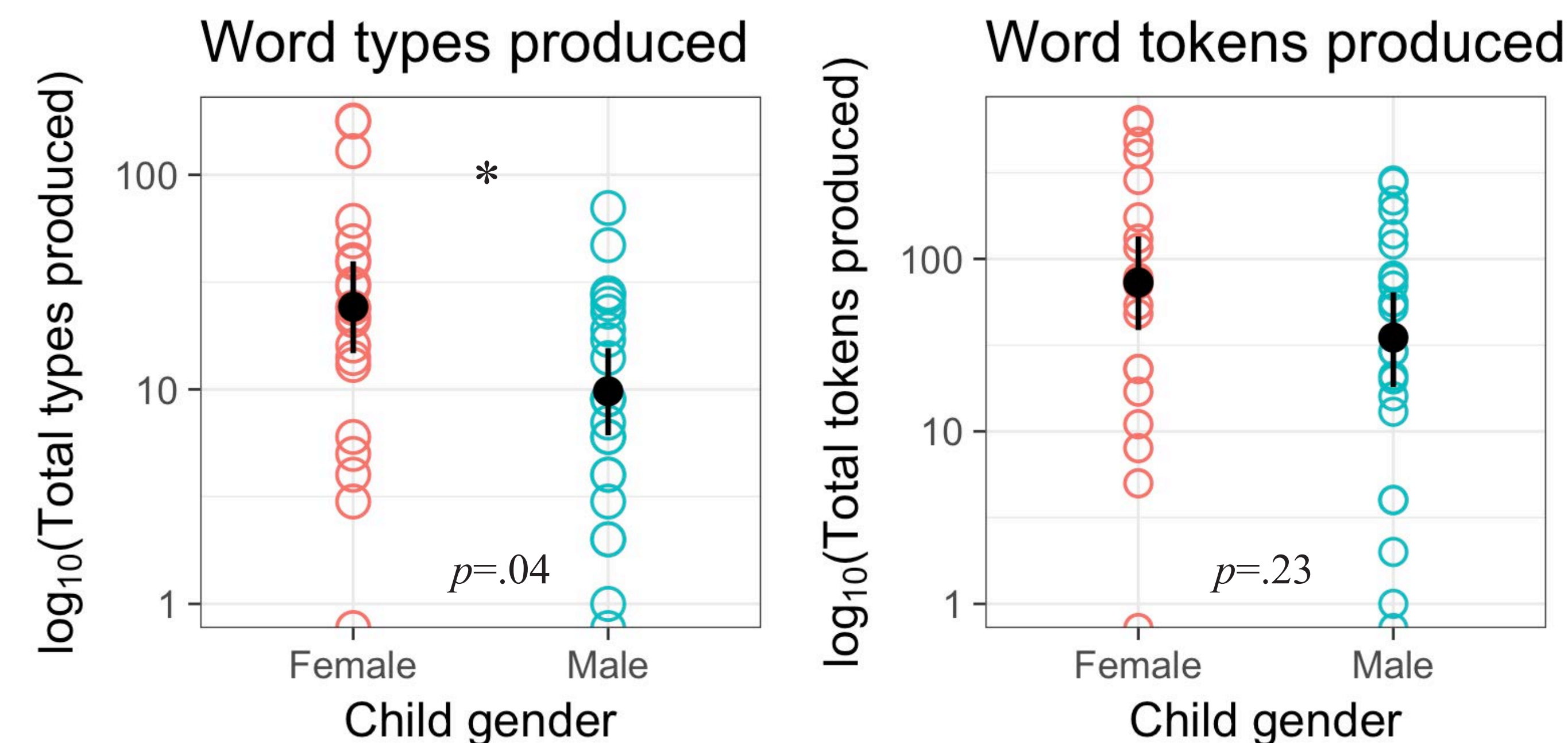
## METHOD

- Analysis from 44 infants (21 female), 6-17 months (SEEDLingS corpus)
- Monthly daylong audio and hourlong video recordings at home for each infant
  - ~68 hours of recordings analyzed per infant
- Annotated *child-directed* and *child-uttered* object words
  - Only concrete nouns (e.g. foot, ball)
- Analyzed input/output types & tokens: Wilcoxon tests over raw values, multi-level/linear regressions over log values.



## Language production: Nouns infants said

### Total nouns produced per child

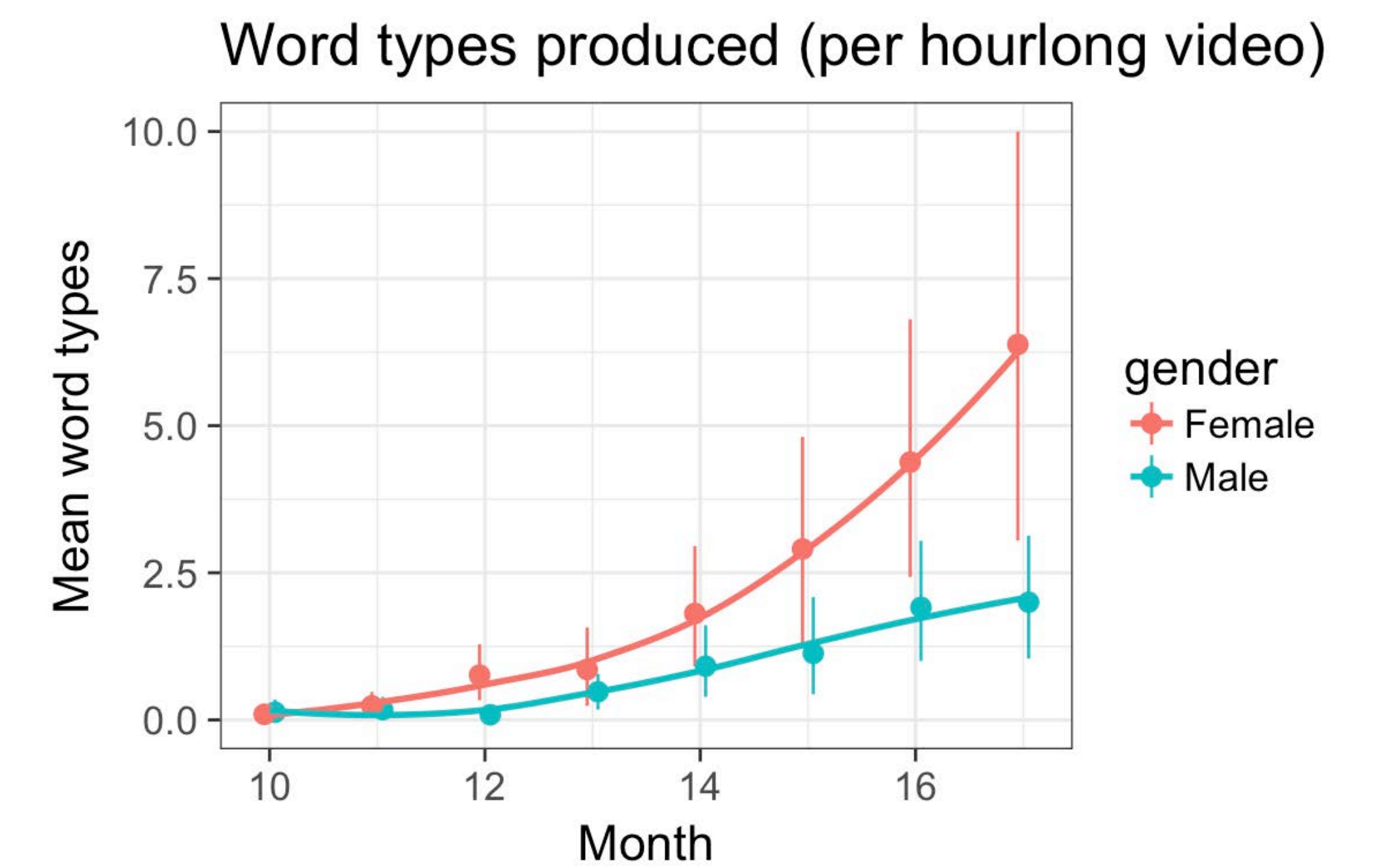


Female infants were *not more talkative overall* (noun tokens), but did say *more unique nouns* (types).

- No difference in age of noun onset ( $M_{girls} = 12.10$  mos,  $M_{boys} = 12.78$  mos;  $p=0.37$ )
- Gender and age accounted for >90% of the variance in productive vocabulary.
  - Type counts: two main effects ( $\beta_{age} = .48$ ,  $\beta_{gender} = -.66$ ;  $ps < .005$ )
  - Token counts: month x gender interaction ( $\beta = -.26$ ,  $p < .05$ )

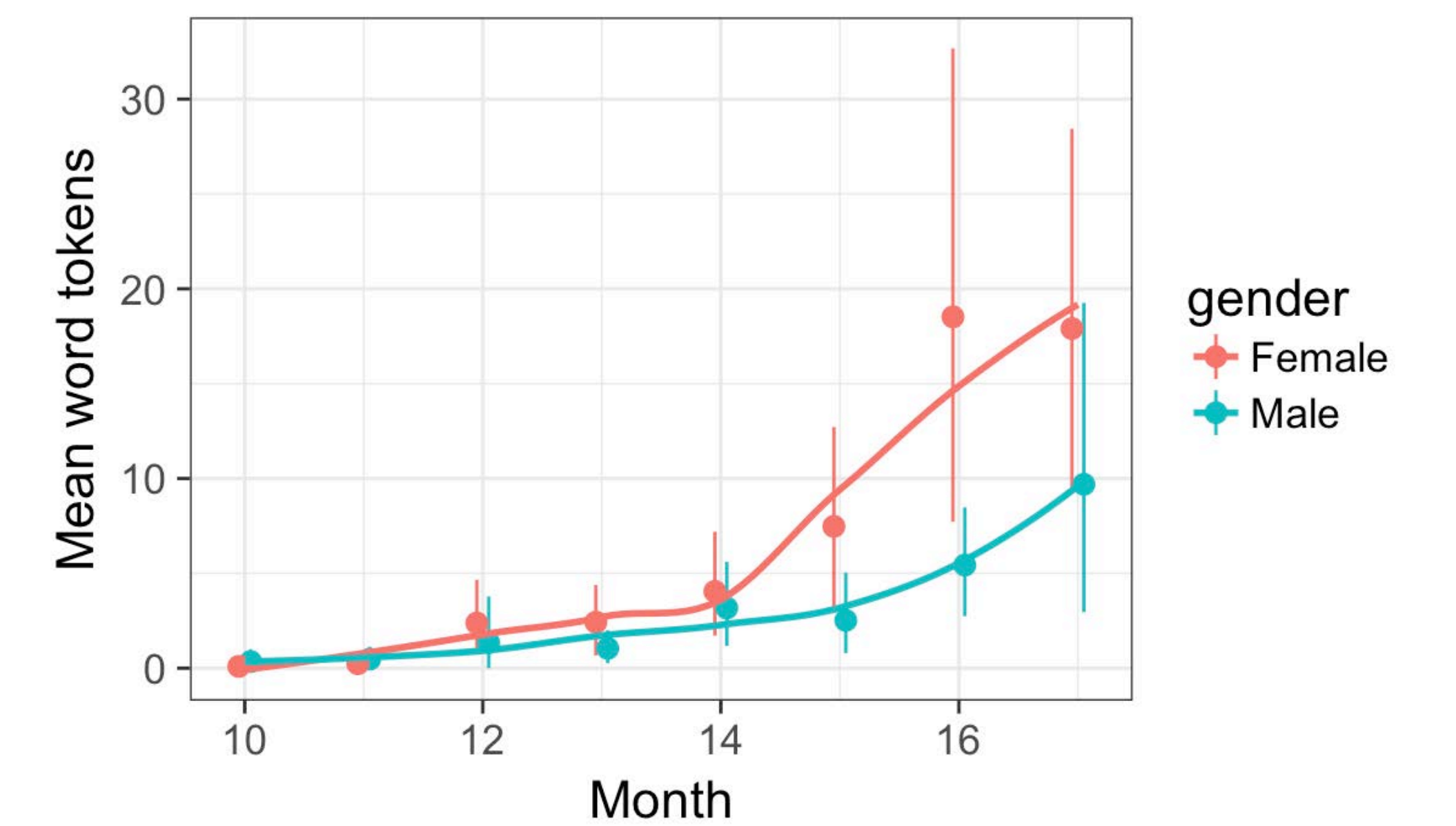
## RESULTS

### Mean nouns produced per child per recording



*Word types:* Older infants and female infants produced more nouns.

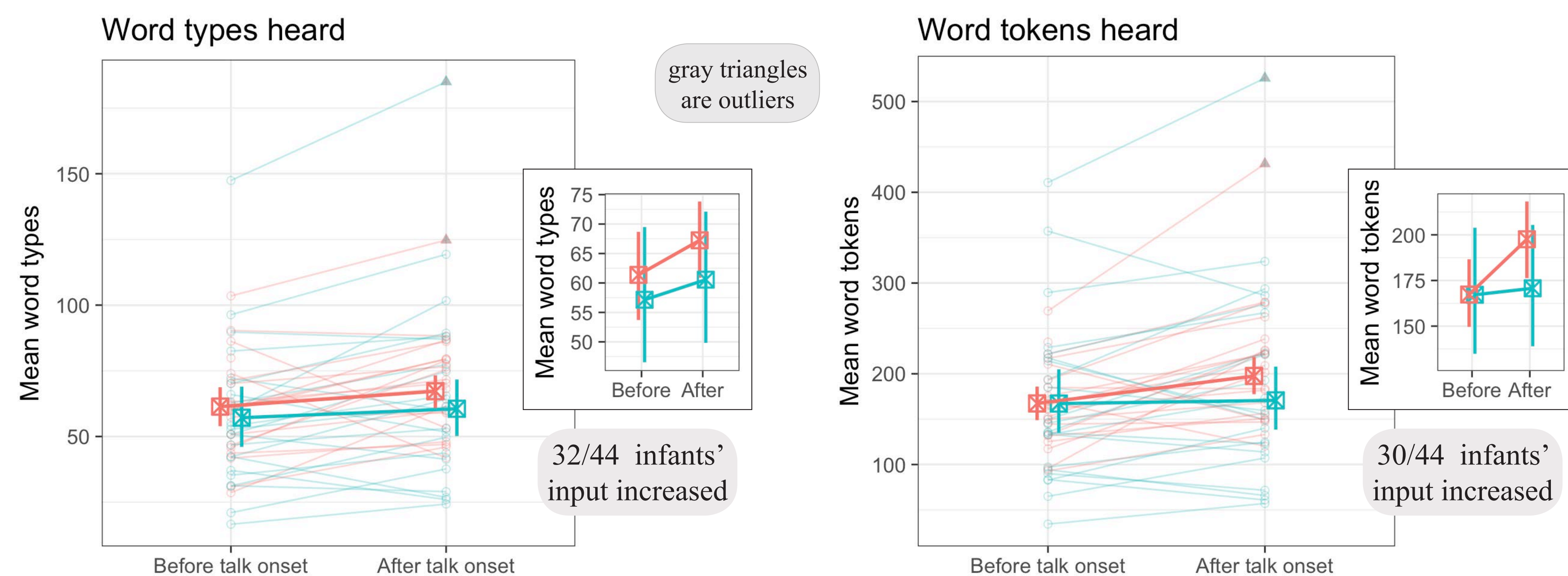
### Word tokens produced (per hourlong video)



*Word tokens:* Female infants' productions increase *more* with age.

## Language input: Nouns infants heard

Significant effect of talk status, *but not gender*, on number of nouns infants heard



- Input counts from hourlong videos
- Significant effect of **talk status** on both types and tokens overall. ( $ps < .001$ ).
- **No gender differences** in input:
  - Types or tokens pre-talk, post-talk, or overall; no interactions (all  $ps > .05$ ).
- Not shown here: **no gender differences** in utterance types (question, imperative, short-phrase, etc.).

## DISCUSSION & CONCLUSIONS

### Language production: Nouns infants said

Not surprising: Female infants have larger productive noun vocabularies than males.

### Language input: Nouns infants heard

Noun input did not vary by infant gender; it varied by infants' **talk status**.

- Female infants do not hear more noun types or tokens in their input.
- Regardless of gender, infants get an input boost once they start talking.

Our results replicate and support the finding that **girls have a production advantage, independent of language exposure**.