

INTRODUCTION

- Vocabulary size in infancy predicts later language and reading skills in early childhood (Duff, Reen, Plunkett, & Nation, 2015).
- Children who hear more child-directed speech show more rapid vocabulary growth (Hart & Risley, 1992).
- Positive relations between the amount of infant vocalizations and later vocabulary size have also been found (Wu & Gros-Louis, 2017).
- Few studies, however, have investigated both the amount of child vocalizations and adult language input as predictors of vocabulary development.
- The present study assessed whether greater parent language input and greater child vocal behaviors were associated with greater child vocabulary size (words understood and said) at 18 months of age.

METHOD

- $N = 41$ 18-month-olds
 - Age: $M = 18.01$ months, $SD = .29$
 - Gender: 17 female, 24 male
- Children and their parents (35 mothers, 6 fathers) played with toys (see Figure 1) at a table during an 8-minute session in the lab. Parents were instructed to interact normally as they would at home.



Figure 1. Toys provided to dyads during the parent-child interaction: xylophone (left), wooden farm animal puzzle (center), and colorful, hard plastic interconnecting blocks (right).

- Rates of adult words per minute and child vocalizations per minute were obtained using counts provided by the Language Environment Analysis System (LENA; The LENA Foundation, Boulder, CO).
- Expressive vocabulary size was measured using the Words and Gestures form of the MacArthur-Bates Communicative Development Inventory (MB-CDI; Fenson, et al., 2006).
 - Parents completed the MB-CDI in English and/or Spanish depending on which languages the child heard at home.
 - Monolingual English: $n = 22$; Monolingual Spanish: $n = 4$; English-Spanish Bilingual: $n = 15$

RESULTS

- Adults produced an average of 57.4 words per minute (range: .98 to 133.28; $SD = 33.96$) and children produced an average of .76 vocalizations per minute (range: 0 to 3.31; $SD = .82$). Average vocabulary size (the number of words the child understands and says) was 57.07 words (range: 0 to 335; $SD = 82.86$).
- Significant (or marginally significant) correlations were evident among all variables (see Figure 2)
 - More adult words per minute were significantly associated with more child vocalizations per minute ($r = .454$, $p = .003$; see Figure 2a).
 - More child vocalizations per minute were significantly associated with greater expressive vocabulary size ($r = .463$, $p = .002$; see Figure 2b).
 - More adult words per minute were marginally associated with greater expressive vocabulary size ($r = .27$, $p = .088$; see Figure 2c).

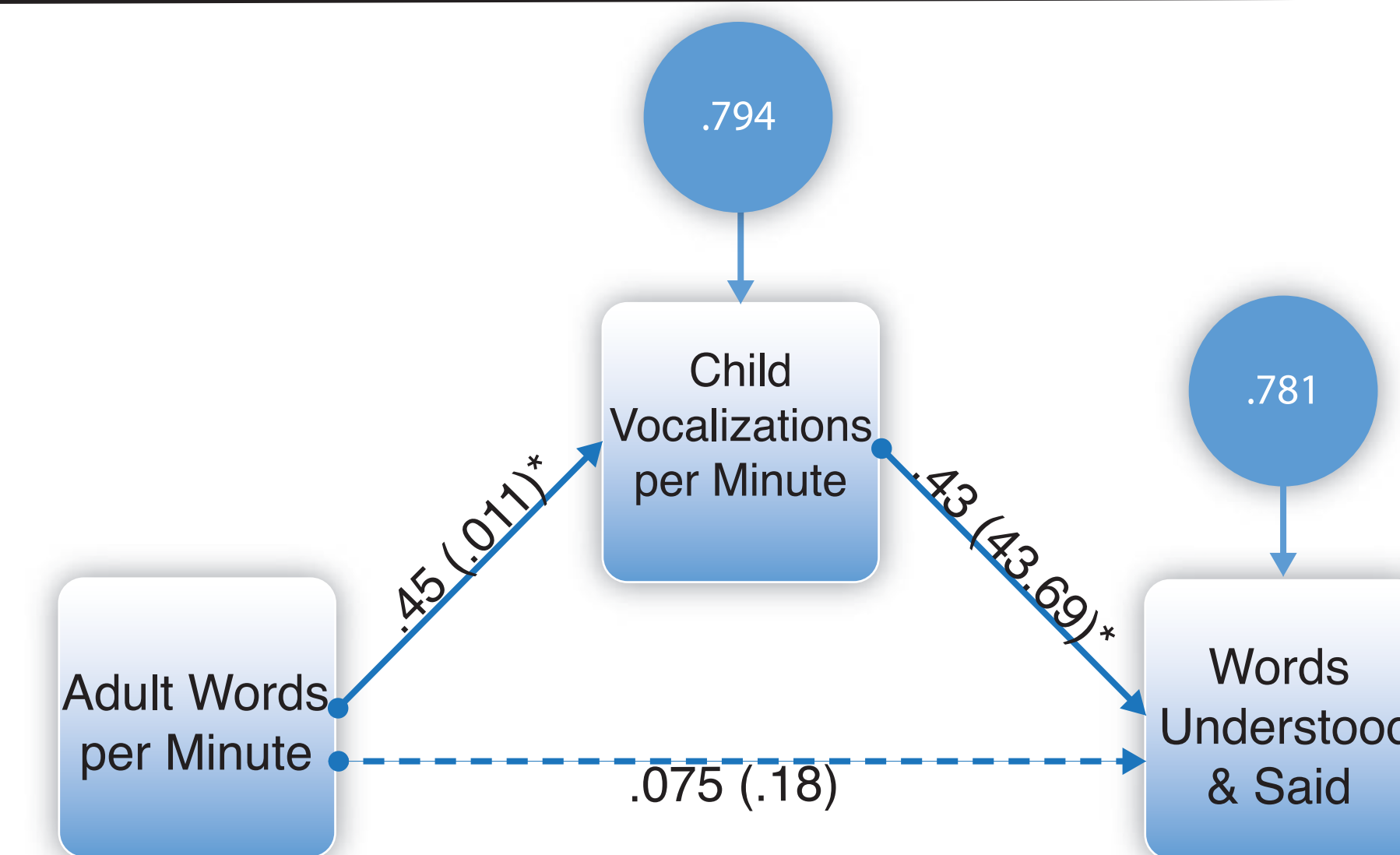


Figure 3. Path model depicting relations between adult words per minute, child vocalizations per minute, and expressive vocabulary size. Standardized regression coefficients are presented outside the parentheses and unstandardized coefficients are presented inside parentheses. Unexplained error variances are presented in the circles. Note: * $p < .02$.

- We used mediation analyses to assess causal relations between the variables. We hypothesized that more adult input would be associated with more child vocalizations, which would, in turn, predict greater expressive vocabulary size (see Figure 3).
 - Adult words per minute was a significant predictor of child vocalizations per minute, $b = .011$, $p = .003$, $SE = .003$, $R^2 = .206$.
 - In turn, child vocalizations per minute was a significant predictor of vocabulary size when controlling for adult words per minute, $b = 43.69$, $p = .011$, $SE = 16.40$, $R^2 = .219$.
 - When controlling for child vocalizations per minute, however, adult vocalizations was not a significant predictor of vocabulary size, $b = .183$, $p = .643$, $SE = .393$.

DISCUSSION

- Findings are consistent with previous work which shows that children who vocalize more have greater language skills (see Wu & Gros-Louis, 2017; Goldstein, et al., 2009), and extend those findings to unstructured dyadic interactions.
- A brief, lab-based, dyadic interaction is an appropriate context for assessing relations among measures of adult language input, child vocalizations, and parent-report of vocabulary size.
- Findings support our hypothesis and demonstrate that the amount of adult speech predicts the amount of child vocalizations, which, in turn, predicts vocabulary size.
 - Children's vocal behavior mediates the relationship between parental input and vocabulary size.
 - Results highlight the importance of child vocalizations for language development.
- Future studies will assess how parental input and child vocalizations earlier in infancy relate to vocabulary size later in development.

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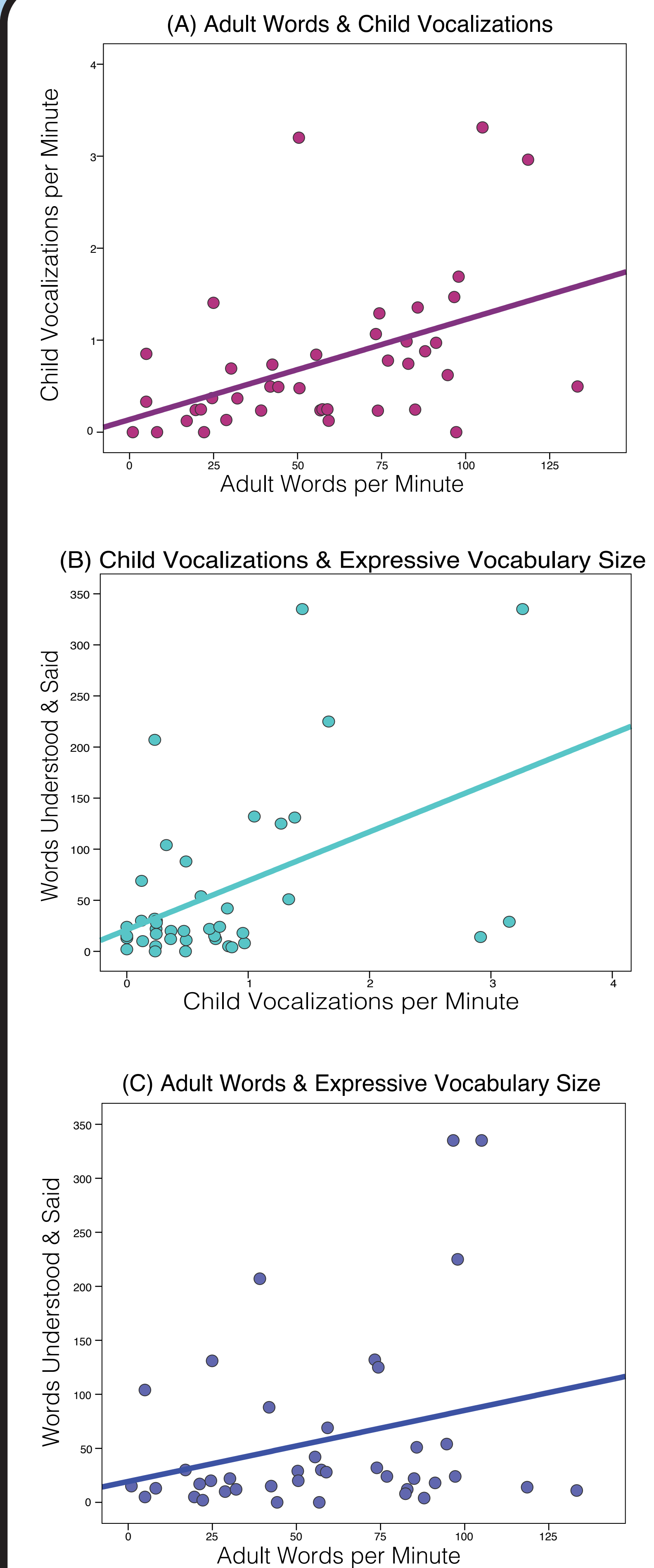


Figure 2. Scatterplots depicting relations between child vocalizations per minute and (a) adult words per minute, and (b) expressive vocabulary size, as well as (c) adult words per minute and expressive vocabulary size. Each dot represents an individual data point. Lines represent linear regressions.