

Introduction

- Infant temperament has been identified as a potentially important contributor to early language development.
 - Vocal Reactivity, an early language indicator, significantly predicted Duration of Orienting and Perceptual Sensitivity for infants between ages 6 and 12 months¹.
 - Soothability, Duration of Orienting, and Smiling and Laughter at 6 months of age was associated with receptive vocabulary at 12 months of age².
- Connections between toddler temperament / attention has also been examined with relation to language use.
 - Increased emotionality (i.e., heightened levels of distress) between ages 2 and 4 years has shown associations with lower receptive vocabulary skills³.
 - Attention shifting and focus, along with perceptual sensitivity, have shown positive associations with language development at 21 months of age⁴.
- However, studies have not examined the effects of change in infant temperament processes across infancy on toddler language use.
- In the current study, latent growth modeling (LGM) is used to examine the effects of developing duration of orienting, perceptual sensitivity, and vocal reactivity on toddler use of language at 24 months of age while controlling for factors that could influence temperament and/or language.

Hypotheses

- After accounting for infant gender, family income-to-needs (IN), maternal education, and maternal depressive symptoms, it was anticipated that
 - Higher intercepts and slopes (i.e., faster improvement over time) of vocal reactivity, perceptual sensitivity, and duration of orienting would predict better language use at 24 months of age

Method - Participants

- 158 Families with 4-month-old infants
- Primarily Caucasian (92.4%)
- Wide SES range (income-to-needs range = .334-7.952)
- Mother's mean age = 30.31 (range 20.00 – 40.00)
- Mother's mean years of education = 15.17 (range 10.00 – 25.00)

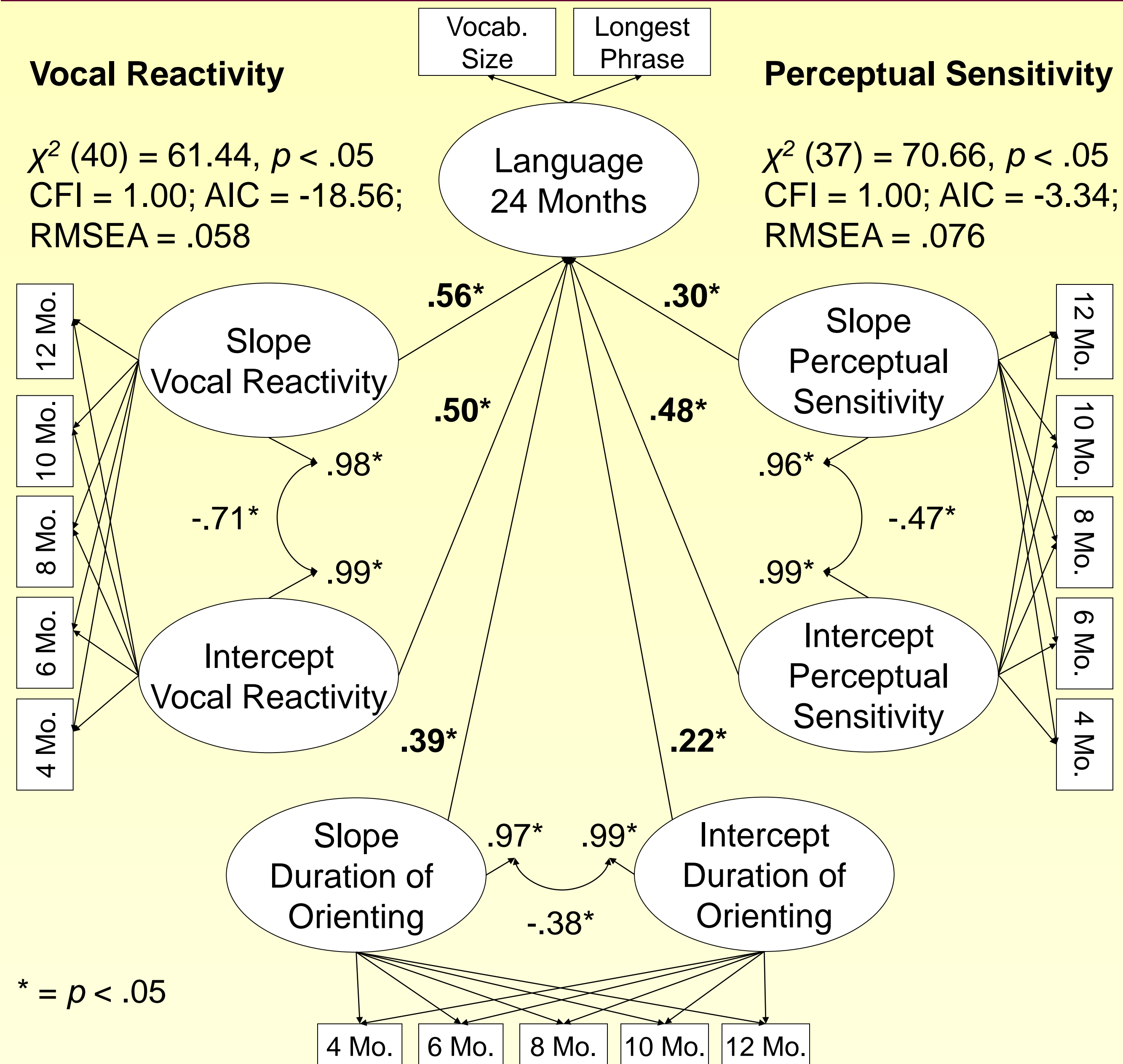
Method - Measures

- Beck Depression Inventory-II⁵
- Infant Behavior Questionnaire – Revised⁶
 - Perceptual Sensitivity: responsiveness to low intensity stimuli in the environment (Surgency/Extraversion)
 - Duration of Orienting: ability to remain attentive to objects for long periods of time (Orienting/Regulation)
 - Vocal Reactivity: amount of vocalization exhibited throughout daily routines (Surgency/Extraversion)
- Child Behavior Checklist - Language Development Survey⁷
 - Vocabulary Size: determined from checklist of words
 - Longest Phrase: most words said in sequence

Method - Procedure

- Mothers completed the Beck Depression Inventory and demographics 4 months postpartum
- Caregivers completed the IBQ-R, including perceptual sensitivity, duration of orienting, and vocal reactivity when infants were 4, 6, 8, 10, and 12 months of age
- Caregivers completed the Language Development Survey when their children reached 24 months of age
- LGM, using EQS 6.1 software, was used to test hypotheses
 - 62.5% did not complete the 24 month LDS measure
 - Maximum Likelihood Estimation was used to handle missing data

Results



Duration of Orienting $\chi^2(40) = 54.62, p > .05, CFI = 1.00,$
 AIC = -25.39; RMSEA = .048

- Each model estimated separately; Perceptual Sensitivity is a Spline Model; best fitting model for others was linear model
- Infant gender, family IN, maternal education, and maternal depressive symptoms were covariates in all models
 - Relative to boys, girls attained better language skills by 24 months of age; higher IN predicted faster increases (i.e. higher slopes) of perceptual sensitivity. No other associations between covariates and temperament or language were observed
- Higher intercepts and slopes of infant duration of orienting, perceptual sensitivity, and vocal reactivity were associated with better language

Conclusions

- Infant temperament predicted toddler language
 - Importantly, the current study demonstrates that changes in specific infant temperament constructs make contributions to early language.
 - Girls had better language at 24 months, but gender differences in temperament were not observed
 - Higher IN did not predict language, but predicted faster increases in perceptual sensitivity; IN effects on language may have occurred indirectly through perceptual sensitivity
 - Other associations between covariates and temperament and language were not observed
- Infants with better attention related temperament attributes may have greater capacity to learn language.
- Given connections between language and behavior problems⁸, temperament may partially contribute to the link between language and behavioral difficulties.
- Future studies could build upon this work by using lab measures of temperament and structured language assessments

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