

# The Effect of Maternal Prenatal Stress on Toddler Language Development: Testing Breastfeeding as a Moderator



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## INTRODUCTION

- Language plays a role in various domains of development.
- Lower language in toddlerhood leads to negative consequences that may persist into middle childhood and adolescence.
- Language development can be negatively impacted by maternal prenatal stress.
- Breastfeeding can promote child language development.

Prior studies have had a narrow focus on prenatal stress resulting from natural disasters. Moreover, it is unclear if breastfeeding may help mitigate the effects of negative factors such as prenatal stress on development. These are the gaps the present study addresses.

**I hypothesize that maternal prenatal stress will be negatively associated with toddler language development.**

**I hypothesize that breastfeeding will serve as a protective moderator for the effect of prenatal stress on toddler language development.**

## METHODS

### Participants

The Brain and Early Experience (BEE) Study is a longitudinal cohort study following pregnant women and one target child. To be included in this analytic sample, the mothers had to have completed the outcome measure ( $N = 97$ ).



### Measures

- Self-reported prenatal stress was assessed through Cohen's Perceived Stress Scale.
- The biomarker of prenatal stress used was hair cortisol.
- Breastfeeding duration was assessed through a questionnaire.
- Toddler language was assessed through the MacArthur-Bates Communicative Development Inventories (CDI). Two sections were used: child showing signs of understanding by responding to familiar words or phrases and child understanding and saying words.

### Procedure

I looked at measures collected from the mothers at a prenatal visit, which occurred around the beginning of the women's third trimester of pregnancy, and from the mother-child dyads at an 18-month visit.

## RESULTS

### First hypothesis:

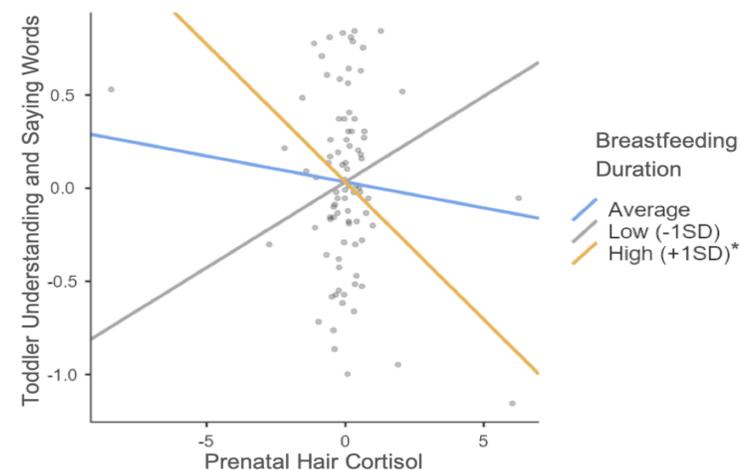
- I estimated multiple linear regression analyses, testing main effects of prenatal self-reported stress and hair cortisol.
- Self-reported stress was not significantly associated with either measure of toddler language.
- Hair cortisol was not significantly associated with either measure of toddler language.

### Second hypothesis:

Interaction term analysis:

- I calculated interaction terms by multiplying prenatal stress and breastfeeding. I then estimated multiple linear regression analyses to test the effect of the interaction on toddler language.
- The interaction between prenatal hair cortisol and breastfeeding was a significant predictor of toddler understanding and saying words.

*Probing of the interaction between prenatal hair cortisol and breastfeeding duration on toddler understanding and saying words.*



Stratified analysis:

- I stratified the mother-child dyads by breastfeeding duration at 12 months. Within each group, I investigated whether prenatal stress had an impact on language.
- In the group that breastfed for less than 12 months, prenatal hair cortisol was associated with toddler understanding and saying words, such that greater prenatal hair cortisol on this lower breastfeeding group predicted better toddler language outcomes.

## DISCUSSION

- Neither prenatal self-reported stress nor hair cortisol predicted toddler language at 18 months.
- Breastfeeding did not predict toddler language.
- Breastfeeding acted as a moderator in the relationship between prenatal hair cortisol and child understanding and saying words. In this case, breastfeeding seemed to exacerbate the negative effect of prenatal stress on language.
- If the mothers experienced high stress prenatally as observed by hair cortisol, greater breastfeeding duration was associated with lower language in the toddlers, and shorter breastfeeding duration was associated with better language outcomes.
- These results should be interpreted with caution due to the number of tests that were conducted in this analysis.

## IMPLICATIONS

- The findings did not reveal detrimental effects of prenatal stress on toddler language or positive effects of breastfeeding on language.
- The results indicate that mothers who experience higher stress during their pregnancy or who are not able to breastfeed should not be concerned that this will negatively impact their children's language development.

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