



# Perinatal Sleep Disturbance and Neural Processing to Infant Emotional Cues

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## INTRODUCTION

- Sleep disturbance has been linked to poorer functioning, including lower quality parenting.<sup>1,2</sup>
- Sleep is negatively affected during the perinatal period, and the maternal brain undergoes changes throughout the perinatal period to prepare for motherhood.<sup>3,4,5</sup>
- However, little is known about how sleep is associated with the maternal brain during the perinatal period.
- We examined the significance of sleep during the third trimester and at 4 months postpartum in relation to women's neural responding reflective of attention to infant emotional cues (distress, happy, neutral) important for parenting.

## METHODS

### Participants

- During pregnancy assessment, participants were 167 women ( $M = 28.79$  years,  $SD = 4.63$ ), 81 women returned for the 4-month assessment.
- Mothers were predominantly white (84.1%) and middle income (median \$85,000).

### Sleep

General Sleep Disturbance Scale<sup>6</sup>

- Sleep Quality Subscale, Sleep Quantity Subscale, Medications Subscale, Total Sleep Disturbance Scale.

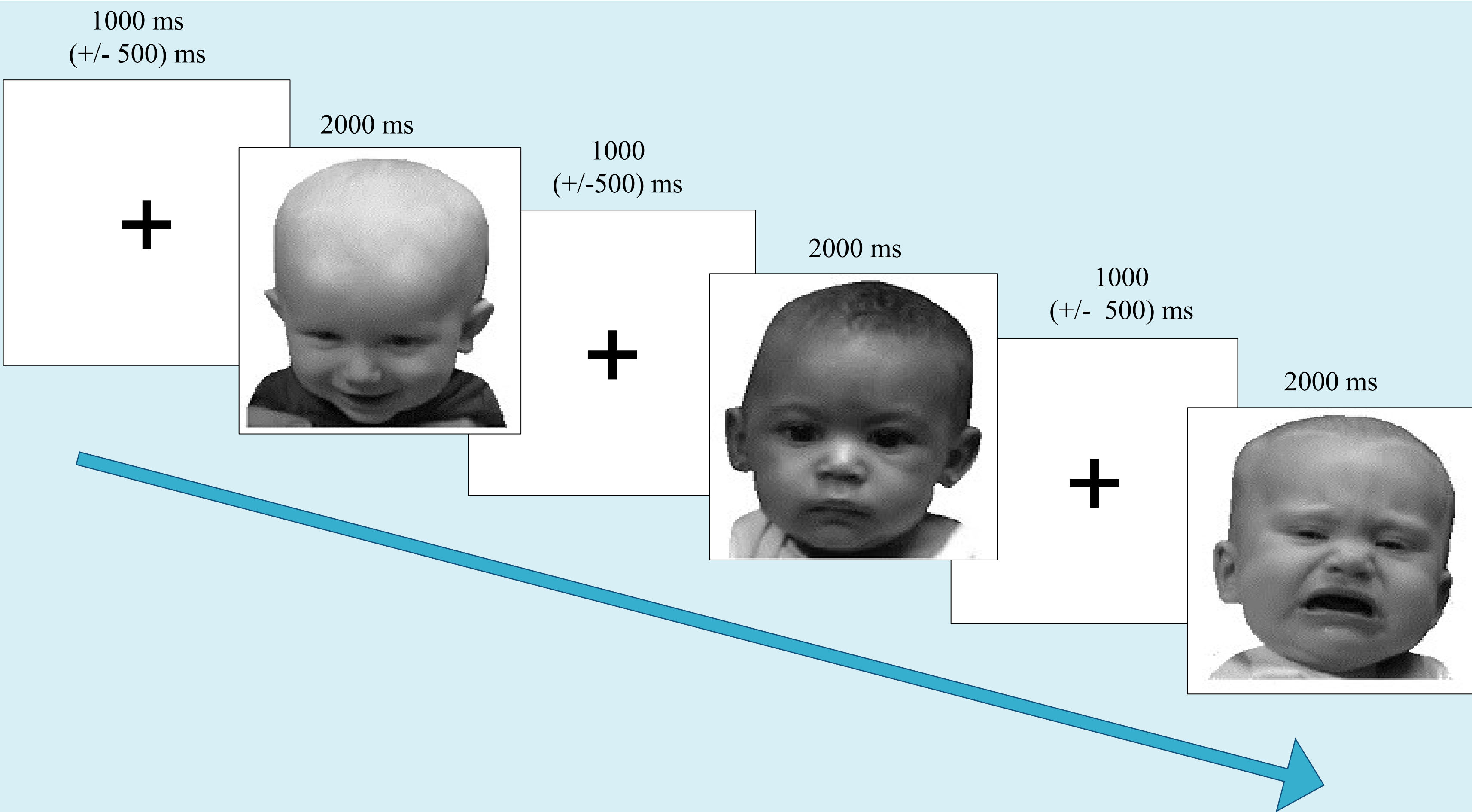
### Emotional Categorization Task

- Participants completed a categorization task compromising 162 repeated infant images displaying distress (54), happy (54), or neutral (54) expressions.
- Facial expressions were viewed in series, and participants indicated the facial expression displayed (See figure 1).

### Electroencephalogram (EEG) Recording

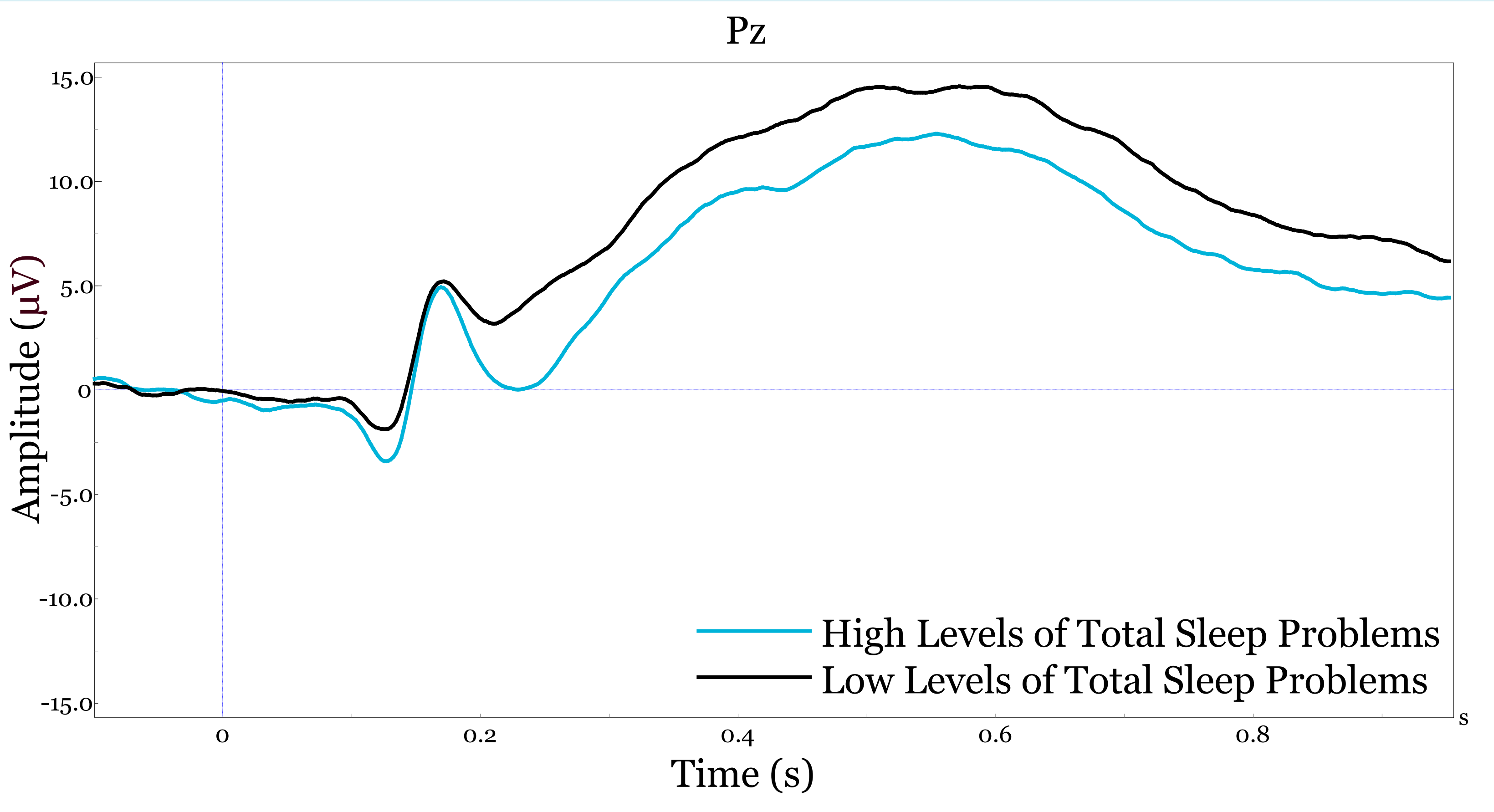
- The P300 is a neural response reflective of attention.<sup>7</sup>
- The P300 amplitude was defined as average activity in a 300 to 750 ms window following stimulus presentation at the Pz electrode.

## EMOTIONAL CATEGORIZATION TASK



## FIGURE

P300 to distress expressions for women with high (v. low) total sleep problems.



## TABLE

**Table 1. Intercorrelations between prenatal sleep variables and maternal neural responding to infant distress**

|                          | Prenatal Sleep Quality |              | Prenatal Sleep Quantity |              | Prenatal Sleep Medications |              | Prenatal Total Sleep Disturbance |              |
|--------------------------|------------------------|--------------|-------------------------|--------------|----------------------------|--------------|----------------------------------|--------------|
| Prenatal P300 Amplitude  | <i>r</i>               | <i>p</i>     | <i>r</i>                | <i>p</i>     | <i>r</i>                   | <i>p</i>     | <i>r</i>                         | <i>p</i>     |
|                          | -0.06                  | 0.457        | -0.12                   | 0.136        | <b>-0.20</b>               | <b>0.011</b> | -0.07                            | 0.380        |
| Postnatal P300 Amplitude | <i>r</i>               | <i>p</i>     | <i>r</i>                | <i>p</i>     | <i>r</i>                   | <i>p</i>     | <i>r</i>                         | <i>p</i>     |
|                          | <b>-0.24</b>           | <b>0.031</b> | <b>-0.25</b>            | <b>0.026</b> | <b>-0.26</b>               | <b>0.017</b> | <b>-0.29</b>                     | <b>0.010</b> |

## RESULTS

### Prenatal Sleep and Neural Responding to Infant Distress (see Table)

#### Prenatal Neural Responding

- Greater use of sleep medication was associated with a dampened P300 amplitude to distress faces.

#### Postnatal Neural Responding

- Poorer sleep quality was associated with a dampened P300 amplitude to distress faces.
- Too much/little sleep was associated with a dampened P300 amplitude to distress faces.
- Greater use of sleep medication was associated with a dampened P300 amplitude to distress faces.
- Greater total sleep disturbance was associated with a dampened P300 amplitude to distress faces (see Figure).

### Prenatal Sleep and Neural Responding to Infant Happy and Neutral Expressions

- There were no significant associations between prenatal sleep and prenatal or postnatal P300 amplitude to happy or neutral faces.

## CONCLUSION

- Poorer prenatal sleep was concurrently and longitudinally associated with neural responding reflective of dampened attention to infant distress.
- These findings suggest that prenatal sleep disturbance may negatively impact the neural changes the maternal brain undergoes to prime new mothers for sensitive parenting.
- Findings suggest that improving sleep quality during pregnancy may support the maternal brain during this sensitive period.

## ACKNOWLEDGEMENTS

- Thanks to the women who participated in this study.
- Research was supported by the National Science Foundation (#2017920).

Scan for references:



Scan for Family Child Development Lab website:

