



Predictive Significance of Prenatal Neural Responding to Infant Faces for Observed Sensitivity and Infant Attachment

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INTRODUCTION

- Mothers' neural processing of infant emotional expressions as indexed via event-related potentials (ERPs)—time-locked brain activity to events—reflective of perception of (N170) and attention to (P300) infant distress expressions are implicated in parenting-related and attachment-relevant factors (Kuzava et al., 2019).
- However, research typically employs parenting and attachment proxies and assesses neural responding and parenting behavior concurrently.
- To provide better insight into the significance of the maternal brain for mother and infant outcomes, we examined the predictive significance of women's prenatal neural responding to infant emotional expressions implicated in facial encoding (N170) and attention (P300) for direct observations of mothers' postpartum caregiving behavior at 4 months and infant attachment security at 12 months.

METHODS

Participants

- Participants were 104 primiparous expectant mothers (M age = 29.6 years; SD = 4.7) and their infants living in Missouri, USA
- Mothers were predominantly White/not-Hispanic (91.8%), middle income (median: \$80,000), and educated (39.3% bachelor's degree)

Emotional Categorization Task & EEG Recording (3rd Trimester)

- Expectant mothers categorized images of infants displaying distress (54), happy (54), and neutral (54) facial expressions (repeated 3x; order random; sequential display) while EEG was monitored (see Emotion Categorization Task Figure)
- The N170 & P300 to each expression were extracted
 - N170: amplitude at temporal/parietal sites (P7/P8) 140-200 ms post-stimulus
 - P300: amplitude at central-parietal site (Pz) 300-750 ms post-stimulus

Maternal Sensitivity (M infant age = 4 months; N = 104)

- Maternal sensitivity (i.e., prompt, appropriate responding to infants) was observed during a 10m toy play using NICHD Study of Early Child Care system (Frosch & Owen, 2017)

Infant Attachment (M infant age = 12 months; N = 23)

- Mothers and infants completed the Strange Situation Procedure (SSP; Ainsworth et al., 1978)
- Infant security classification (B v. not B) was used in analyses

ACKNOWLEDGEMENTS

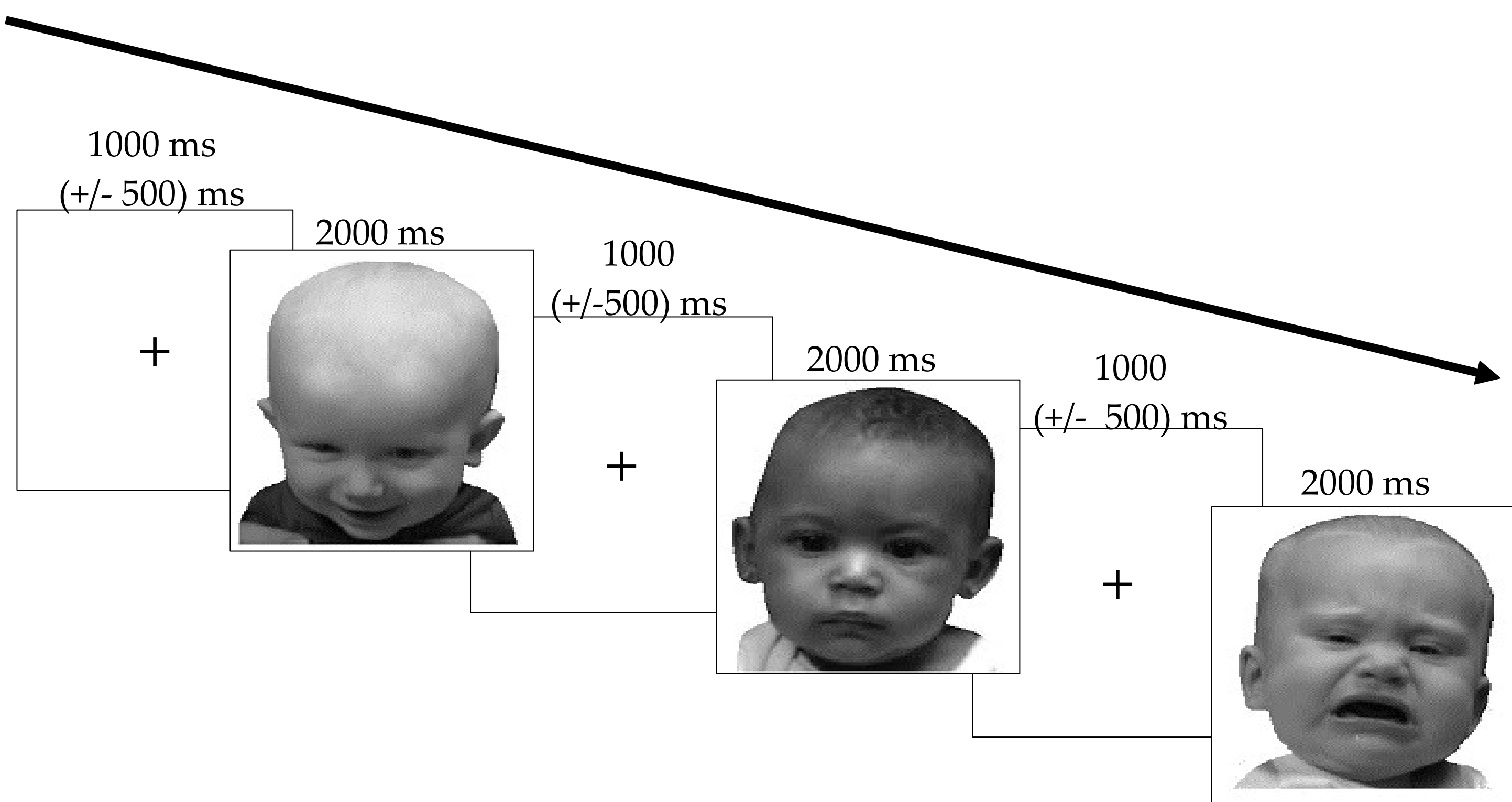
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Scan for Family Child Development Lab website:



EMOTION CATEGORIZATION TASK



ERPs to Infants, Sensitivity, & Attachment

Fig. 1: Expectant Women's P300 to Infant Faces and Postpartum Sensitivity

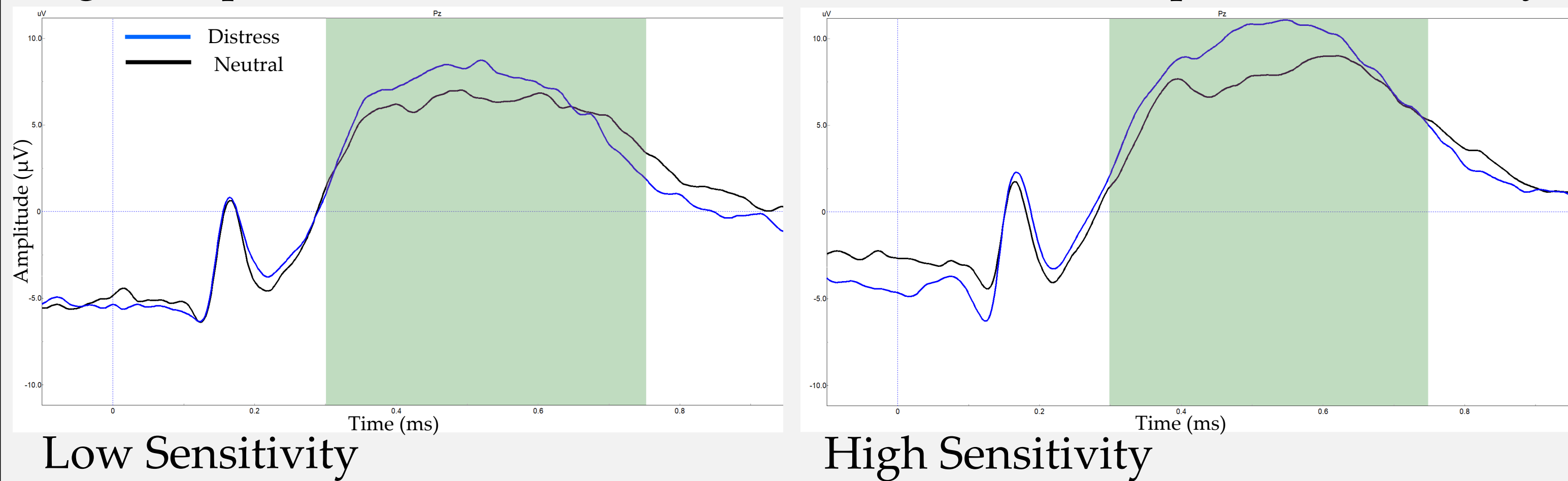


Fig. 2: Expectant Women's P300 to Infant Faces and Infant Attachment

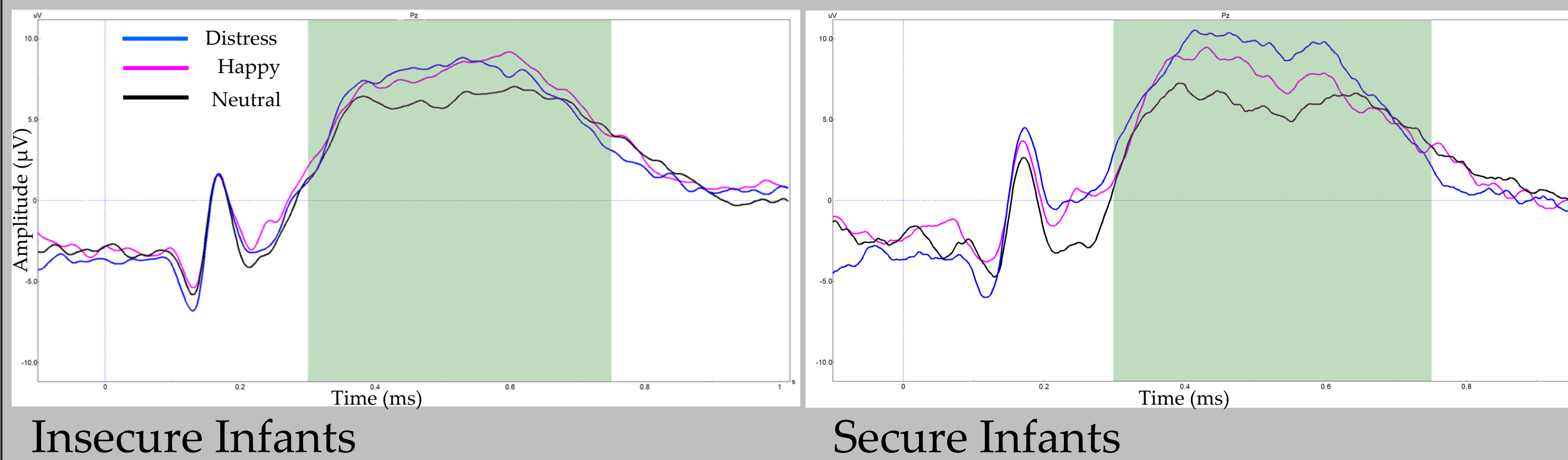
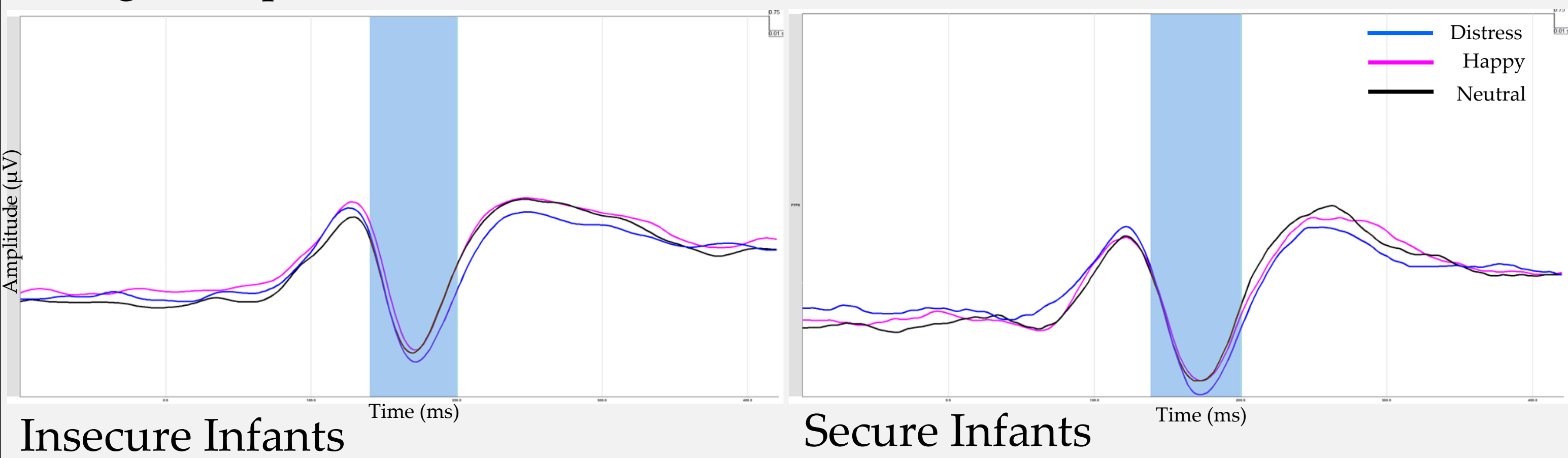


Fig. 3: Expectant Women's N170 to Infant Faces and Infant Attachment



RESULTS

N170 to Infant Emotional Expressions and Observed Sensitivity:

- Expectant mothers' N170 to infant emotional expressions was not significantly associated with their postpartum sensitivity.

P300 to Infant Emotional Expressions and Observed Sensitivity:

- Expectant mothers' heightened P300 amplitude to infant distress (v. neutral) faces predicted their subsequent sensitivity when interacting with their 4-month-old infant ($r = .26, p < .01$; see Fig. 1)

N170 to Infant Emotional Expressions and Infant Attachment:

- Expectant mothers' heightened N170 amplitude to infant distress (v. neutral; v. happy) faces moderately predicted infant security (r 's = .30 - .34; see Fig 2).

P300 to Infant Emotional Expressions and Infant Attachment:

- Expectant mothers' heightened P300 to infant distress (v. neutral; v. happy) faces moderately predicted infant security (r 's = .31 - .38; see Fig 3)

CONCLUSIONS

- Expectant mothers' neural responding reflective of heightened attention (P300) to infant distress expressions predicted their greater postpartum sensitivity toward their 4-month-old infant.
- Expectant women's neural responding reflective of better encoding of (N170) and heightened attention to (P300) infant distress expressions predicted infant attachment security over one year later.
- Examining women's neural responding to infant emotional expressions during pregnancy provides novel insight into the direction of associations, suggesting that women's neural processing of infant faces prior to infant birth contributes to postpartum parenting behavior and infant attachment.
- These findings might inform the timing and targets of intervention, suggesting that interventions aimed at promoting expectant mothers' awareness of and attention toward infant distress signals prior to infant birth might enhance subsequent parent and infant outcomes.

References

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