Maternal Prenatal Fragmented Mood Predicts Child Temperament and Cognitive Development

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Introduction

• Consistent with a developmental focus on the etiology of mental disorders, mounting evidence indicates that prenatal exposure to maternal psychological distress exerts pervasive effects on the developmental trajectories of offspring.

• It is possible that disturbed patterns of maternal signals early in life, especially their fragmentation and unpredictability, contribute to emotional and cognitive vulnerabilities.

• Here we address Aim 1 of Project 2, which is to test the hypothesis that fetal exposure to fragmented maternal emotional states increases vulnerabilities to cognitive and emotional deficits during early development.

• Mother-child pairs were followed from early pregnancy to 6-9 years of age. Cognitive development was assessed at 24 months of age using the Mental Development Index (MDI) of the Bayley Scales of Infant Development (BSID-II).

• Negative affectivity, a temperament dimension predictive of later development of affective disorders, was measured at 6, 12, 24, and 78 months of age with the Infant/Child Behavior Questionnaire (IBQ/ECBQ).

• Maternal depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D). These were used to calculate an index of fragmented mood.

Methods

• Characterization of Fragmented Maternal Mood

  Mood entropy is determined by examining the sample distribution of responses across items within a scale (in this case CES-D).

  A value is calculated between 0 and 2 based on each woman’s distribution of responses. This value indicates the “uncertainty of item response.” Higher values indicate more fragmentation.

Results

Table 1. Prenatal Mood Entropy is Associated with Child Negative Affectivity

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<th>Negative Affectivity Measured with the IBQ/CBQ</th>
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<tr>
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<td>12 Months (N=218)</td>
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<td>Mood Entropy</td>
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<td>.15*</td>
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Note: These partial correlations adjust for prenatal and concurrent postnatal depressive symptoms; *p < .05.

Does mood fragmentation predict outcomes beyond levels of mood?

• Previously, we have shown that levels of prenatal maternal psychological distress predicted a range of developmental outcomes in offspring including adverse birth outcomes, cognitive impairments, emotional regulation, childhood anxiety, externalizing behaviors, cortical thinning, and altered stress responding.

• Because mood entropy is associated with levels of mood ($r = .59$) it is necessary to determine whether fragmented mood exerts independent influences.

• In support of Aim 1 of Project 2, these findings clearly demonstrate that fragmentation of maternal mood predicts child cognitive development and negative affectivity beyond the influence of levels of mood. All analyses adjust for both prenatal and concurrent postnatal depression levels.

Conclusions

• Prenatal mood entropy (maternal mood fragmentation) was negatively associated with cognitive development in two year old children after controlling for pre and postnatal maternal depression.

• Prenatal mood entropy was positively associated with negative affectivity, after controlling for pre and postnatal maternal depression. This fact persisted into preadolescence, and may be a risk factor for later internalizing disorders.

• These findings are among the first in humans to support the idea that fragmented patterns of maternal signals during the prenatal period play a role in the development of emotional and cognitive vulnerabilities.