Different amounts of protest in 4-month-old infants of depressed vs. non-depressed mothers
Gufler, Sandra Rejnholdt; Smith-Nielsen, Johanne; Væver, Mette Skovgaard; Harder, Susanne

Publication date:
2014

Document version
Early version, also known as pre-print

Citation for published version (APA):
Abstract
Amount of vocal protest was measured in 4-month-old infants of depressed vs. non-depressed mothers during 10 minute face-to-face interaction. The sample consisted of a two groups of mothers with their infants: depressed (n=17) and non-depressed (n=49), in total N=66. Vocal protest was measured using PRAAT phonetic software and manual, reliable coding. Results showed that infants of depressed mothers expressed a lower amount of vocal protest compared to infants of non-depressed mothers as measured in mean percentage of time (p < .001).

Background
A significantly heightened amount of protest has previously been reported for infants of depressed mothers during face-to-face interaction (Field, Healy, Goldstein, & Guthertz, 1990). Other studies have also reported a heightened amount of protest in infants of depressed mothers on a tendency level (Murray, Foni-Cowley, Hooper, & Cooper, 1996; Friedman, Beebe, Jaffe, Ross, & Triggs, 1996). Previous studies have predominantly used composite multimodal measures, which measure several modalities together (Field et al., 1990; Murray, et al., 1996). However, multimodal measures may cover up so-called discordant affects (the infant is expressing converging affects through different modalities), which have been detected in infants of depressed mother (Beebe et al., 2009).

Method
Participants
The sample consisted of 66 primiparous mothers and their infants from the urban Copenhagen area with PPD group (n=17) and non-depressed group (n=49). Inclusion criteria were: Primiparous mother, healthy infant, mother at least 18 years, living in the Copenhagen area, normal hearing and vision abilities. Exclusion criteria were: Psychosis and/or presence of co-morbid bipolar disorder and abuse of any substance.

Measures
Depression status was measured with the self-report measure Edinburgh Postnatal Depression Status (EPDS) and Depression status was measured using validated and standardized Psychosis and/or presence of co-morbid bipolar disorder and abuse of any substance.

Procedure
Set-up
The interaction took place according to a standardized design of mother-infant face-to-face interaction. Mother and infant were seated in front of each other at a distance of approximately 50 cm, the infant in an infant seat and the mother on a small chair. Vocal recordings were made using individually head-mounted high-quality microphones. The mother was instructed to play with their infants as she would usually do at home.

Audio recording
Ten minutes of mother-infant face-to-face interaction were recorded. Recordings were aborted if the infant cried extensively (more than 30 seconds in succession). 11 of the 49 recordings (22.4%) of the control group were aborted before the ten minutes had elapsed due to the infant protesting. None of the 17 depressed interactions were aborted.

Discussion
Contrary to previous findings, the results of the present study showed a lowered amount of vocal protest in infants of depressed mothers. Possible interpretations will now be discussed. Figure 1 shows the results from the present and previous studies.

Protest results
On average, infants of non-depressed mothers showed a higher percentage of time in protest (M = 11.56, SD = 14.66) than infants of depressed mothers (M = 3.21, SD = 4.78). This difference was highly significant (6.392) at 3.61, p < .001.

Vocal coding and reliability
Acoustic analysis and labeling was carried out using PRAAT software for phonetic analysis. The recordings were segmented into speech and non-speech intervals using a semi-automated procedure during which possible segments of speech were first identified based on intensity threshold levels. The segments were then verified and adjusted manually and infant vocalizations were reliably separated into negative (protest) and neutral-positive vocalizations by blind coders. Coders were trained to achieve reliability at minimum kappa (K) = 0.80 for event and 0.80 for percentage agreement, which is considered acceptable (Cohen, 1988). Inter-rater reliability was calculated for 20% of each recording. Time-based and event-based Kappa was calculated with sequential analysis software (Bakeman & Quera, 2011). For protest time-based K = 0.88 and K = 0.84, % = 93. Seven files were consensus-coded because reliability could not be reached.

Results
Maternal and infant characteristics
Basic characteristics of the groups are presented in Table 1. No significant differences were found in maternal age, single status, maternal unemployment status, maternal years of education, infant gender or infant birth weight. The two groups only differed according to depression diagnosis.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Depressed (M, SD)</th>
<th>Non-depressed (M, SD)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age (years)</td>
<td>28.1 (5.5)</td>
<td>28.7 (5.9)</td>
<td>.250</td>
</tr>
<tr>
<td>Single status</td>
<td>1.13 (1.0)</td>
<td>1.13 (1.0)</td>
<td>.990</td>
</tr>
<tr>
<td>Maternal employment status</td>
<td>1.00 (1.0)</td>
<td>1.00 (1.0)</td>
<td>.890</td>
</tr>
<tr>
<td>Maternal years of education</td>
<td>1.41 (1.5)</td>
<td>1.41 (1.5)</td>
<td>.990</td>
</tr>
<tr>
<td>Infant gender</td>
<td>0.50 (0.5)</td>
<td>0.50 (0.5)</td>
<td>.990</td>
</tr>
<tr>
<td>Infant birth weight (kg)</td>
<td>3.36 (0.5)</td>
<td>3.36 (0.5)</td>
<td>.990</td>
</tr>
</tbody>
</table>

Possible explanations for the results may include: First, the depressed mothers may have experienced a lower level of depression than expected. Second, the depressed group may be a more severe group, and thus the difference could have been even larger. Third, the depressed group may have experienced more stress and depression, which could have affected their ability to protest. Finally, the depressed mothers may have had different parenting styles, which could have affected their ability to protest.