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Different amounts of protest in 4-month-old infants of depressed vs. non-depressed mothers

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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). Two other studies have also reported a heightened amount of protest in infants of depressed mothers on a tendency level (Murray, Fiori-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., 2008).

Aim

The aim of the present study was to measure amount of infant protest in infants of depressed vs. non-depressed mothers. Infant protest was measured through a single modality, the vocal modality, which has been found to be the most salient system through which both mother and infant communicate with each other at 4 months (Van Egeren, Barratt, & Roach, 2001).

Method

Participants

The sample consisted of $N=66$ primiparous mothers and their infants from the urban Copenhagen area with PPD group ($n=17$) and a non-depressed group ($n=49$). Inclusion criteria were: Primiparous mother, healthy infant, mother at least 18 of age, 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 substances.

Measures

Depression status was measured with the self-report measure Edinburgh Postnatal Depression Status (EPDS) and the standardized psychiatric interview Present State Examination (PSE: Wing, Cooper, & Sartorius, 1974), which was administered by a clinical psychologist at enrollment in both groups.

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 passed due to the infant protesting. None of the 17 depressed interactions were aborted.

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) $\geq .60$ for event and $\geq .80$ for percentage agreement, which is considered acceptable (Cohen, 1988). Interrater-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 $K = 0.90$, % = 98, event-based $K = 0.84$, % = 93. Seven files were consensus-coded because reliability could not be reached.

Ethics

All participants were thoroughly informed about the project and all signed a consent form. All participants in the depressed group were offered thorough feedback after all visits and were offered to participate in short-term cognitive behavioral group therapy.

Data Analysis

Data was analyzed performing an independent sample t-test using IBM SPSS Statistics 19.

Results

Maternal and infant characteristics

Basic characteristics of the two samples are presented in Table 1. No significant differences were found in maternal age, single parent 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

Maternal and infant characteristics

Variables	Depressed ($n=17$)	Non-depressed ($n=49$)	P-value
Maternal age at delivery, years (sd)	30.41 (3.5)	30.69 (4.1)	0.786
Maternal age range	24-38	24-43	
Single parent status			
Parents not living together, n (%)	0 (0)	1 (2.04)	-
Maternal unemployment status			
Unemployed, n (%)	1 (5.9)	3 (6.1)	0.971
Maternal years of education, n (%)			0.361
9-12 years (ISCED* level 3)	0 (0)	5 (10.2)	
13-14 years (ISCED level 4)	1 (6.2)	2 (4.1)	
15-16 years (ISCED level 5)	9 (56.2)	18 (36.7)	
17 years or more (ISCED level 5-6)	6 (37.5)	24 (49.0)	
Depression diagnosis of DSM-V			0.000
None or minimal depression, n (%)	0 (0)	49 (100)	
Minor depression	0 (0)	0 (0)	
Major depression	17 (100)	0 (0)	
Infant gender, n (%)			0.357
Female	7 (41.2)	26 (54.2)	
Infant Birth weight, g (sd)	3476.18 (436)	3535.07 (573)	0.713
Birth weight range, g	2730-4336	2300-4900	

* ISCED: International Standard Classification of Education by UNESCO (United Nations Educational, Scientific and Cultural Organization)

Protest results

On average, infants of non-depressed mothers showed a higher percentage of time in protest ($M = 11.56$, $SD = 14.65$) than infants of depressed mothers ($M = 2.91$, $SD = 4.78$). This difference was highly significant $t(63.92) = 3.61$, $p < .001$.

Table 2

Mean percentage of time protesting

	Depressed ($n=17$)	Non-depressed ($n=49$)	P-value
Mean % of time	11.56	2.9	< .001

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.

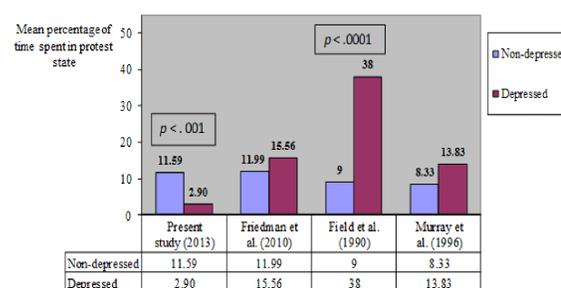


Figure 1: Mean percentage of time spent in protest in the present and previous studies.

One possible explanation is the use of different measures. However, only across the depressed samples does the measure seem to largely impact the amount of protest. This could be explained by the presence of discordant affect in the infants of depressed mothers, which would result in different amount of protest when different modalities are measured.

Sample characteristics might have affected the results. The depressed women in the present sample can be considered low-risk (Table 1), while Field has often used particularly high-risk samples. Interactions of high-risk infant-mother dyads are quantitatively and qualitatively different (Murray & Cooper, 1997; Field, 1967). Furthermore, it has been argued that there are different types of depressed mothers characterized by different behavior patterns in mother and infant (Cohn, Matias, Tronick, Cornell, & Lyons-Ruth, 1986; Tronick & Weinberg, 1997; Field, Hernandez-Rief, & Diego, 2005). Infants of under stimulating disengaged mothers has been found to cry more in order to get a response from the mother while the infants of over stimulating intrusive mothers cry less to screen the mothers off (Cohn et al., 1986; Field et al. 1990). The infants of the disengaged mothers might turn passive and turn to self-regulation in time (Tronick & Weinberg, 1997).

Age could have played a role, since the behavior of the infant might change with the amount of exposure to PPD. The infants in the present study are 16 weeks, while infants in the other studies are younger (8-11 weeks, 13.6 weeks, and 14.8 weeks). The differences in age are relatively small, however an infant might experience many interactions on a daily basis, making the experience on which they base their behavior accumulate quickly.

Finally, the infants of depressed mothers might as a group show both a heightened and a lowered amount of protest. Adopting Beebe's mid-range model for interpretation would indicate that the different depressed samples are facing different types of regulatory differences. A heightened amount of protest would indicate that the infant is preoccupied with the interactive regulation while a lowered amount would indicate that the infant has turned to self-regulation (Beebe, Rustin, Sorter, & Knoblauch 2005).

Conclusions

Results showed a lowered amount of protest in infants of depressed mothers, while previous studies have detected higher amounts. The relatively small sample size of the depressed group should be taken into account. However, findings of both a higher and a lower amount of protest in infants of depressed mothers might be explained by a model where a mid-range amount is seen as optimal. Operating outside the "mid-range" could be understood as attempts to cope with interactional disturbances by heightening or lowering the response.

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