Maternal Warmth in Depressed Mother and Child Problem-Solving Behavior in a Challenging Task

Jiaqi Li

Department of Psychology

College of Arts and Sciences

The Ohio State University

Abstract

Using a sample of 66 mother-child pairs, this study examined maternal warmth in a depressed mother and child problem-solving behavior during a challenging puzzle task. Maternal warmth was investigated on 3 dimensions: Mother positive emotion expression, mother comfort, and quality of the mother-child relation. Participants were recruited from the Columbus, Ohio area, with mothers who had depressive symptoms and had a child who was 5-years-old. The dyads were asked to complete three puzzle tasks, and participants' emotions and behaviors were later coded. Results supported that mother positive emotion was positively associated with child persistence on the task; the quality of the mother-child relationship was negatively associated with child negative emotional arousal. However, mother comfort was positively associated with child negative emotional arousal and child discouragement behaviors, which was not expected. Results also showed the impact that family SES and mother depression had on child problem-solving behaviors. Further research could investigate child self-soothing behavior and its association with child negative emotional arousal.

Introduction

Parent-child interactions are one of the most important settings that allow children to learn about emotions and use as a model to practice emotional regulation skills (Mirabile, 2010). Parental emotion-related socialization behaviors could influence child's functioning in several ways, including the experience and expression of emotion, regulation of emotions, and the quality of relationship between child and the socialization agent (Eisenberg, Cumberland, Spinard, 1998).

Mothers' parenting behavior and the ways in which they interact with their children is influenced by their mental health problems. In particular, maternal depression has been shown to have a negative impact on mothers' interaction with their children. "The experience of living with a depressed mother has serious consequences for many children and increases their risk for a number of developmental and adjustment problems" (Downey & Coyne, 1990; Lovejoy, Graczyk, O'Hare & Neuman, 2000, p.561). Depressed women tend to report, diminished emotional involvement and increased hostility and resentment (Weissman & Paykel, 1972; Lovejoy et al., 2000). Generally, depressed mothers show more flat emotion, and less responding behaviors. Thus, children with depressed mothers often behave differently compared to children with mothers who were not depressed in their problem-solving behavior and emotional arousal. In the current study, mothers and children were observed during a challenging and stressful task, which was designed to elicit frustration in the child.

"Parental warmth consists of an attitude characterized by nurture, support and reassurance towards offspring. It also implies being emotionally sensitive and available to children's needs" (Berg-Nielsen et al., 2002, p.532). Although it has been defined differently across studies, common characteristics of maternal warmth include positive emotion, support, soothing behavior, and encouragement. This study investigated three dimensions of maternal

warmth: mother positive emotional arousal, mother comfort, and quality of mother-child relationship, and their association with child behavior outcomes.

"Mothers' interest, encouragement, and praise during challenging problem solving tasks likely helps young children remain focused and calm in the moment, thereby enhancing learning and performance" (Leerkes, Blankson, O'Brien, Calkins, & Marcovitch, 2011, p. 11). It is also supported that parents who were more responsive and displayed higher positive affect had children who showed more persistence on a challenging task compared to the control group (Loop & Roskam, 2016). Therefore, it is believed that with greater mother positive emotion expression, children display higher persistence toward problem-solving tasks.

A positive parental emotional climate predicts children remaining positive and planning to repair mistakes toward failures and further challenges, "because parent positivity helps children internalize the value of joint activities, regulate frustration, and build feelings of competence and control, whereas a negative emotional climate impedes these processes, resulting in helpless responding" (Smiley, Tan, Goldstein, & Sweda, 2016, p. 286). A positive emotional climate between mother and child is associated with children who are positive during a problem-solving task, while a negative emotional climate between mother and child is more likely to be associated with children's negative arousal (Smiley et al., 2016). Moreover, it is likely that mother's emotional responsiveness tends to reduce children's negative emotional arousal (Eisenberg, Fabes, & Murphy, 1996). A positive emotional climate evidenced during a mother-child interaction task is an indicator of a higher quality mother-child relationship; whereas a lack of maternal emotional responsiveness is an indicator of a poorer mother-child relationship, thus resulting in child's negative emotional arousal. The current study will examine children's negative emotion toward a challenging task, and its association with the quality of the mother-child relationship.

There are few studies that have examined mother comforting behaviors and child behavioral outcomes. In the current study, a similar association as the one expected for the quality of the mother-child relationship and child negative emotional arousal was expected. It was expected that when mothers showed more comforting behaviors, children would display lower negative emotional arousal and less discouragement behaviors. This study examined relations between dimensions of maternal warmth and child problem-solving behaviors, and whether these were consistent with previous findings concerning the role of maternal depression on child behavior during a challenging task.

Three main hypotheses were tested. First, maternal positive emotion was expected to be positively associated with children's persistence on the task. Second, both quality of the mother-child relationship and mother comfort was expected to be negatively associated with children's negative emotional arousal. Third, mothers' comforting behavior was expected to be negatively associated with children's discouragement behavior.

Methods

Participants

Participants were drawn from an ongoing longitudinal study that investigates maternal depression and children's emotion regulation. Participants were recruited through flyers sent to daycares and community centers in the Columbus, Ohio area. Mother participants were required to have no other psychiatric disorders other than a depressive disorder (with or without anxiety disorders), be at least 21 years old, and have a child who was 5 years old with no developmental disorders or delays. A total of 66 5-year-old children and their mothers participated in the study. Mothers' age ranged from 22 to 58 years old. There were 39 boys and 27 girls. Among the participants, 54.54% were Caucasian, 30.30% were African American or Black, and 0.03% were Asian, and 12% reported as multiple races. Among these participants, 89.2% of mothers had attained a college degree or higher, and 21.5% of mothers

had attained high school degrees.

Procedures

Mothers and children were asked to participate in a study visit at a research lab at The Ohio State University. The Puzzle Task was one of the problem-solving tasks completed during the visit. It included three sets of puzzles that increased in difficulty for children to complete, and mothers could assist but not complete the puzzle for the child. The child was timed when completing the puzzle. The child had one minute to complete the first puzzle, one and a half minutes for the second puzzle, and two minutes for the third puzzle. The experimenter let the child know how much time he/she had left every 30 seconds. The puzzle task was video recorded and later coded.

Measures

For the data derived from behavioral coding, inter-coder reliability was required to meet at least 80% agreement during the training, for both mother codes and child codes. Mother and child emotion and behavior were coded by separate teams of coders. After training, the coders met once a week to discuss coding issues in order to assure the accuracy of coding. Inter-coder reliability was computed based on 20% of the tapes that were double coded.

Mother and child micro coding

Certain maternal and child behaviors were coded second-by-second as they occurred during the video-recorded puzzle task. Indicators of behaviors included verbal statements, tone of voice, facial expressions, and physical movements. Generally, verbal statements and tone were given precedent over physical movements, as these tended to convey more meaning and had more impact on the interaction.

Comfort/soothing. This code included mother's physical comforting behavior (e.g., hugging) and statements to sooth the child (e.g., "you will figure it out"). These behaviors generally followed an episode when the child was expressing anxiety or stress over the

activity and were directed as reducing the child's distress. The final comfort/soothing score represented the total duration of time that mother was engaged in comforting/soothing behavior with the child.

Child discouragement. This behavior was coded when child made depressed physical behaviors (e.g., sighing) or verbal statements (e.g., "I can't do it") that showed a lack of confidence and hopelessness about the task. The value of this variable represented the duration that the child displayed signs of discouragement.

Mother and child global coding

Certain behaviors and emotional states were coded globally for mother and child. These codes were meant to assess the overall quality of the interaction, including general emotional tone, involvement with the activity, and mutual engagement between mother and child. Mother and child were coded separately on positive emotional arousal, child persistence, and negative arousal; mother and child were rated jointly for the mother-child relationship.

Mother positive emotional arousal. This code evaluated mother's verbal or nonverbal expression of positive emotion throughout the task on a 7-point scale (1 = *remains calm or is negative during the task* to 7 = *mother is clearly very positive during the task*).

Child persistence on task. This code evaluated the extent of the child's focus and effort toward the puzzle task on a 7-point scale (1 = *child actively tries to avoid the task* to 7 = *child focuses on the puzzle-solving almost the whole time*).

Child negative emotional arousal. This code evaluated child's verbal or nonverbal expression of negative emotion throughout the task on a 7-point scale (1 = *remains calm or positive during the task* to 7 = *child is obviously very highly negative during the task*).

Mother-child relationship. This code evaluated the relationship between mother and child with regard to their relatedness and mutual engagement throughout the task at a 7-point scale (1 = *no mutual emotional engagement, rejection and avoidance characterize the*

interaction to 7 = *mother and child clearly enjoy each other's company, the interaction is positive and relaxed*).

Mother depressive symptoms were measured by Center for Epidemiological Studies Depression Scale (CES-D; Raldoff, 1977). This questionnaire includes 20 questions rated on a 4-point scale that evaluates depressive symptoms experienced over the last week. An overall score (range 0-60) of depressive symptoms was created from these questions. The scale showed good reliability, with alpha = 0.94.

Child gender and annual household income were measured through a questionnaire. Annual household income ranged from "*Less than $10,000*" to "*$150,000 or more*" at $10,000 increments, and was coded as a continuous variable.

Data Analytic Plan

Regression analyses were conducted to test the hypotheses. Child gender, maternal depressive symptoms and family income were initially included in all analyses as covariates, but only maternal depressive symptoms and family income were retained in the final analyses, as child gender was unrelated to any dependent variables. For each regression analysis, all predictor maternal and mother-child relationship variables were simultaneously entered and the nonsignificant predictors were then removed for the purpose of parsimony.

Results

Means, standard deviations and bivariate correlations of all variables in the analyses are presented in Table 1. Mothers with elevated depressive symptoms had lower incomes (r = -.32), and displayed less positive emotion (r = -0.27) and comforting behavior to their children (r = -0.25). Mother Comfort and Child Persistence had a correlation coefficient of -0.25 (p = 0.05), indicating mothers who showed more comfort had children who were less persistent on the task. Mother Comfort and Child Discouragement had a correlation

coefficient of 0.41 ($p = 0.10$), demonstrating that mothers who showed more comfort had children who had more discouragement behavior during the puzzle task.

Mother Positive Emotion Arousal and Child Persistence

The regression model was significant, $R^2 = 0.19$, F (4, 59) = 3.13, $p = 0.02$. The regression analysis (Table 2) showed that there was a marginally significant association between mother positive emotional arousal and child persistence on the puzzle task ($\beta = 0.24$, $p = 0.06$), suggesting a trend that mothers who expressed higher intensity levels of positive emotion had children who were more persistent on the task. Annual household income was marginally positively associated with Child Persistence ($\beta = 0.28$, $p = 0.06$).

Mother-Child Relationship and Child Negative Emotion

The regression model was significant, with the independent variables in the model explaining 32% of the individual variance in child negative emotion arousal, $R^2 = 0.32$, F (4, 61) = 6.69, $p = 0.00$. Table 3 shows that the mother-child relationship variable was negatively associated with child negative emotional arousal on the puzzle task ($\beta = -0.35$, $p = 0.003$). This indicated that children who had high quality relationships with their mother showed lower levels of negative emotional arousal. This suggests that quality of the mother-child relationship has an impact on child negative emotional arousal during the problem-solving task. Mother depressive symptoms were marginally negatively associated with child negative emotional arousal on the puzzle task ($\beta = -0.20$, $p = 0.09$), suggesting a trend that mothers with elevated depressive symptoms had children who displayed less negative emotional arousal.

Mother Comfort/Soothing with Child Negative Emotion

The regression model was significant, $R^2 = 0.32$, F (4, 61) = 6.69, $p = 0.00$. The second regression analysis (Table 3) showed that mother comfort was positively associated

with child negative emotional arousal ($\beta = 0.45$, $p = 0.001$), indicating that mothers who showed more comfort had children who expressed more negative emotion.

Mother Comfort/Soothing with Child Discouragement

The regression model was significant, $R^2 = 0.27$, F (4, 61) = 5.32, $p = 0.001$. The third and final regression analysis (Table 4) showed that mother comfort was positively associated with child discouragement on the puzzle task in a laboratory setting ($\beta = 0.42$, $p = 0.002$), indicating that mothers who showed more comforting behavior had children who displayed more discouragement behavior. Mother depressive symptoms were negatively associated with child discouragement ($\beta = -0.21$, $p = 0.10$).

Discussion

This study examined maternal warmth in depressed mothers and child problem-solving behavior. The first hypothesis was that mother positive emotional arousal would be positively associated with child persistence on the stressful task. Mother positive emotional arousal was marginally associated with child persistence, suggesting a trend of a positive relation between mothers' positive emotion expression and children's persistence during a puzzle task, which is consistent with past literature (Loop et al., 2016). With a larger participant sample, mother positive emotional arousal might be significantly associated with child persistence. In addition, annual household income was marginally positively associated with child persistence, showing a trend that children whose family income was higher showed higher persistence on the task.

The second hypothesis was the quality of the mother-child relationship would be negatively associated with child negative emotional arousal on the task, which was supported by results from the current study. However, the hypothesis that mother comforting behavior would be negatively associated with child negative emotional arousal was not supported. As demonstrated in past literature (Smiley et al., 2016; Eisenberg et al., 1996), the quality of the

mother-child relationship was related to the child's emotional arousal during the challenging task. Mother-child dyads that were rated higher in the quality of their relationship showed stronger relatedness, more mutual engagement, and frequent affective interactions. Within this mutually positive emotional climate, it is likely that children are less likely to show negative emotions toward the challenging task. However, the significant positive association between mother comforting and child negative emotional arousal indicated that mothers with more comforting behavior had children who displayed higher negative emotional arousal. This result suggests that mother's comforting behavior, as it was observed in the current study, may not be an efficient strategy to sooth children's negative emotional arousal in this setting or for this age group. Additionally, unlike other maternal behaviors, mothers' comforting tended to be a response to child negative emotion expression, so the amount of mothers' comforting behavior is contingent upon the length and intensity of child negative emotion. Mother depressive symptoms were also marginally associated with child negative emotional arousal, suggesting a trend of a negative relation that mother with elevated depressive symptoms had children who were less negatively aroused. Possible reasons may be that depressed mothers tend to show flat affect and be less responsive, thus children are the same, showing less emotional arousal during challenging tasks.

The third hypothesis was that maternal comfort/soothing behavior would be negatively associated with child discouragement behavior, which was not supported. Results showed that mother comforting behavior was positively associated with child discouragement behavior, demonstrating that mothers who showed more comforting behavior had children who displayed more discouragement behavior on the task. Again, results indicated that this comfort strategy may not be very effective on soothing children and lowering the child's overall negative emotional arousal and discouragement behavior toward the challenging task.

Limitations

There were only 66 participants in the study, which is a small sample. A larger sample might show more clear relations for variables that were marginally significant. All mothers had elevated depressive symptoms in this sample. As such the results may not be generalizable to the general population. Additionally, the majority of the mother participants were highly educated, which might not fully represent the population. Still, there were several strengths to this study. The composition of race within the sample is similar to that of the Columbus area, where the sample was recruited. Results were based on multiple coders observing the interactions and coding objectively based on a coding manual, rather than on self-reported data from mother.

Future Directions

Future studies could examine the mother positive emotion expression and child persistence in a larger sample. Studies could also examine the relation between mother negative emotion and child persistence. Mothers who have some stress toward the task might focus more on the child's problem-solving behavior and making sure the child remains on-task. Additionally, future studies could investigate the relation between child self-soothing behavior and child negative emotion during the task. Based on the results, mother comforting behavior was positively associated with child negative emotion and discouragement behavior. Studies could examine whether child self-soothing behavior is effective or not in helping lower the child's negative emotion.

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Table 1. Descriptive statistics and bivariate correlations of study variables

	Mean	SD	1	2	3	4	5	6	7	8
1. Child Gender	0.42	0.50								
2. Annual household income	4.52	3.22	0.00							
3. Maternal Depressive Symptoms	29.47	11.75	-0.13	-0.32*						
4. Mother comfort	0.72	1.11	0.18	0.47**	-0.25*					
5. Mother Positive Emotional Arousal	2.89	1.31	0.15	0.11	-0.27*	0.11				
6. Child discouragement	2.05	3.89	-0.01	0.20	-0.24	0.41**	-0.19			
7. Child persistence	5.99	1.18	-0.02	0.07	0.02	-0.25*	0.21	-0.21		
8. Child Negative Emotional Arousal	2.60	1.42	0.08	0.23	-0.24	0.45**	-0.23	0.83**	-0.43**	
9. Dyadic interaction	3.75	1.21	-0.01	0.09	-0.21	0.13	0.59**	-0.19	0.15	-0.24

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 2. Regression analysis on child persistence on task

	B	*SE*	*Beta*	*t*	*Sig.*
Annual household income	0.11	0.06	0.28	1.94	0.06
Maternal Depressive Symptoms	0.00	0.01	0.04	0.28	0.78
Mother Positive Emotional Arousal	0.22	0.12	0.24	1.92	0.06

a Dependent Variable: child persistence

Table 3. Regression analysis on child negative emotional arousal

	B	*SE*	*Beta*	*t*	*Sig.*
Annual household income	-0.03	0.06	-0.06	-0.43	0.67
Mother depressive symptoms	-0.02	0.01	-0.20	-1.71	0.10
Mother Comfort	0.60	0.17	0.45	3.45	0.001
Dyadic interaction	-0.40	0.13	-0.35	-3.08	0.003

a Dependent Variable: child Negative Emotional Arousal

Table 4. Regression analysis on child discouragement

	B	*SE*	*Beta*	*t*	*Sig.*
Annual household income	-0.04	0.16	-0.04	-0.27	0.80
Maternal Depressive Symptoms	-0.07	0.04	-0.20	-1.70	0.10
Mother comfort	1.54	0.45	0.42	3.22	0.002

a Dependent Variable: child discouragement