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Maternal Resolution of Grief After Preterm Birth: Implications for Infant Attachment Security

WHAT'S KNOWN ON THIS SUBJECT: For mothers of children with chronic medical conditions or disabilities, such as epilepsy or cerebral palsy, a history of maternal unresolved grief regarding the child's diagnosis has been associated with insecure infant-mother attachment.

WHAT THIS STUDY ADDS: Unresolved grief related to a preterm birth is associated with the development of insecure infant-mother attachment. Mothers with resolved grief after preterm birth are 2.9 times as likely to have securely attached infants, compared with mothers with unresolved grief.

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abstract

OBJECTIVE: This study explored the association between mothers' unresolved grief regarding their infant's preterm birth and infant-mother attachment security. We hypothesized that mothers with unresolved grief would be more likely to have insecurely attached infants at 16 months and that this association would be partially mediated by maternal interaction quality.

METHODS: This longitudinal study focused on 74 preterm infants (age of <36 weeks) and their mothers who were part of a larger study of high-risk infants. The present analysis included assessment of neonatal and socioeconomic risks at NICU discharge; maternal depression, Reaction to Preterm Birth Interview findings, and quality of parenting at a postterm age of 9 months; and infant-mother attachment at postterm age of 16 months. Associations among findings of grief resolution with the Reaction to Preterm Birth Interview, quality of parenting interactions, and attachment security were explored by using relative risk ratios and logistic and multivariate regression models.

RESULTS: The relative risk of developing insecure attachment when mothers had unresolved grief was 1.59 (95% confidence interval: 1.03–2.44). Controlling for covariates (adjusted odds ratio: 2.94), maternal feelings of resolved grief regarding the preterm birth experience were associated with secure infant-mother attachment at 16 months. Maternal grief resolution and interaction quality were independent predictors of attachment security.

CONCLUSION: Maternal grief resolution regarding the experience of preterm birth and the quality of maternal interactions have important implications for emerging attachment security for infants born prematurely. *Pediatrics* 2011;127:284–292

Premature birth often is traumatic and a source of parental distress.[1–3] This nonnormative transition to parenthood has been described as an "emotional crisis"[4] that typically is characterized by feelings of loss and grief,[5–7] which sometimes persist for months after the infant's NICU discharge.[1,8–11] In some ways, adaptation to having a preterm infant is similar to adaptation to having a child with a disability; the mother must adjust her expectations and hopes for her child in the face of uncertainties, and she must mourn the hoped-for child while still embracing the child she has.[12,13] The degree to which a mother can resolve feelings of grief and loss regarding the premature delivery is thought to affect the mother-child relationship.[4,6,9,14]

Persistent feelings of grief may affect a parent's ability to respond sensitively and contingently to the infant's cues,[15] which may influence infant attachment. Attachment theory describes how a parent's interactive behavior influences later infant emotional development[16,17]; contingently responsive and sensitive parenting contributes to secure infant attachment[18] and better social/emotional development.[19] Conversely, interactions lacking in sensitivity and responsiveness are associated with insecure attachment.[20] Preterm infants, especially those born with lower birth weights or greater medical risks, seem to be at risk for developing insecure attachments.[21–23] Insecure attachment is a nonspecific risk for later psychopathological conditions,[24–26] whereas attachment security is related to subsequent social competence and empathy.[27–29]

The association between maternal grief resolution and attachment has been explored among children with diagnosed chronic medical conditions or disabilities by using the Reaction to Preterm Birth Interview (RPBI).[30–33] The RPBI probes parents' feelings about the diagnostic process, the child's condition, and their reactions to the diagnosis. The interview results are coded as resolved or unresolved.[34] Since initial validation, associations between RPBI grief resolution and the quality of parent-child interactions or attachment have been demonstrated for multiple clinical samples, including children with Down syndrome, autism, cerebral palsy, epilepsy, and phenylketonuria,[31–33,35–38] but has not been explored for premature infants. Because feelings of grief are common among mothers of preterm infants[4,6] and because infant attachment predicts children's later social/emotional development,[25] it is important to identify associations between maternal grief regarding preterm birth and attachment, so that vulnerable mother-infant dyads can be identified and supported.
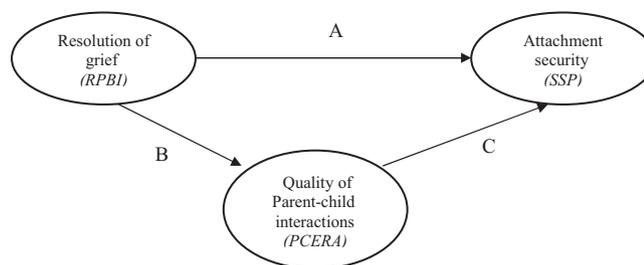
We hypothesized that mothers experiencing unresolved grief would be more likely to have infants with insecure attachment, compared with mothers with resolved grief. We expected the association between grief resolution and security to persist after adjustment for infant and maternal covariates identified a priori. Because unresolved grief was associated previously with specific maternal behaviors (eg, frightening behavior),[39–43] we also expected that the quality of maternal parenting at postterm age of 9 months would partially mediate (ie, explain) the association between maternal grief resolution at postterm age of 9 months and attachment at postterm age of 16 months (Fig 1).

METHODS

Participants

Seventy-four infant-mother dyads who are part of a larger longitudinal study[11] participated. All 74 infants were born preterm (<36 weeks of gestation).

For the larger study, 181 mothers and their infants were recruited from 3 Wisconsin NICUs in 2002–2005. Families were invited to participate if infants were at ≤35 weeks of gestation or weighed <2500 g at birth and had no congenital or significant neurologic problems or prenatal drug exposures, on the basis of hospital screening (prenatal maternal interview and postnatal infant meconium assay and urine toxicological screen), and if mothers were ≥17 years of age, could read English, and self-identified as the child's primary caregiver. For multiple births, 1 infant was selected randomly for participation. Seventy percent of the infants were white, 10% were black, 1% was Middle Eastern, and 19% were multiracial. Infant birth weights ranged from 490 to 3328 g (mean $\pm$ SD: 1744 $\pm$ 588 g), gestational ages ranged from 25.0 to 35.8 weeks (mean $\pm$ SD: 31.4 $\pm$ 3.2 weeks), and infants were hospitalized a mean $\pm$ SD of 33.4 $\pm$ 28.7 days. At NICU discharge,

FIGURE 1
Hypothesized partial mediation model. SSP indicates strange situation procedure. A indicates the relationship between the predictor (RPBI) and outcome (attachment); B, relationship between the predictor (RPBI) and the intervening variable (PCERA); C, relationship between the intervening variable (PCERA) and outcome (attachment).

mothers had a mean ± SD age of 29.7 ± 5.9 years and 14.3 ± 2.7 years of education. Most mothers (n = 54 [73%]) were married, and the mean ± SD family income was $56 541 ± $33 002. Thirty-eight infants (51%) were boys.

Procedures

This study was approved by hospital and university institutional review boards. Infants were assessed at 6 time points between NICU discharge and corrected age of 36 months (calculated on the basis of the infant's due date, as is commonly used for assessments of preterm infants).[44] This report focuses on data obtained at the NICU discharge, 9-month, and 16-month time points. At NICU discharge, medical records were reviewed, and maternal demographic information was obtained. The 9-month home visit included observation of infant-mother play, assessment of maternal depression, and an interview about the mother's preterm birth experience (which was audiotaped and later transcribed). During the videotaped interaction, mothers were instructed to play "as they normally would" for 15 minutes, and these interactions were later coded. The 16-month laboratory visit included assessment of infant attachment and maternal vocabulary.

Measures

Infant-Mother Attachment

Infant-mother attachment was assessed at postterm age of 16 months by using the Strange Situation Procedure test described by Ainsworth et al.[16] The Strange Situation Procedure test is the standard method for assessing attachment among infants 12 to 18 months of age. The videotaped procedure includes a series of mother-child separations and reunions that arouse the infant's motivation to explore (when not distressed) and urge to seek proximity to the caregiver (when

distressed). Classification is on the basis of 4 categories (secure, insecure-avoidant, insecure-resistant, and disorganized), as coded from the child's reunion behaviors.[16] A trained attachment researcher who was blinded to the study variables coded the tapes. Ten tapes (14%) were coded by a second trained researcher, with a κ of 0.80 across the secure and insecure categories.

Maternal Grief Resolution

Mothers were interviewed at postterm age of 9 months with the RPBI, a structured, standardized interview modified from the Reaction to Diagnosis Interview[30] to focus on the experience of premature delivery. Like the Reaction to Diagnosis Interview, the RPBI consists of 5 questions designed to elicit content and affect regarding the parent's view of the child's medical condition and prematurity (Table 1). The questions probe the parent's thoughts and feelings about the child's birth, the process leading to delivery, changes in those thoughts or feelings, and past and current thoughts regarding the causal role she or other factors might have played in her child's prematurity.

Each interview was coded according to the Reaction to Diagnosis Interview classification system[34] by trained individuals who were blinded to other family infor-

TABLE 1 Reaction to Preterm Birth Interview

When did you first realize that [child's name] was going to be born prematurely?
What were your feelings at the time of realization?
Have these feelings changed over time?
Tell me exactly what happened when you gave birth to [child's name's] prematurely. Where were you? Who else was there? What were you thinking and feeling at the moment?
Parents sometimes wonder or have ideas about why they have a child who was born prematurely. Do you have anything like that that you wonder about? (Prompt if necessary: For example, some parents feel that they might have done something to contribute to their child's condition; others believe that God must have a reason for giving them this child. What do you wonder about?)

mation. Interrater reliability between 2 raters was high (κ = 0.76) across 26 transcripts (35%). The results were categorized as resolved or unresolved.

Resolved grief reflect a focus on the present, an acceptance of the child's condition, a forward-looking orientation, an accurate representation of the child, and an acknowledgment of a change in feelings since the premature birth. Parents with resolved grief are no longer searching for a reason for the preterm birth and demonstrate an assertion of "moving on in life." Parents with resolved grief are able to describe the child's abilities accurately and can acknowledge the benefits and challenges of having a child born prematurely.[34,45]

Characteristics of unresolved grief include distortions of the child's condition or unrealistic expectations about the child's prognosis. Parents with unresolved grief may demonstrate a continued search for reasons why the child was born prematurely, and they often seem to be "stuck in the past." In telling their stories, parents with unresolved grief seem to be reliving the birth experience, but their narratives often lack details about their feelings or the events regarding the premature delivery. The emotional tone of the narrative seems overwhelmed or angry; parents with unresolved findings seem disengaged or cut off from the preterm birth experience, with minimization or denial of the impact of the experience on themselves.[34,45]

Maternal Parenting Interactions

Infant-mother play interactions at 9 months were coded with the 29 parenting variables of the Parent-Child Early Relational Assessment (PCERA).[46] The PCERA is an observational coding system that has been used with preterm infants.[47] Variables are coded on a scale of 1 (negative quality) to 5 (positive quality). Previous studies reported acceptable ranges of internal consis-

tency ($r = 0.75-0.96$) and validity.[48] The 29 PCERA parent items were subjected to an unweighted, least-squares, exploratory, factor analysis with a varimax rotation with a 3-factor solution, similar to the theoretically derived subscales presented by Clark.[48] We labeled the factors positive affect, communication, and connectedness (factor 1 [14 items]; $\alpha = .95$), intrusiveness, anxiety, and insensitivity (factor 2 [8 items]; $\alpha = .89$), and anger, hostility, and criticism (factor 3 [5 items]; $\alpha = .93$). Higher scores reflected more-positive parenting; therefore, for factors 2 and 3, lower scores represented more intrusiveness and anger. Ten percent of the sample was coded independently by 2 trained researchers. Interrater reliability ranged from 0.83 to 0.97 (mean: 0.88), similar to findings in previous studies.[49,50]

Neonatal Health Risks

A standardized neonatal health risk index used with preterm infants[11] was calculated through review of NICU medical records. Infant gestational age and birth weight were standardized, reverse-scored, and combined with the standardized sum of the presence of 10 neonatal medical risks (ie, apnea, respiratory distress, chronic lung disease, gastroesophageal reflux, multiple birth, supplementary oxygen treatment at NICU discharge, apnea monitor use at NICU discharge, 5-minute Apgar score of <6, ventilation during NICU stay, and NICU stay of >30 days). The index had a Cronbach's α of .70, and scores ranged from -4.08 to 5.91 (mean ± SD: -0.12 ± 2.63), with higher scores reflecting more prematurity and neonatal health risks.

Family Socioeconomic Risks

A socioeconomic risk index was calculated by summing the presence of the following risk factors identified from the NICU demographic questionnaire: family income below federal poverty guidelines (adjusted for family size), both parents unemployed, single mother, adolescent mother, >4 dependent children, mother did not graduate from high school, and father did not graduate from high school. Scores ranged from 0 to 7, with higher scores reflecting more risks (Cronbach's $\alpha = .75$).

Maternal Vocabulary

The Peabody Picture Vocabulary Test, 3rd Edition,[51] was used to measure maternal receptive vocabulary because the RPBI relies, in part, on the respondent's verbal skills. The Peabody Picture Vocabulary Test is a widely used, individually administered assessment for individuals between 2 and 90 years of age; it has a mean of 100 and a SD of 15, and results correlate strongly with IQ. In this sample, maternal Peabody Picture Vocabulary Test scores ranged from 76 to 136 (mean ± SD: 100.7 ± 13.3).

Maternal Depressive Symptoms

The Center for Epidemiologic Studies-Depression Scale[52] was used to assess maternal depressive symptoms at 9 months. The Center for Epidemiologic Studies-Depression Scale is a 20-item, self-report questionnaire that asks respondents to rate their symptoms in the previous week on a 4-point scale ranging from 0 (rarely/none of the time) to 3 (most/all of the time). It is a well-validated measure used with high-risk and low-risk samples.[52] For the present study, Cronbach's α was .88.

RESULTS

Grief Resolution

Most mothers (67.6%) in our sample exhibited resolved grief on the RPBI. Groups with resolved and unresolved grief were similar with respect to demographic characteristics (Table 2).

Attachment Security

One-half of the infants ($n = 37$) were classified as securely attached to their mothers, whereas 14 (30%) were avoidant, 22 (19%) were resistant, and 1 (1%) was disorganized (Fig 2). We used the binary variable of secure versus insecure (50% secure and 50% insecure) in our analyses.

Association Between RPBI Findings and Attachment

Data were analyzed by using PASW Statistics 17.0 (SPSS, Chicago, IL). After data screening to detect any statistical assumption violations, the association between resolution of grief and infant attachment classification was calculated for the four attachment groups (Table 3). We then dichotomized infant attachment into secure/insecure categories, and the relative risk of insecure attachment was calculated (95% confidence interval [CI]). The relative risk of insecure attachment for infants of mothers with unresolved grief was 1.59 (95% CI: 1.03–2.44) (Table 4).

To determine whether the RPBI grief-attachment association was decreased or altered by covariates that were identified a priori (neonatal health, family socioeconomic risk, maternal vocabulary, and maternal depression), we estimated a hierarchical logistic regression model (adjusted odds ratio). Covariates were entered in the first step and RPBI results in the second step, so that we could examine the corresponding inferential statistic (step 2 χ^2) to determine the unique contribution of RPBI results to attachment, with adjustment for covariates. As hypothesized, the RPBI results still significantly predicted infant attachment security after adjustment for the 4 covariates (step 2 $\chi^1_2 = 4.22$; $P = .040$). When mothers demonstrated resolved RPBI grief, their infants experienced 2.9 times the odds of being classified as having secure attachment (Table 5).

TABLE 2 Characteristics of Mothers With Resolved Versus Unresolved Grief and Their Infants

	Resolved (N = 50)	Unresolved (N = 24)
Maternal variables		
Age, range (mean ± SD), y	17–40 (30.5 ± 5.2)	17–42 (28.2 ± 7.0)
Education, range (mean ± SD), y	11–21 (14.3 ± 2.4)	8–21 (14.2 ± 3.3)
Yearly household income, range (mean ± SD), $	6000–146 000 (59 651 ± 30 145)	4320–140 000 (50 060 ± 38 158)
No. of dependents, range (mean ± SD)	1–11 (2.1 ± 1.6)	1–5 (2 ± 1.1)
No. of family socioeconomic risk factors, range (mean ± SD)	0–5 (0.8 ± 1.4)	0–5 (1.3 ± 1.7)
Depression score at 9 mo, range (mean ± SD)	0–30 (9.2 ± 7.2)	0–24 (9.7 ± 6.9)
Peabody Picture Vocabulary Test standard score, range (mean ± SD)	76–136 (100.9 ± 13.4)	76–131 (100.2 ± 13.4)
Marital status, n (%)		
Married	39 (78)	15 (62.5)
Not married	11 (22)	9 (37.5)
Child variables		
Gender, n (%)		
Male	23 (46)	15 (62.5)
Female	27 (54)	9 (37.5)
Race, n (%)		
White	38 (76)	14 (58.3)
Black	4 (8)	3 (12.5)
Hispanic	4 (8)	2 (8.4)
Middle Eastern	1 (2)	0 (0)
Multiracial	3 (6)	5 (20.9)
Multiple birth, n (%)		
No	43 (86)	18 (75)
Yes	7 (14)	6 (25)
Birth weight, range (mean ± SD), g	490–3328 (1711 ± 584)	722–2802 (1812.6 ± 602.5)
Gestational age, range (mean ± SD), wk	25–35⅚ (31< ± 3⅚)	25–35⅚ (31⅚ ± 3½)
Duration of hospitalization, range (mean ± SD), d	4–105 (32.9 ± 29.7)	4–86 (34.3 ± 27.1)

There were no statistically significant differences between resolved and unresolved groups with respect to the variables in the table (with χ^2 statistics for categorical variables and 1-way multivariate analyses of variance and follow-up 1-way analyses of variance for continuous variables).

TABLE 3 Associations Between RPBI Grief Resolution and Child Attachment in 4-Way Classification

Grief Resolution	Attachment, n			
	Avoidant (N = 14)	Secure (N = 37)	Resistant (N = 22)	Disorganized (N = 1)
Resolved (N = 50)	9	29	12	0
Unresolved (N = 24)	5	8	10	1

TABLE 4 Associations Between RPBI Grief Resolution and Child Attachment

Grief Resolution	Attachment, n	
	Secure (N = 37)	Insecure (N = 37)
Resolved (N = 50)	29	21
Unresolved (N = 24)	8	16

FIGURE 2
Distribution of attachment classifications (n = 74).

Maternal Parenting as Potential Mediator of Relationship Between RPBI Findings and Attachment

We then tested whether the association between RPBI results of resolution and attachment was partially mediated by maternal interaction quality, according to regression methods described by Baron and Kenny.[53] For demonstration of mediation (Fig 1), (1) the predictor (RPBI results) must be related to the outcome (attachment), (2) the predictor must be related to the intervening variable (PCERA), and (3) the relationship between the intervening variable and the outcome should be stronger than the relationship between the predictor and the outcome. The logistic regression analysis reported above tested the first criterion. To test the second criterion, we conducted 3 linear regression analyses, with the RPBI results predicting each PCERA factor. These analyses indicated that the RPBI results did not predict maternal interaction quality, which ruled out the second criterion of our

TABLE 5 Hierarchical Logistic Regression Analyses of RPBI Status as Predictor of Infant Attachment Security

	Odds Ratio (95% CI)	P
Step 1		
Neonatal health risks	1.00 (0.84–1.19)	.997
Family socioeconomic risks	1.07 (0.74–1.54)	.458
Maternal vocabulary	1.02 (0.97–1.06)	.439
Maternal depression at 9 mo	1.10 (0.94–1.10)	.627
Step 2		
Neonatal health risks	1.00 (0.83–1.20)	.997
Family socioeconomic risks	1.16 (0.78–1.71)	.458
Maternal vocabulary	1.02 (0.98–1.07)	.351
Maternal depression at 9 mo	1.02 (0.94–1.10)	.636
RPBI grief resolution	2.94 (1.02–8.47)	.046

TABLE 6 Linear Regression Analyses Predicting Maternal Interaction Quality

Outcome Variable	Predictor Variable	B, Estimate ± SE (95% CI)	β	P
PCERA factor 1 (positive affect and communication)	RPBI status	0.40 ± 0.26 (−0.11–0.92)	.18	.12
PCERA factor 2 (intrusiveness and anxiety)	RPBI status	0.15 ± 0.24 (−0.34–0.63)	.07	.55
PCERA factor 3 (anger and hostility)	RPBI status	0.04 ± 0.23 (−0.41–0.49)	.85	.85

Results of these analyses were virtually unchanged if the 4 covariates used in the logistic regression analyses were added. B represents an unstandardized coefficient and β a standardized coefficient.

mediator model (Table 6). Because the method described by Baron and Kenny[53] for detecting mediator effects has been criticized for having low power, we also tested the model by using a joint significance test.[54] The results were virtually the same as those reported here.

Maternal Parenting and Attachment

To test the third criterion of the mediator model, we conducted a logistic regression analysis predicting attachment for each PCERA factor, with parenting quality entered in step 3 of the models (adjusted odds ratio). In these logistic regression models, better parenting (ie, more-positive affect [factor 1], less intrusiveness [factor 2], and less anger [factor 3]) significantly increased the odds of infant attachment security (Table 7). The RPBI results continued to predict 16-month infant attachment in the models with PCERA factors 2 and 3, although the RPBI results decreased to trend-level significance (P = .059) in the model with PCERA factor 1 (positive affect) (Fig 3).

DISCUSSION

The present study contributes to our understanding of attachment in pre-

term infants by focusing on maternal grief resolution. A mother's unresolved grief regarding her child's preterm birth was associated with later insecure infant-mother attachment. In addition, maternal interaction quality predicted attachment security, although it did not mediate the association between grief resolution and attachment.

At postterm age of 9 months, nearly one-third of mothers expressed unresolved grief regarding their infant's preterm birth, consistent with research describing how maternal feelings of stress and trauma regarding a preterm delivery can persist long after NICU discharge.[1,10,14] However, when mothers resolved their feelings of grief, their children experienced nearly 3 times the odds of developing a secure attachment by 16 months. These results extend the findings of previous studies that demonstrated an association between maternal grief resolution regarding a child's chronic illness and attachment.[30–33] Our analyses suggest that resolution of grief

TABLE 7 Hierarchical Logistic Regression Analyses of PCERA Factors 1, 2, and 3 as Predictors of Infant Attachment Security

Predictor Variables	Odds Ratio (95% CI)	P
Model 1 (step 3 χ_2^1 = 5.01; P = .025)		
Neonatal health risks	0.96 (0.79–1.16)	.644
Family socioeconomic risks	1.35 (0.88–2.09)	.172
Maternal vocabulary	1.01 (0.97–1.06)	.542
Maternal depression	1.03 (0.95–1.11)	.505
RPBI grief resolution	2.89 (0.96–8.73)	.059
PCERA factor 1 (positive affect and communication)	1.87 (1.05–3.32)	.033
Model 2 (step 3 χ_2^1 = 9.82; P = .002)		
Neonatal health risks	0.90 (0.73–1.11)	.326
Family socioeconomic risks	1.41 (0.91–2.19)	.123
Maternal vocabulary	1.02 (0.97–1.08)	.348
Maternal depression	1.05 (0.96–1.14)	.282
RPBI grief resolution	3.39 (1.08–10.63)	.036
PCERA factor 2 (intrusiveness and anxiety)	2.66 (1.36–5.23)	.004
Model 3 (step 3 χ_2^1 = 10.85; P = .001)		
Neonatal health risks	0.90 (0.73–1.10)	.309
Family socioeconomic risks	1.50 (0.94–2.39)	.086
Maternal vocabulary	1.02 (0.97–1.07)	.499
Maternal depression	1.03 (0.95–1.12)	.446
RPBI grief resolution	4.02 (1.24–13.05)	.020
PCERA factor 3 (anger and hostility)	3.03 (1.46–6.30)	.003

Only step 3 results are presented; steps 1 and 2 are shown in Table 5.

95% CI: 0.96-8.73, p=.059

Resolution of grief (RPBI)

Attachment security (SSP)

95% CI: -0.11-0.92, p=.12

Positive affect, communication connectedness (PCERA)

95% CI: 1.05-3.32, p=.033
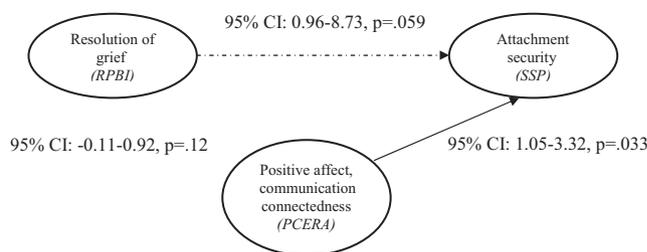
FIGURE 3
Maternal positive interactions and resolved grief as predictors of infant security. SSP indicates strange situation procedure; CI, confidence interval.

seems to have a protective effect on the development of secure infant attachment, with the majority of securely attached infants having mothers with resolved grief. However, the association between unresolved grief and the development of insecure attachment may be more complex, with grief resolution being only one component that influences later attachment.

Previous studies focusing on grief resolution included parents who knew the severity of and prognosis for the child's condition.[30,45] In contrast, a preterm infant's prognosis often is not known for months or years[55]; therefore, the process of resolution of grief after preterm birth may be complex and may vary with the child's subsequent development. In our study, grief resolution was unrelated to the severity of infant medical risk, which suggests that it is not the level of medical complications at NICU discharge that contributes to maternal resolution of grief.

Building on previous research linking unresolved loss, maternal interactions, and insecure attachment,[40,41] we hypothesized that the association between maternal grief resolution and infant attachment would be partially mediated by maternal interactive behavior. Although we did not find evidence for mediation, maternal interaction quality was an independent predictor of infant attachment. Consistent with previous research,[18] we found that affectively positive, sensitive, and responsive maternal behavior was associated with secure attachment, whereas intrusive, anxious, and hostile parenting was associated with insecurity.

The lack of association between maternal unresolved grief and the quality of parenting interactions (ie, the second criterion in the mediation model) merits additional exploration. There are several explanations for why a mediating effect was not observed. The relationships between unresolved grief, atypical maternal behavior, and insecure attachment were exhibited most characteristically in previous research under circumstances of significant pathological conditions, for example, when maternal behavior was frightening and when the attachment classification was disorganized.[40,42] Our sample had only 1 infant with disorganized attachment, which prevented us from exploring this association in greater depth. In addition, mothers with unresolved grief may not demonstrate frightening behaviors under situations of low stress,[39] and the free-play episode in which maternal interactive behavior was coded might not have been stressful enough to elicit the low-incidence, maladaptive parenting behaviors associated with insecure attachment.

It also is possible that experiencing unresolved grief with regard to having a preterm infant at postterm age of 9 months does not translate into demonstrating anxious, intrusive, insensitive, or angry parenting behaviors at the same time point. The finding that the RPBI findings decreased to trend-level significance in the model focusing on maternal positive affect, communication, and connectedness (Fig 3) suggests that additional research should focus on the potentially protective effects of positive parenting for preterm infants. Finally, it is possible that the link between resolved loss and secure attachment in preterm infants occurs through positive parenting behaviors (eg, positive affect and connectedness) in a variety of contexts, rather than through the absence of frightening or negative behaviors.

One important limitation of the study was the relatively small sample size of 74 dyads, which did not allow for more in-depth analysis of pathways and moderators that contribute to grief resolution and attachment security. Although the rate of attrition was relatively low (15%), families that remained in the study were somewhat more socioeconomically advantaged than those lost to attrition. Because we focused on preterm infants, our results are not generalizable to term infants. This study used an adaptation of the Reaction to Diagnosis Interview rather than the original measure because of the population studied. In assessing maternal adaptation to preterm birth, we did not focus on specific medical diagnoses because children in the study typically did not have such diagnoses at NICU discharge. Finally, we did not include fathers, who can be important in mothers' adaptation to parenthood and key attachment figures for children.

CONCLUSIONS

This study suggests that resolution of grief regarding preterm birth and the quality of early parent-infant interactions are significant predictors of infant attachment security for infants

born preterm. Currently, the process through which mothers resolve their grief after a preterm birth is not known. Furthermore, it is not clear whether the constructs of resolution of grief regarding preterm birth and the quality of early dyadic interactions can be assessed by a pediatric provider in the context of a follow-up visit for these high-risk infants. Additional research is needed to explore the factors that contribute to grief resolution after preterm birth and to determine whether resolution of grief and the fac-

tors influencing maternal adaptation to preterm birth can be explored successfully in the context of a pediatric visit.

In addition, the role of anticipatory guidance in pediatric visits (ie, highlighting the infant's developmental capacities and prognosis, reflecting with the parents on the impact of the child's condition on the parents, and exploring and optimizing the mother's experience of social support[30,45]) to facilitate resolution of grief is an area in need of exploration. Another opportu-

nity for intervention may include using mental health resources to help the parents integrate the experience of grief regarding the preterm birth with their ongoing parental roles.[56,57]

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