

Psychosocial predictors of primiparous breastfeeding initiation and duration

By: Meagan E. Matthews, [Esther M. Leerkes](#), [Cheryl A. Lovelady](#), and [Jeffrey D. Labban](#)

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Abstract:

Background: Many US women fall short of meeting the recommendations on breastfeeding. Whereas prenatal demographic factors have been well researched in relation to breastfeeding, psychosocial maternal characteristics are less understood but could be important predictors of breastfeeding initiation and duration.

Objective: This study examined primiparous maternal psychosocial characteristics and temperamentally based negative infant affect as predictors of breastfeeding initiation and duration while accounting for depression and sociodemographic covariates.

Methods: Prenatally, 237 primiparous women were administered the Adult Attachment Interview and completed a measure of beliefs related to infant crying. At 6 months postpartum, negative infant affect was assessed via mother report. Breastfeeding was assessed at 6 months and 1 year postpartum via mother report.

Results: Results indicated that younger, low income, less educated, single, ethnic minority mothers and mothers with elevated depressive symptoms were less likely to initiate breastfeeding and breastfed for a shorter period than other women. Women who initiated breastfeeding tended to have higher adult attachment coherence scores (more secure attachment) than those who did not initiate breastfeeding (median score of 6.00 vs 4.00). An interaction was observed between negative infant affect and beliefs about crying related to spoiling, such that earlier cessation of breastfeeding was observed among mothers who reported high levels of negative infant affect and strongly endorsed the belief that responding to cries spoils infants (hazard ratio = 1.71, $P < .01$).

Conclusion: Although these psychosocial variables predicted relatively little variation in breastfeeding over and above covariates, the results suggest some novel approaches to promote breastfeeding.

Keywords: adult attachment | breastfeeding | breastfeeding duration | breastfeeding initiation | infant crying | prenatal factors | primiparous | temperament

Article:

Well Established

Prenatal demographic factors such as age, education, race, and work status have been found to affect breastfeeding. However, connections between prenatal maternal psychosocial characteristics and breastfeeding have been sparsely researched, aside from depression and breastfeeding attitudes.

Newly Expressed

Mothers' characteristics before the birth of their first child, such as adult attachments and beliefs about infant crying, are associated with breastfeeding initiation and duration and might interact with negative infant affect to predict breastfeeding initiation and duration.

Background

Previous research has examined many sociodemographic predictors of breastfeeding initiation and duration, such as age, education, race, and income.¹⁻³ However, psychosocial predictors of breastfeeding have been less thoroughly researched. The goal of this project was to focus on 2 prenatal maternal psychosocial factors that may be related to a mother's ability to handle parenting stress and hence promote subsequent breastfeeding: adult attachment security and beliefs about infant crying. Whether these factors moderate the relation between infant temperament and breastfeeding duration was also examined. Researching these predictors could lead to novel approaches to promoting breastfeeding and a more finely tuned ability to identify mothers who are unlikely to initiate or maintain breastfeeding for the recommended amount of time.

Adult Attachment Status

Bowlby proposed that children develop an internal working model, or schema about self in relation to the world, in the context of early experiences with caregivers.⁴ People who were consistently and appropriately cared for as children are more likely to develop a secure attachment characterized by positive feelings about self and trust in others. By contrast, negative caregiving experiences are linked with insecure attachment characterized by a negative view of self and distrust in others. These schemas shape expectations about future relationships and interactions. Adults with an insecure attachment status have reported experiencing more negative emotions in response to infant cries,⁵ struggle to identify infant distress cues accurately,^{6,7} and feel less comfortable with emotional and physical intimacy.⁸ These tendencies could undermine breastfeeding, which requires physical proximity, often with a distressed infant, and some ability to decipher infant signals. Thus, we hypothesized that mothers with an insecure adult attachment would be less likely to initiate breastfeeding and would breastfeed for a shorter duration than mothers with secure adult attachment status. Prior research on this topic is mixed. In a study of more than 400 mothers, those with approach-oriented attachments (most similar to secure) were more likely to initiate breastfeeding, breastfeed longer, and breastfeed through difficulties than mothers with insecure attachment representations.⁷ By contrast, another study (N = 60) reported no significant relationship between secure attachment and breastfeeding.⁹ Both studies relied on

self-reported measures of attachment, which have been criticized due to concerns that insecure participants are more likely to endorse overly positive statements.¹⁰

Maternal Beliefs about Infant Cries

Mothers' attitudes about breastfeeding have been linked with breastfeeding behaviors,¹¹ yet other parental beliefs have not been considered. Beliefs about infant cries may affect breastfeeding. Infant-oriented beliefs about crying reflect prioritization of the infant's needs and positive, flexible attitudes about crying.¹² Mothers with these beliefs may be more likely to breastfeed their crying infants. By contrast, mother-oriented beliefs prioritize wishes of the parent above those of the infant. Mothers who believe that cries are manipulative and should be ignored or minimized may be unlikely to feed on demand and more likely to create rigid feeding schedules, which routinely undermine breastfeeding success.^{13,14} Therefore, mothers with more infant-oriented beliefs about crying are hypothesized to be more likely to breastfeed their infants and to breastfeed longer than mothers with mother-oriented or negative beliefs about crying.

Negative Infant Affect

Negative infant affect, a facet of temperament, describes the intensity, frequency, and duration of infants' expressions of fear, anger, and sadness.¹⁵ Infants high in negative affect are frequently fussy and make more bids for attention than infants low in negative affect. In past research, it was assumed that negative infant affect would adversely affect maternal behavior because highly irritable infants demand more attention and may provide less reinforcement, eroding maternal confidence and behavior over time.¹⁶ However, Crockenberg^{16,17} asserted that an adverse effect on parenting is dependent on other stressors or supports. The mixed pattern of findings regarding temperament and breastfeeding suggests that this may be the case for breastfeeding as well. Some studies note that more irritable infants tend to be breastfed for a shorter period and are less likely to be exclusively breastfed.¹⁸⁻²⁰ Yet, other studies report negligible links between temperament and breastfeeding¹⁸ or the opposite pattern.²¹

From Crockenberg's¹⁷ perspective, high negative infant affect would be linked with shorter duration of breastfeeding only among mothers whose own characteristics inhibit them from coping effectively with the behavior of infants with high negative affect. We hypothesized that high negative infant affect would be associated with shorter breastfeeding duration only among insecurely attached mothers or among those who held more mother-oriented beliefs about crying because they are inclined to experience more frustration and self-doubt in the face of frequent distress, thereby undermining breastfeeding.

Objectives

The objectives of this study were to examine the effects of maternal attachment status, maternal beliefs about infant crying, and infant temperament on breastfeeding. It was hypothesized that (1) mothers with a secure adult attachment and those with more infant-oriented beliefs about infant crying during pregnancy would be more likely to initiate and to maintain breastfeeding longer than other mothers and (2) the association between negative infant affect and breastfeeding duration would be moderated by maternal psychosocial characteristics such that

negative infant affect would be inversely associated with breastfeeding duration only among mothers with insecure adult attachments or more mother-oriented beliefs about crying.

Methods

Procedure

The current study used a longitudinal design to examine mothers at 3 points in time: during pregnancy and at 6 and 12 months postpartum. The sample was drawn from 259 first-time mothers participating in a larger study of maternal sensitivity to infant and toddler distress at The University of North Carolina at Greensboro (UNCG) from 2009 to 2011.²² The Institutional Review Board at UNCG granted ethical approval for this study. Participants were recruited from childbirth classes, obstetric practices, and prenatal breastfeeding classes given by the Special Supplemental Nutrition Program for Women, Infants, and Children. The women included in this study were those who signed consent forms, self-identified as African American or European American, and were 18 years or older, fluent in English, and pregnant with their first child.

During the third trimester, mothers were mailed questionnaire packets that included measures of beliefs about infant crying, and during a visit to our campus research laboratory, they were administered the Adult Attachment Interview,^{23,24} which lasted about an hour. When infants were 6 months old and 1 year old, mothers were asked to complete questionnaires that included items about breastfeeding. To be included in the current study of psychosocial factors of breastfeeding, mothers must have provided breastfeeding information at 6 or 12 months postpartum. Mothers were compensated with \$50 and a small gift prenatally and at 6 months, and \$100 and a small gift at 1 year.

Measures

Outcome variables: breastfeeding initiation and duration

During the 6-month laboratory visit and 1-year laboratory visit, mothers reported if they had ever breastfed their infants, and if so, how long they breastfed. Breastfeeding duration is a continuous variable ranging from 0 to 13 months because all infants were at least 13 months old when the 1-year questionnaires were administered.

Adult Attachment Interview^{23,24}

Mothers were asked to give specific examples of meaningful events from childhood interactions with primary caregivers using a standardized interview protocol. The interviews were audiotaped, transcribed, and coded by 3 trained coders for coherence—the extent to which participants consistently and clearly described past experiences with caregivers (1 = *not at all coherent* to 9 = *very coherent*). Coherence is the primary score that differentiates secure individuals from insecure individuals. Intercoder reliability²⁵ between 50 double-coded cases was acceptable (interclass correlation was 0.75, $P < .001$).

Infant Crying Questionnaire²⁶

Mothers rated how frequently they agreed with the 39 phrases related to infant crying on a 5-point scale (1 = *never* to 5 = *always*) during the prenatal period. Two of the 5 subscales, *attachment* ($\alpha = .83$, 8 items, eg, “How I respond when my baby cries will make my baby feel safe and secure”) and *crying as communication* ($\alpha = .74$, 3 items, eg, “When my baby cries, I think my baby is trying to communicate with me”), are considered infant oriented. Mother-oriented subscales include *spoiling* ($\alpha = .70$, 3 items, eg, “When my baby cries, I will let baby cry it out so he/she doesn’t get too spoiled”), *directive control* ($\alpha = .75$, 8 items, eg, “I will teach my baby that crying doesn’t get you what you want”), and *minimization* ($\alpha = .76$, 9 items, eg, “When my baby cries, I want to make baby stop quickly; crying is a nuisance”). Cronbach’s alphas are from the current sample.

Infant Behavior Questionnaire–Revised Very Short Form²⁷

Mothers completed the Infant Behavior Questionnaire–Revised Very Short Form (IBQ-RVSF) when their children were 6 months old. Given the goals of the study, only the negative affect scale was used. The negative affect scale consists of 12 items, such as “How often did s/he become upset when s/he could not get what s/he wanted?” (Cronbach’s $\alpha = .74$ in this sample). Mother reports on the IBQ and IBQ-R long forms on which this measure is based have each demonstrated convergent validity with observed temperament and fathers’ reports of temperament.²⁸⁻³⁰

Potential Covariates

Based on prior research, infant sex, maternal age, maternal body mass index (BMI),³¹ household income-to-needs ratio, education, partner status, minority status, plans to return to work after childbirth, employment at 6 months postpartum, and depressive symptoms were considered as potential covariates.^{32,33} Age, household income-to-needs ratio, education, partner status, and race were measured prenatally via demographic questionnaires. Maternal employment and infant sex were recorded via demographic questionnaires when infants were 6 months old.

Participants’ height and weight information were collected at 1 year postpartum and used to calculate BMI. Depressive symptoms were measured prenatally by the Depression Scale from the Center for Epidemiological Studies.³⁴ Higher scores indicate more depressive symptomology ($\alpha = .87$).

Statistical Analyses

Single imputation was conducted within SPSS using a fully conditional specification model, meaning that missing values were predicted 1 at a time from all demographics and variables.

Descriptive statistics demonstrated that most variables were not normally distributed, so nonparametric tests were used. Independent-samples Mann-Whitney *U* tests and chi-square tests were used to examine differences in potential covariates and predictor variables between women who did and did not initiate breastfeeding. Then, analysis of covariance (ANCOVA) was used to test for significant differences in attachment coherence, which was normally distributed, between

women who did and did not initiate breastfeeding, while controlling for covariates. Spearman rho correlations were used to examine associations between breastfeeding duration and continuous covariates and predictors. Independent-samples Mann-Whitney *U* tests were used to examine potential differences in breastfeeding duration as a function of categorical covariates. Then, partial Spearman rho correlations were calculated between duration and hypothesized variables while controlling for covariates. Covariates were chosen based on their importance in prior research and whether they correlated with breastfeeding duration or differed by initiation.

Finally, multivariate Cox regression was used to test the proposed interaction between negative infant affect and maternal psychosocial predictors. Cox regression is an appropriate survival analysis technique when dependent variables are not normally distributed and the time to event is dependent on 1 or more covariates. Results reflect the degree to which these factors predict the time to cessation of breastfeeding. The 28 mothers who never initiated breastfeeding were left-censored. Given the limited statistical power to detect interaction effects in nonexperimental work and the high multicollinearity when multiple related interactions are tested simultaneously,³⁵ we calculated 6 separate Cox regressions, each testing 1 of the hypothesized interactions. Negative infant affect was mean centered and each moderator was converted into a categorical variable in which low scores reflected those that were more than 1 standard deviation (SD) below the mean, moderate scores reflected those that were within ± 1 SD of the mean, and high scores reflected those that were more than 1 SD above the mean. In each model, breastfeeding duration was the dependent variable and covariates were entered in the first step of the regression. In the second step of each model, negative infant affect, 1 moderator (ie, maternal attachment coherence, or 1 of the 5 beliefs about crying), and the interaction term between negative affect and the selected moderator were entered as predictors. To interpret interactions, simple slopes between negative affect and breastfeeding duration were calculated at each level of the categorical moderator³⁵ and Kaplan-Meier survival curves for various levels of negative infant affect and the moderator were plotted.

Results

Twenty mothers were not included in the current sample because they did not provide breastfeeding information at either 6 or 12 months postpartum. Two infants died shortly after birth and their mothers did not participate. The total sample for the current report consisted of 237 mothers. Mann-Whitney *U* tests and chi-square tests indicated that the continuously participating mothers did not differ significantly from the 22 mothers who were not included in terms of race, age, education, partner status, income-to-needs ratio, adult attachment, and beliefs about infant crying. Mothers' ages ranged from 18 to 44 years (median = 24 years; interquartile range [IQR], 20-29 years), and 25.3% of mothers reported a high school education or less, 32.1% reported some college, and 42.6% reported a 4-year college degree or higher. Yearly family income varied from poverty to more than \$100 000 (median = \$35 000; IQR, \$15 000-\$67 500). Of the participants, 118 self-reported their races as non-Hispanic European American, 112 reported being African American, and 7 reported being both European American and African American or Hispanic. Fifty-six percent of mothers were married to and/or living with the infant's father. All infants were full term and healthy, and 51% were female. Only 3.8% of data were missing, and these data were missing completely at random based on Little's³⁶ test, $\chi^2(343) = 385.45, P = .06$.

Breastfeeding Initiation

Most mothers in this sample initiated breastfeeding (88%). Consistent with the hypothesis, mothers who initiated breastfeeding had higher mean attachment coherence than women who did not initiate breastfeeding: 5.48 versus 4.32 (independent-samples *t* test $P < .01$; Table 1). Women who did and did not initiate breastfeeding varied on only 1 belief about crying; mothers who did not initiate breastfeeding more strongly endorsed beliefs about crying in the directive control category, with medians of 3.62 versus 3.38 (Mann-Whitney *U* test $P = .04$; Table 1).

Table 1. Mann-Whitney *U* Tests and Correlations for Continuous Predictor and Covariate Variables.

Variable	Initiated Breastfeeding		Did Not Initiate		Mann-Whitney <i>U</i> Test	Breastfeeding Duration	
	N = 209		N = 28			P Value	N = 237
	Median	Range	Median	Range			r^a
Prenatal predictor variables							
Attachment coherence	5.48 ^b	2.00-8.00	4.32 ^b	2.00-9.00	.00 ^b	.22	.00
Spoiling beliefs about crying	2.67	1.00-4.67	2.33	1.00-4.33	.60	-.03	.61
Minimizing beliefs about crying	2.00	1.00-4.56	1.89	0.93-3.22	.45	.11	.09
Attachment beliefs about crying	4.88	3.50-5.00	5.00	2.75-5.13	.34	-.15	.02
Directive control beliefs about crying	3.38	1.88-5.00	3.62	1.50-4.75	.04	-.23	.00
Communication beliefs about crying	4.67	2.67-5.00	4.58	3.00-5.00	.39	.05	.48
6 month predictor variable							
Negative infant affect	3.42	1.45-5.58	3.92	1.25-6.50	.02	-.15	.02
Covariates							
Age, y	25.00	18.00-44.00	20.00	18.00-36.00	.00	.49	.00
Education	3.00	1.00-7.00	2.00	1.00-7.00	.00	.49	.00
Income-to-needs ratio	2.38	0.09-6.81	0.93	0.04-5.11	.00	.44	.00
Body mass index 1 year postpartum	27.81	18.12-52.86	31.63	14.90-50.63	.19	-.15	.02
CES-D score ^c	11.00	0.00-39.00	14.50	2.00-42.0	.09	-.12	.00

^a Values are based on Spearman's rho correlations.

^b Because attachment coherence was normally distributed, the means are reported and an independent-samples *t* test was calculated.

^c 33.8% of women met the clinical cutoff for depression, scored using the Depression Scale from the Center for Epidemiological Studies.³⁴

Mothers who initiated breastfeeding were older, more educated, had a higher income-to-needs ratio, lower depressive symptoms, and were more likely to be European American and to have a partner living in the home than women who did not initiate breastfeeding (see Tables 1 and 2). Controlling for these differences in an ANCOVA, significant differences in attachment coherence were still evident between women who did and did not initiate breastfeeding, $F(7, 229) = 8.60, P < .01$. Specifically, mothers who initiated breastfeeding had higher attachment coherence/security (adjusted mean = 5.45) than those who did not initiate breastfeeding (adjusted mean = 4.63).

Breastfeeding Duration

Participants' median breastfeeding duration was 3 months (IQR, 1-8 months). Prior to controlling for covariates, maternal attachment coherence was positively correlated with breastfeeding duration (Spearman rho = .22, $P \leq .00$). Duration of breastfeeding was negatively associated with prenatal beliefs about controlling infant cries (Spearman rho = $-.23$), the belief that responding to cries promotes attachment (Spearman rho = $-.15$), and perceived negative infant affect (Spearman rho = $-.15$). Breastfeeding duration was not significantly correlated with beliefs about crying related to spoiling the infant, minimizing cries, or viewing cries as communication. Mothers who were older, were better educated, had higher incomes, had fewer depressive symptoms, had lower BMI, were European American, and lived with a partner breastfed longer than other mothers. Women who were employed at 6 months postpartum breastfed for a marginally longer period than women who were unemployed. When controlling for these covariates, attachment coherence, directive control beliefs about crying, attachment-related beliefs about crying, and negative infant affect were no longer significantly associated with breastfeeding duration (Spearman partial rho = .04, $-.02$, $-.01$, and $-.02$, respectively, all $P > .50$).

Table 2. Tests for Categorical Covariates.

Variable	Initiated Breastfeeding		Did Not Initiate Breastfeeding		Chi-Square Test P Value	Breastfeeding Duration in Months		Mann-Whitney U Test P Value
	N = 209		N = 28			N = 237		
	N	%	N	%		Median	Range	
Partner status								
Partner in the home	130	97.00	4	3.00	.00	6.0	0-13	.00
No partner in the home	79	76.70	24	23.30		2.0	0-13	
Ethnicity								
European American	114	96.60	4	3.40	.00	6.0	0-13	.00
Ethnic minority	95	79.80	24	20.20		3.0	0-13	
Infant sex								
Female	104	86.70	16	13.30	.46	3.0	0-13	.29
Male	105	89.70	12	10.30		3.0	0-13	
Prenatal Plans to Return to Work								
Yes	189	87.90	26	12.10	.48 ^a	3.0	0-13	.77
No	19	95.00	1	5.00		2.0	0-13	
Employment status 6 months postpartum								
Employed	NA		NA		NA	4.0	0-13	.07
Not employed						2.5	0-13	

Abbreviation: NA, not applicable.

^a Value is based on Fisher exact test

Negative affect interactions in relation to breastfeeding cessation

One of 6 interactions tested with Cox regressions significantly predicted breastfeeding cessation (see Table 3). The significant interaction was between negative infant affect and maternal beliefs about crying related to spoiling, hazard ratio = 1.34, $P < .05$. Kaplan-Meier survival curves are displayed in Figure 1 for mothers whose infants were high versus low on negative infant affect based on a simple median split and who had various levels of spoiling beliefs about crying. The figure illustrates that mothers with infants rated high on negative affect are at greater risk of early cessation of breastfeeding only when they scored high on spoiling beliefs about crying, hazard

ratio = 1.71, $P < .01$. In contrast, high negative infant affect was linked with lower likelihood of ceasing breastfeeding early when spoiling beliefs about crying were moderate or low, hazard ratio = 0.53, $P < .01$. Consistent with the preliminary analyses, mothers were less likely to cease breastfeeding early if they were older, more educated, and had a partner in the home.

Table 3. Hazard Ratios for Ceasing Breastfeeding by Predictors and Covariates.

Variable	n	Adjusted HR ^a	P Value ^a	95% CI ^a	
				Lower	Upper
Categorical predictor variables					
Partner status					
No partner in the home	103	1.00			
Partner in the home	134	0.98	.09	0.96	1.90
Ethnicity					
European American	118	1.00			
Ethnic minority	119	1.19	.36	0.82	1.72
Employment status 6 months postpartum					
Not employed	95	1.00			
Employed	142	1.00	.94	0.73	1.34
Spoiling beliefs about crying					
Low (1 SD or more below mean)	38	1.00			
Moderate (within ± 1 SD of mean)	164	0.72	.19	0.44	1.18
High (1 SD or more above mean)	35	0.76	.18	0.52	1.13
Continuous predictor variables					
Age		0.96	.04	0.92	0.99
Education		0.85	.02	0.75	0.98
Income-to-needs ratio		0.94	.27	0.84	1.05
Body mass index 1 year postpartum		1.01	.21	0.99	1.03
CES-D score ^b		1.00	.74	0.99	1.02
Negative infant affect		1.02	.82	0.87	1.19
Attachment beliefs about crying		0.85	.51	0.53	1.38
Negative infant affect \times spoiling beliefs about crying		1.34	.02	1.05	1.70

Abbreviations: CI, confidence interval; HR, hazard ratio; SD, standard deviation.

^a Values are from multivariate Cox regression containing all variables listed in the table.

^b Generated using the Depression Scale from the Center for Epidemiological Studies.³⁴

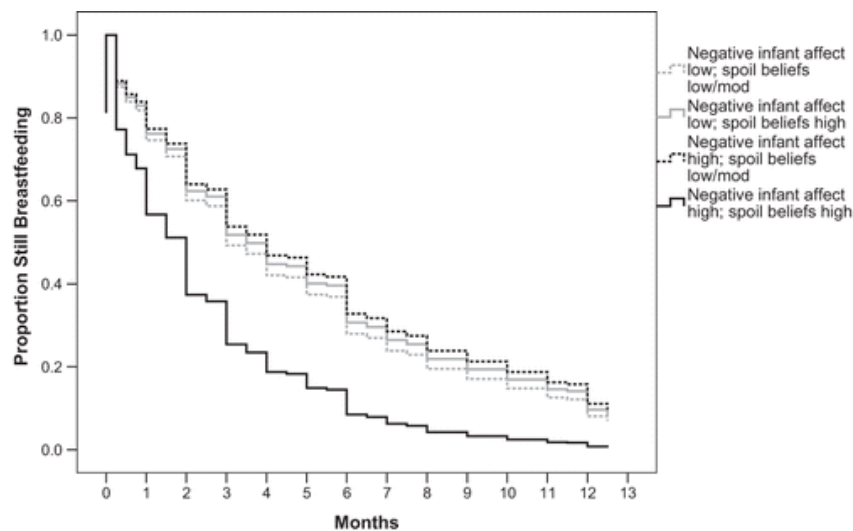


Figure 1. Time to Breastfeeding Cessation for Various Combinations of Negative Infant Affect and Spoiling Beliefs about Crying.

Discussion

This research highlights the link between maternal attachment and breastfeeding initiation, and this is the first known study that examined prenatal beliefs about crying in relation to breastfeeding. The current results suggest that certain psychosocial characteristics of mothers, present prior to giving birth, are associated with breastfeeding, albeit to a small extent, and that the effect of infant temperament on breastfeeding varies depending on maternal beliefs.

Adult Attachment

Consistent with prior research,⁷ mothers with high coherence (secure attachment) were more likely to initiate breastfeeding and breastfeed for a longer duration than mothers with insecure attachment. After accounting for covariates, attachment continued to differentiate between women who did and did not initiate breastfeeding, but it did not predict duration. It may be that insecure attachment primarily operates as a deterrent to considering breastfeeding, perhaps because of attachment-related maternal discomfort with physical proximity or intimacy when infants are distressed.⁸ That this effect is significant independent of depression and demographics suggests that mothers' attachment experiences are an important predictor of breastfeeding.

Beliefs about Crying and Infant Temperament

Maternal beliefs about infant cries did not distinguish between mothers who did and did not initiate breastfeeding nor were they a robust predictor of breastfeeding duration. However, as predicted, the belief that responding to infant cries results in spoiling moderated the association between perceived infant temperament and breastfeeding duration. Mothers who rated their infants high in negative affect, who also believed that responding to cries spoils infants, tended to cease breastfeeding earlier than other mothers. Mothers who believe infants should not be rewarded for crying may refuse to breastfeed on demand, which can undermine the supply of breast milk and lead to early termination of breastfeeding. On the other hand, mothers who perceived their infants as high in negative affect, but who did not endorse the belief that responding to cries leads to spoiling, breastfed longer. Perhaps mothers who do not believe they will spoil their children by responding to cries breastfeed longer if their infants are fussy frequently because they feel breastfeeding is comforting for their babies.

Strengths, Limitations, and Future Research

To our knowledge, this is the only study of breastfeeding outcomes that has used the gold-standard measure of adult attachment, the Adult Attachment Interview. Measuring maternal attachment and beliefs about crying prenatally is a strength because identifying prenatal predictors of breastfeeding would allow for early intervention among mothers who are unlikely to breastfeed. Also, although some may criticize maternal reports of temperament as biased,³⁷ mothers' own perceptions of their infants' temperament are likely more central to breastfeeding decisions than objective raters' perceptions of temperament. Finally, that nearly 50% of the sample was African American is a strength, as identifying factors that promote breastfeeding among this population is needed in light of low breastfeeding rates.³⁸

Despite these strengths, there were some methodological limitations for this study. The most evident challenge was the lack of in-depth, breastfeeding-specific measures. Infant feeding was not the focus of the larger study of mother-infant interactions from which the current study was drawn. Ideally, more thorough breastfeeding questions should be implemented to capture mothers' feeding beliefs and intentions and the exclusivity and method of feeding (at the breast or pumping).

Conclusion

Maternal psychosocial factors that predict breastfeeding may be useful for identifying women at risk of not breastfeeding or early weaning and helpful for creating breastfeeding support. In the current study, mothers with more secure adult attachments were more likely to initiate breastfeeding. Thus, greater breastfeeding promotion efforts should be dedicated to women with insecure adult attachments. Also, mothers of highly negative infants who believed responding to cries could spoil their infants breastfed for a shorter amount of time than mothers without such beliefs related to spoiling. Parents need to be assured that responding to infants' cries by breastfeeding does not cause infants to become "spoiled." Additional research is needed to identify the best approaches to encourage and support breastfeeding for mothers who face these specific barriers.

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References

1. Centers for Disease Control and Prevention, Department of Health and Human Services. National immunization survey: provisional breastfeeding rates by socio-demographic factors among children born in 2007. http://www.cdc.gov/breastfeeding/data/NIS_data/2007/socio-demographic_any.htm. Accessed June 18, 2013. [Google Scholar](#)

2. Ogbuanu, C, Glover, S, Probst, J, Liu, J, Hussey, J. The effect of maternity leave length and time of return to work on breastfeeding. *Pediatrics*. 2011;127(6):1414-1427. [Google Scholar](#), [Crossref](#), [ISI](#)
3. Scott, JA, Binns, CW, Oddy, WH, Graham, KI. Predictors of breastfeeding duration: evidence from a cohort study. *Pediatrics*. 2006;117(4):646-655. [Google Scholar](#), [Crossref](#), [ISI](#)
4. Bowlby, J . Attachment and Loss, Volume One: Attachment. New York, NY: Basic Books; 1969. [Google Scholar](#)
5. Groh, AM, Roisman, GI. Adults' autonomic and subjective emotional responses to infant vocalizations: the role of secure base script knowledge. *Dev Psychol*. 2009;45(3):889-893. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
6. Leerkes, E, Siepak, K. Attachment linked predictors of women's emotional and cognitive responses to infant distress. *Attach Hum Dev*. 2006;8(1):11-32. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
7. Scharfe, E . Maternal attachment representations and initiation and duration of breastfeeding. *J Hum Lact*. 2012;28(2):218-225. [Google Scholar](#), [SAGE Journals](#), [ISI](#)
8. Bartholomew, K . Avoidance of intimacy: an attachment perspective. *J Soc Pers Relat*. 1900;7(2):147-178. [Google Scholar](#), [SAGE Journals](#), [ISI](#)
9. Akman, I, Kuscu, MK, Yurdakul, Z. Breastfeeding duration and postpartum psychological adjustment: role of maternal attachment styles. *J Paediatr Child Health*. 2008;44(6):369-373. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
10. Gjerde, PF, Onishi, M, Carlson, KS. Personality characteristics associated with romantic attachment: a comparison of interview and self-report methodologies. *Pers Soc Psychol Bull*. 2004;30(11):1402-1415. [Google Scholar](#), [SAGE Journals](#), [ISI](#)
11. McCann, MF, Baydar, N, Williams, RL. Breastfeeding attitudes and reported problems in a national sample of WIC participants. *J Hum Lact*. 2007;23(4):314-324. [Google Scholar](#), [SAGE Journals](#), [ISI](#)
12. Leerkes, EM, Parade, SH, Burney, RV. Origins of mothers' and fathers' beliefs about infant crying. *J Appl Dev Psychol*. 2010;31(6):467-474. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
13. DiGirolamo, AM, Grummer-Strawn, LM, Fein, SB. Effect of maternity-care practices on breastfeeding. *Pediatrics*. 2008;122(suppl 2):S43-S49. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)

14. Merten, S, Dratva, J, Ackermann-Liebrich, U. Do baby-friendly hospitals influence breastfeeding duration on a national level? *Pediatrics*. 2005;116(5):702-708. [Google Scholar](#), [Crossref](#), [ISI](#)
15. Rothbart, MK . Longitudinal observation of infant temperament. *Dev Psychol*. 1986;22(3):356-365. [Google Scholar](#), [Crossref](#), [ISI](#)
16. Crockenberg, S, Leerkes, EM. Infant negative emotionality, caregiving, and family relationships. In: Crouter, AC, Booth, A, eds. *Children's Influence on Family Dynamics: The Neglected Side of Family Relationships*. Mahwah, NJ: Lawrence Erlbaum Associates; 2003:57-78. [Google Scholar](#)
17. Crockenberg, S . Are temperamental differences in babies associated with predictable differences in caregiving? In Lerner, JV, Lerner, RM, eds. *New Directions for Child Development: No. 31. Temperament and Social Interaction in Infants and Children*. San Francisco, CA: Jossey-Bass; 1986:53-73. [Google Scholar](#)
18. Niegel, S, Ystrom, E, Hagtvet, KA, Vollrath, ME. Difficult temperament, breastfeeding, and their mutual prospective effects: the Norwegian mother and child cohort study. *J Dev Behav Pediatr*. 2008;29(6):458-462. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
19. Vandiver, TA . Relationship of mothers' perceptions and behaviors to the duration of breastfeeding. *Psychol Rep*. 1997;80(3):1375-1384. [Google Scholar](#), [SAGE Journals](#), [ISI](#)
20. Wasser, H, Bentley, M, Slining, M. Infants perceived as "fussy" are more likely to receive complementary foods before 4 months. *Pediatrics*. 2011;127(2):229-237. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
21. Lauzon-Guillain, B, Wijndaele, K, Clark, M. Breastfeeding and infant temperament at age three months. *PLoS One*. 2012;7(1):1-7. [Google Scholar](#), [Crossref](#), [ISI](#)
22. Leerkes, EM, Supple, AJ, Su, J, Cavanaugh, AM. Links between remembered childhood emotion socialization and adult attachment: similarities and differences between European American and African American women [published online October 10, 2013]. *J Fam Issues*. doi:10.1177/0192513X13505567. [Google Scholar](#), [SAGE Journals](#), [ISI](#)
23. Main, M, Goldwyn, R, Hesse, E. *Adult Attachment Scoring and Classification System*. Unpublished manuscript, University of California at Berkeley; 2003-2008. [Google Scholar](#)
24. Cassidy, J, Shaver, PR. *Handbook of Attachment: Theory, Research, and Clinical Applications*. New York, NY: Guilford Press; 1999. [Google Scholar](#)
25. Shrout, PE, Fleiss, JL. Intraclass correlations: uses in assessing rater reliability. *Psychol Bull*. 1979;86(2):420-428. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)

26. Haltigan, JD, Leerkes, EM, Burney, RV, O'Brien, M, Supple, AJ, Calkins, SD. The Infant Crying Questionnaire: initial factor structure and validation. *Infant Behav Dev.* 2012;35(4):876-883. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
27. Putnam, SP, Helbig, AL, Gartstein, MA, Rothbart, MK. Development and assessment of short and very short forms of the Infant Behavior Questionnaire–Revised. Preliminary findings presented at: The Biennial Meeting of the Society for Research in Child Development; April, 2009; Denver, CO. [Google Scholar](#)
28. Parade, SH, Leerkes, EM. The reliability and validity of the Infant Behavior Questionnaire–Revised. *Infant Behav Dev.* 2008;31(4):637-646. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
29. Rothbart, MK . Measurement of temperament in infancy. *Child Dev.* 1981;52:569-578. [Google Scholar](#), [Crossref](#), [ISI](#)
30. Putnam, SP, Helbig, AL, Gartstein, MA, Rothbart, MK, Leerkes, E. Development and assessment of short and very short forms of the Infant Behavior Questionnaire–Revised [published online November 9, 2013]. *J Pers Assess.* doi:10.1080/00223891.2013.841171. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
31. Nommsen-Rivers, LA, Chantry, CJ, Peerson, JM, Cohen, RJ, Dewey, KG. Delayed onset of lactogenesis among first-time mothers is related to maternal obesity and factors associated with ineffective breastfeeding. *Am J Clin Nutr.* 2010;92(3):574-584. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
32. Centers for Disease Control and Prevention . Racial and socioeconomic disparities in breastfeeding–United States, 2004. *MMWR Morb Mortal Wkly.* 2006;55(12):335-339. [Google Scholar](#), [Medline](#)
33. Grossman, LK, Larsen-Alexander, JB, Fitzsimmons, SM, Cordero, L. Breastfeeding among low-income, high-risk women. *Clin Pediatr (Phila).* 1989;28(1):38-42. [Google Scholar](#), [SAGE Journals](#), [ISI](#)
34. Radloff, LS . The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas.* 1977;1(3):385-401. [Google Scholar](#), [SAGE Journals](#)
35. Whisman, MA, McClelland, GH. Designing, testing, and interpreting interactions and moderator effects in family research. *J Fam Psychol.* 2005;19(1):111-120. [Google Scholar](#), [Crossref](#), [Medline](#), [ISI](#)
36. Little, RJA . A test of missing completely at random for multivariate data with missing values. *J Am Statist Assoc.* 1988;404(83):1198-1202. [Google Scholar](#), [Crossref](#)
37. Forman, DR, O'Hara, MW, Laren, K, Coy, KC, Gorman, LL, Stuart, S. Infant emotionality: observational methods and the validity of maternal reports. *Infancy.* 2003;4(4):541-565. [Google Scholar](#), [Crossref](#), [ISI](#)

38. Centers for Disease Control and Prevention. Progress in increasing breastfeeding and reducing racial/ethnic differences—United States, 2000-2008 births. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6205a1.htm>. Published February 8, 2013. Accessed June 18, 2013. [Google Scholar](#)