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The My Emotions Questionnaire: A Self-Report of Mothers' Emotional Responses to Infant Crying

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Abstract

The purpose of this paper was to examine the psychometrics of the My Emotions Questionnaire, a self-report designed to assess mothers' emotional reactions when their infants cry. Participants were 240 first-time mothers. When infants were 6 months and 1 year old, mothers completed the new questionnaire and measures assessing beliefs and behavioral responses to infant crying and interview-based measures of mothers' emotional reactions and causal attributions about crying were administered. Maternal sensitivity and negative behaviors were observed when infants were 6 months, 1 year, and 2 years old. Mothers reported on their discipline practices when children were 2 years old. Five emotion factors emerged based on exploratory factor analysis of the 6-month data: amusement, anxiety, frustration, sympathy and protective. The 5-factor structure was supported via a confirmatory factor analysis of the 1-year data. All scales demonstrated adequate internal consistency reliability and significant stability from 6 months to 1 year. Amusement, frustration, and protectiveness demonstrated the best convergent validity with cry cognitions and predictive validity to parenting measures followed by anxiety, although effects tended to be small to moderate. Evidence for the validity of sympathy was less compelling. The potential utility of the questionnaire for basic and applied research is discussed.

Keywords

Infant crying; maternal emotions; validity; reliability

Infant crying elicits strong emotional reactions from parents and other adults (Barr, Fairbrother, Pauwels, Green, Chen & Brant, 2014; Gustafson, Bisson, MacDonald & Green, 2017; Hechler, Beijers & de Weerth, 2015), and the nature of parental emotional responses to crying predicts individual differences in parenting behaviors and/or quality (Del Vecchio et al., 2009; Leerkes, 2010). In turn, both negative emotional reactions to crying and related compromised parenting including non-responsive, less sensitive, or more harsh reactions to crying are associated with important child outcomes such attachment insecurity (Leerkes, 2011; Leerkes, Parade, and Gudmundson, 2011; McElwain & Booth La Force, 2006), compromised emotion regulation and early behavior problems (Leerkes, Blankson, &

O'Brien, 2009), as well as sleep difficulties (Philbrook & Teti, 2016). As such, several early intervention programs focus on helping mothers regulate their own negative emotional reactions and empathize more when their infants cry (e.g., Bick & Dozier, 2013; Cassidy et al., 2010; Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2008). To date, intervention studies have not assessed the extent to which mothers' emotional reactions to crying are altered and play a role in predicting improved parenting or child outcomes. Such information is important in order to assess mechanisms of change and to enhance interventions in the future. The purpose of this study is to present preliminary evidence of the utility of a new self-report of mothers' emotional reactions to infant crying that distinguishes between discrete emotions and whether the emotion is focused on the infant's needs or the mother's needs.

Existing Measures of Emotional Reactions to Crying

Many researchers have relied on self-reports to better understand emotional reactions to crying. Generally, these involve rating the extent to which specific discrete emotions are felt during or after exposure to crying. In some studies, pre-existing emotion measures like the Positive and Negative Affect Scales (Watson, Clark & Tellegen, 1988) which consists of 10 positive (e.g., interested, excited, proud) and 10 negative words (e.g., irritable, ashamed, nervous) has been used in whole (e.g., Gustafson, Bisson, MacDonald & Green, 2017) or in part (e.g., Del Vecchio, Walter, & O'Leary, 2009). In other studies, authors have simply listed a variety of emotion terms and asked participants to rate them, and in some cases maintain the distinct emotion terms (e.g., Barr et al., 2014), in other cases reduce them to broad positive emotion and negative emotion factors (e.g., Fairbrother, Barr, Pauwels, Brant & Green, 2015; Hechler, Beijers & de Weerth, 2015), and in other cases distinguish between discrete emotion factors composed of multiple related emotion terms including sympathy/empathy, anger/frustration and anxiety/worry (e.g., Leerkes & Siepak, 2006; Zeifman, 2003). This research has led to important findings, such as knowledge that high frustration when exposed to persistent crying is associated with thoughts of harming the infant (Fairbrother et al., 2015). On the other hand, some of the research is difficult to interpret given the breadth of utilized emotion measures. For example, that overall negative emotional reactivity in response to crying is linked with shorter latency to respond to crying (Del Vecchio et al., 2009) does not clarify which negative emotions play an important role in prompting this response. Second, while some emotion terms are quite clear as to whether or not they have the crying infant's interests at heart (e.g., empathy) or not (e.g., amusement), others like anger or anxiety are open to interpretation as a mother can be angry at her infant or on behalf of her infant (e.g., angry at the situation the infant is in) introducing error when predicting maternal behavior (Leerkes & Siepak, 2006). In fact, decades ago, Murray (1979) pointed out that adults' reactions to crying could be both altruistic, focused on wanting to help the infant, or egoistic, focused on protecting the listener underscoring the need for precision when using emotion terms that could reflect either. In the next section, we highlight this more nuanced approach.

A Nuanced Perspective of Parenting-Related Emotion

In line with Murray's (1979) perspective about reactions to crying, Dix, Gershoff, Meunier, and Miller (2004) asserted that parenting-related emotions can be either child-oriented, that is focused on the child's interests, development, or well-being; or parent-oriented, that is focused on the parent's interests, needs, or state. For example, parents can be worried for their infant because the infant is upset (child-oriented), or they can be worried for themselves because they are supposed to know how to respond effectively (parent-oriented) each of which are likely to motivate different parental responses. Dix and colleagues asserted that child-oriented emotion should be linked with more optimal parenting and child outcomes, whereas parent-oriented emotions should be linked with less optimal parenting and child outcomes. In fact, prior research supports this view. For example, higher child-oriented maternal joy was associated with more synchronous maternal behavior when interacting with their toddlers, whereas higher mother-oriented negative emotions (i.e., sadness, anger, and worry) were associated with less synchronous and more withdrawn and restrictive maternal behaviors during mother-toddler interaction (Bryan & Dix, 2009; Dix et al., 2004). In cry-related research, mothers' infant-oriented empathy/sympathy in response to infant crying was associated with greater accuracy in detecting infant distress, more appropriate causal attributions about crying, less negative beliefs about crying, and greater observed maternal sensitivity in response to infant distress (Leerkes, 2010; Leerkes, Supple, O'Brien, et al., 2015; Leerkes et al., 2016). In contrast, higher mother-oriented negative emotions in response to infant crying were associated with less accurate interpretation of infant distress cues, lower endorsement of child-oriented parenting goals, and lower observed maternal sensitivity in a distress-eliciting context when infants were 6 months old (Leerkes, 2010; Leerkes et al., 2004).

In addition to the underlying orientation of emotion predicting parenting, the discrete felt emotion may also be important. That is, discrete parent-oriented emotions may predict different parenting practices or styles. For example, parent-oriented anger may promote parent-child conflict, whereas parent-oriented sadness may promote parental withdrawal from the child (Dix et al., 2004). Consistent with this view, mother-oriented anger, but not anxiety, in response to crying predicted mothers' greater punitive and minimizing responses to infant crying which in turn predicted infant-mother attachment avoidance (Leerkes, Parade & Gudmundson, 2011). In contrast, mother-oriented anxiety, but not anger, predicted infant-mother attachment resistance in the same study. Thus, a focus on both discrete emotions and the orientation of those emotions is important when investigating the role of emotions in parenting and related child outcomes.

To date, the only measurement approach that has considered both is a time-intensive video-based interview initially developed by Dix and colleagues (2004) and modified by Leerkes and colleagues (Leerkes, 2010; Leerkes et al., 2004; 2015, 2016). Although both teams have yielded reliable and valid measures of parental emotions using this approach, such an approach may not be practical with limited resources or in applied settings given it requires access to videos of parent-child interaction, a lengthy interview with careful probing, transcription of interviews, and subsequent narrative coding. Furthermore, an interview format may increase social desirability pressure reducing mothers' likelihood of reporting

mother-oriented emotions. Thus, a brief, validated, self-report measure to assess maternal emotional reactions to crying is needed. Our goal was to create such a measure for use with parents of infants in hopes it would be useful to both basic and applied researchers.

The Current Study

The 20 item My Emotions Questionnaire was developed to reflect the range of emotions and underlying orientations described by nearly 200 mothers during video-recall interviews about their responses to their own and stranger infants crying from two previous studies (Leerkes, 2010; Leerkes, Crockenberg, & Burrous, 2004). Each item includes both an emotion term and an explanation for the feeling state intended to distinguish between mother and infant-orientation. Sample items include when my baby cries: “I feel sad for my baby” (infant-oriented), “I feel sad for myself because I have to deal with it” (parent-oriented), “I feel annoyed at my baby for pulling me away from other things” (parent-oriented), and “I feel angry at the situation or person that upset my baby” (infant-oriented). We administered this survey to primiparous mothers participating in a study about predictors of maternal sensitivity to infant distress when their infants were approximately 6 months and 1 year old.

To assess the factor structure of this measure, we utilized exploratory factor analysis on the 6-month measure and then confirmatory factor analysis on the 1-year measure and assessed internal consistency reliability of resulting scales at both times and model fit at 1 year. Based on prior research (Dix et al., 2004; Leerkes, 2010; Leerkes & Siepak, 2006), we anticipated 4 subscales: mother-oriented amusement, mother-oriented anger, mother-oriented anxiety, and infant-oriented empathy/sympathy. We also anticipated that emotional reactions to crying would be moderately stable over time given evidence they correlate with global maternal traits such as personality which tend to be stable over time (Leerkes et al., 2015).

Next, we examined the extent to which demographics (maternal race, age, education, income and infant sex) correlated with the resulting scales. In prior research using an interview method, demographics have tended not to correlate significantly with emotional reactions to crying (Leerkes et al., 2015), thus we expected the same in this case. If correlations are apparent (e.g., if more educated mothers reported fewer mother-oriented negative emotions), this could be evidence of social desirability constraints of the self-report measure.

Next, we assessed convergent and discriminant validity with the video-recall interview method to assess emotional reactions to crying. We anticipated that mother-reported anger, anxiety, and empathy/sympathy would correlate positively with parallel measures from the interview method. No suitable interview measure of amusement in response to crying was available. We also assessed convergent and discriminant validity with mothers’ self-reported beliefs and causal attributions about infant crying. Based upon prior research, we anticipated that mother-reported amusement, anger and anxiety would correlate positively with emotion minimizing and negative attributions about crying and mother-oriented cry beliefs but negatively with situational/emotional attributions and infant-oriented cry beliefs (Leerkes et al., 2015, 2016; Lorber & O’Leary, 2005). We anticipated the opposite pattern of associations for sympathy/empathy. Effect sizes in prior research have typically been small to moderate, with the exception of one study in which a large effect was reported between

negative emotions and negative appraisals (Lorber & O’Leary, 2005), as such we anticipated small to moderate effect sizes for convergent and predictive validity.

Finally, we assessed predictive validity in relation to observed and self-reported measures of parenting. Based on prior research (Bryan and Dix, 2009; Dix et al., 2004; Leerkes et al., 2015, 2016; Lorber & O’Leary, 2005), we anticipated that amusement, anger and anxiety would correlate negatively with maternal sensitivity and positively with non-responsiveness, overtly negative maternal behavior, and over-reactive discipline. We anticipated the opposite pattern of associations between sympathy/empathy and measures of parenting. Based on this prior research, we anticipated small effect sizes for predictive validity.

Method

Participants

Participants in the current study were drawn from a prospective longitudinal study in the southeastern United States investigating the origins of maternal sensitivity during infancy. The initial sample consisted of 259 primiparous mothers (128 European American, 131 African American) and their infants. At recruitment, participants ranged in age from 18 to 44 years ($M = 25$ years). Twenty-seven percent of the participants had a high school degree or less, 27% had some college, and 46% had a 4-year college degree or beyond. The majority (71%) of mothers were married or living with their child’s father, 11% were dating but not living with their child’s father, and 18% were single or not living with the child’s father. Annual family income ranged from less than \$2000 to over \$100,000; median income was \$35,000. Infant gestational age ranged from 35 to 43 weeks ($M = 39.5$); no infants were reported to have serious health or developmental problems, and 51% were female. The analytic sample for this report includes 240 mothers who completed the My Emotions Questionnaire at either 6 months or 1 year postpartum (217 provided data at both time points, 7 at 6 months only, and 16 at 1 year only). Of these, all provided measures of convergent validity during at least one time point. In regard to measures used to assess predictive validity, 229 provided observational parenting data, 239 reported on their non-responsiveness at 6 months and/or 1 year, and 210 reported on their discipline practices at 2 years. Mothers who did not complete the My Emotions Questionnaire at 6 months or 1 year did not differ from mothers who did on age, education, family income and marital status.

Procedure

Expectant mothers were recruited during their third trimester from childbirth education classes, breastfeeding classes, obstetric practices and via word of mouth. They participated in a prenatal interview not used in the current study, completed a demographic questionnaire, and reported on their birth via phone. Then, mothers and infants came to the campus observation room within 2 weeks of the infant’s 6-month birthday. Prior to the visit, mothers were mailed the questionnaires including the My Emotions Questionnaire, which they returned during the visit. Mothers and infants were videotaped during interactive tasks that included caregiving (a diaper change and dressing task), free play with age-appropriate toys, a transition task during which electrodes were placed on mothers and infants to measure heart rate, and three commonly used brief tasks intended to elicit infant distress.

These were an arm restraint task in which an experimenter gently held the infants' arms immobile, a novel toy approach, and the Still Face Procedure as described in Leerkes et al. (2016). After the interactive tasks, mothers completed a video-recall interview to assess emotional reactions and casual attributions about crying.

When children were approximately 14 months old, mothers and children returned to campus and were videotaped during a laboratory assessment in which they engaged in the Strange Situation, a transition period when electrodes were placed on mother and child to measure heart rate, a freeplay task, and two brief/mild distress eliciting tasks: a frustration task in which a toy phone was presented in a locked jar, and a novel character approach task designed to be frightening described in Leerkes et al. (2016). After the interactive tasks, mothers completed the video-recall interview. Before the visit, mothers completed questionnaires including the Maternal Responsiveness Questionnaire.

Within 2 months of the child's 2-year-birthday, mothers and children returned to campus and were videotaped during a transition period when electrodes were placed on both to measure heart rate, a 5-minute toy clean-up task (Stifter, Spinrad, & Braungart-Rieker, 1999), a frustration task in which a desired toy was selected and then placed in a clear locked box, and a spider approach task designed to be frightening as described in Su, Leerkes, and Augustine (2018). Before the visit, mothers completed questionnaires. At the conclusion of each visit, mothers received \$50 to \$100 and children received a small gift. All procedures were approved by the university's institutional review board (protocol number 09–0035, Triad Child Study).

Measures

My Emotions Questionnaire (6M and 1Y).—The initial My Emotions Questionnaire consisted of 20 items in which participants rate how frequently they feel certain ways when their infants cry on a scale from never (1) to always (5). Four subscales were theorized: amusement (e.g., I feel like laughing), anxiety (e.g., I feel nervous, like I won't know how to respond), frustration (e.g., I feel irritated by the sound), and empathy/sympathy (e.g., I feel sad for the baby).

Emotion Interview (6M and 1Y).—Mothers viewed the recorded segments of their interaction with their infants during the distress tasks (i.e., arm restraint, truck task, still-face re-engagement at 6 months, and frustration and novel character task at 1 year). After viewing each task video, mothers rated how strongly they felt 17 emotions (e.g., sad, irritated, concerned, amused) on a 4-point scale ranging from not at all (1) to very strongly (4). Then, mothers were asked to elaborate on why they felt each emotion. Following Dix et al. (2004), each explanation was coded as infant-oriented or mother-oriented. *Infant-oriented explanations* included concerns about the infant's welfare, a desire to help the infant, sympathy or empathy for the infant, or feeling pleasure or pride in the infant's behavior. Examples include: 'I was angry that someone put the baby in that situation,' 'I felt sad for the baby,' and 'I was anxious because I wanted to do something for the baby.' *Mother-oriented explanations* include self-focused concerns, negative reactions about the infant, or responses that are of interest or importance to the mother but not the infant. Examples

include: “I was irritated by the sound of the baby’s cry” and “All that crying made me feel nervous, like I am supposed to know what to do.” Reliability for orientation was calculated based on 40 transcripts (19%) at 6 months and 21 transcripts (10%) at 1 year that were double coded. Kappas ranged from .80 to 1.0 (mean kappa = .95) with 99% average agreement. Three emotional reaction scores were created by averaging mothers’ intensity ratings across interactive tasks for appropriate emotions as follows: infant-oriented empathy (empathy, sympathy, sad), mother-oriented anger (anger, irritation, frustration, annoyed, disgusted), and mother-oriented anxiety (anxious, concerned, nervous, worried). Internal consistency reliability ranged from .60 to .85 across subscales and time points. Although amusement was rated, it became clear with probing that the vast majority of mothers indicated they were amused at something other than infant distress that occurred in the video (e.g., I thought it was funny when he was blowing spit bubbles; he is just so cute that seeing him makes me laugh); thus amusement was not included as our primary interest is emotional reactions to infant distress. The interviewer was blind to mothers’ responses on the My Emotions Questionnaire.

Causal Attributions About Crying (6M and 1Y).—After watching each video clip, mothers rated the extent to which they agreed with 18 statements about why their infant behaved as he or she did during each task on a 4-point scale ranging from strongly disagree to strongly agree. Three attribution scores were created by averaging the item scores across tasks: *emotion-minimizing attributions* includes five items (having a bad day, in a bad mood, tired, hungry, not feeling well), *negative/internal attributions* includes seven items (spoiled, difficult temperament, trying to make mother’s life difficult, unreasonable, crying on purpose, selfish, just wanted attention), and *situational-emotional attributions* included 4 items (upset by the situation, no one was helping my baby, trying to show he/she needs help, had no way to feel better). Internal consistency reliability for all subscales and time points ranged from .77 to .91.

Observed Maternal Sensitivity (6M, 1 and 2 Y).—Trained raters rated maternal sensitivity separately for each task using Ainsworth’s 9-point sensitivity scale from (1) highly insensitive to (9) highly sensitive (Ainsworth et al., 1974). Fifteen percent of the videos were double-coded for reliability at each time point. Intraclass correlations across the interaction segments were high, ranging from .77 to .93 (mean ICC=.87) at 6 months, from .83 to .92 (mean ICC = .87) at 1 year, and from .74 to .93 (mean ICC = .87) at 2 years. Two sensitivity composites were created. Sensitivity to distress was calculated by averaging sensitivity ratings across tasks/episodes which were designed to elicit infant distress (at 6 months: arm restraint, truck, the reunion episode of the still-face procedure; at 1 year: novel character approach, phone in jar task; at 2 year: clean up, spider approach, locked box; alpha = .90). Sensitivity to nondistress was calculated by averaging sensitivity ratings for tasks/episodes which were not designed to elicit distress (at 6 months: caregiving, free play, transition, the face-to-face episode of the still-face procedure; at 1 year: free play and transition tasks; at 2 year, free play and transition, alpha = .88). Composites were averaged across the 3 time points to reduce the number of correlations. This approach is justified because sensitivity was stable over time, and the pattern of correlations with other variables were not expected to vary across time.

Overtly Negative Maternal Behavior.—Discrete maternal behaviors during the distress eliciting tasks at 6-months and 1 and 2-years was continuously coded from digital media files using INTERACT 9 (Mangold, Arnstorf, Germany). Event based coding was used, such that once a code was activated, it remained active until another code was selected. Maternal behavior was coded using 12 mutually exclusive categories described in Leerkes(2010). Thirty cases were double-coded for reliability with kappa = .77, .80, and .88 at the 6-month, 1-year, and 2-year time points respectively. In the current report, we focus on three *overtly negative behaviors*. These were negative (directs negative affect toward the infant), intrusive (forces own agenda on the infant), and mismatched affect (laughs at infant’s distress). Scores reflecting the percentage of time mothers engaged in each of these three interactive behaviors across distress-eliciting tasks were computed for the 6-month, 1-year time points, and 2-year time points, and then averaged over time to yield a single measure.

Maternal Non-Responsiveness.—When infants were 6 months and 1 year old, mothers completed the Maternal Responsiveness Questionnaire in which they rated how likely they were to respond in various ways to their infants’ feeling states in a variety of contexts along a scale of 1 (never) to 5 (always) (Leerkes & Qu, 2017). In this report we focus on the 13 item non-responsiveness scale (e.g., let your child cry for 10 or more minutes before responding, let your child cry until your child stops crying on his or her own no matter how long that takes) because it demonstrated the best convergent validity with observed sensitivity and predictive validity to child outcomes in prior research (Leerkes & Qu, 2017). The internal reliability at 6 months and 1 year were both .94. Non-responsiveness correlated significantly over time ($r(222) = .52, p < .01$), and thus the 6-month and 1-year scores were averaged to yield a single score that reflects mothers’ tendencies to be non-responsive when their infants cried over the first year.

Harsh Discipline.—When children were 2 years old, mothers completed the Parenting Scale (Arnold, O’Leary, Wolff, & Acker, 1993) by rating the extent to which they are likely to use effective versus ineffective strategies on a 7-point scale. In this report, we focus on the 10-item over-reactivity subscale. High mean scores reflect a greater tendency to call the child names, use bad language, spank the child, hold a grudge etc when the child misbehaves. Internal consistency reliability in this sample was .74.

Results

Factor Analyses

The original 20 items were subjected to an exploratory factor analysis (EFA) using full-information maximum likelihood estimation with Promax rotation. Initial analyses suggested up to 6 factors, but the scree plot suggested the 6th factor added little, and it was composed of a mix of 3 items that did not load together conceptually. Hence, these 3 items were removed (items 10, “I feel worried for me that my baby might keep crying for a while”; 13, “I feel sad for myself because I have to deal with it” and 14, “I feel angry at the situation or person that upset my baby”), and the EFA was re-run. This analysis suggested five interpretable factors with Eigen values greater than 1 and factor loadings higher than absolute value of .32 as suggested by Tabachnick and Fidell (2001). These 5 factors

accounted for 55% of the item variability, and subscales were developed by averaging the appropriate items. As noted in Table 1, the subscales included amusement (3 items; e.g., I feel like laughing, I feel like it's funny), anxiety (4 items; e.g., I feel nervous that I won't know how to respond), frustration at infant (4 items; e.g., I feel frustrated with my infant for not calming down), sympathy (3 items; e.g., I feel sad for my baby), and protectiveness (3 items; e.g., I feel a strong desire to make my infant feel better). The content of the first three factors clearly distinguished between a priori dimensions of specific mother-oriented emotions as anticipated-amusement, anxiety, and anger. The final two subscales reflect infant-oriented emotions, but counter to our expectation that there would be a single infant-oriented factor, two types of infant oriented-emotions emerged. The first, consists of items clearly reflecting sympathy. The second reflects a desire to protect or act on behalf of the infant.

We ran a five-factor confirmatory factor analysis on the 1-year data to see if the 5-factor structure fit well. The model included correlations between factors, and error variances of the measured variables both within and across factors were uncorrelated. The various fit indices for the CFA model were mixed with respect to the extent to which the model fit the data ($\chi^2(109) = 235.23$, $p < .01$; $RMSEA = .072$ (90% CI = (.060, .085); $CFI = .878$, $SRMR = .066$). A significant chi square may indicate that a model does not fit the data well; however, this criterion is biased by larger sample size (Hu & Bentler, 1999) and other model fit indices need to be considered. Typically, a model with CFI above .90 and RMSEA and SRMR less than .08 is considered good or adequate fit (Hooper, Coughlan & Mullen, 2008; Hu & Bentler, 1999). However, some researchers have argued that the conventional goodness-of-fit criteria for CFA models (e.g., $CFI > .90$) are too restrictive when applied to multifactor instruments with many items (Marsh, Hau, & Wen, 2004). As a set, the fit indices suggest mediocre to adequate fit providing general support the 5-factor structure.

Internal Reliability, Descriptive Statistics

Cronbach's alpha was calculated to determine the internal consistency of the 5 emotion scales at both time points. As Table 2 illustrates, the 5 subscales had adequate internal consistency with Cronbach's alpha greater than or equal to .65 at both time points. Although, alphas above .70 are generally preferred, it is not uncommon to observe lower alphas in scales composed of a small number of items as is the case here (Tavakol & Dennick, 2011). Mean scale scores and the percent of mothers who endorsed the emotion at all (i.e., those with a mean score higher than 1 which reflects never) are reported in Table 2 also. As would be expected in a community sample, fewer mothers (48% to 85%) reported feeling mother-oriented emotions in response to infant crying and the mean ratings were in the never (1) to rarely (2) range, than infant-oriented emotions which were endorsed by 99% of mothers and had mean ratings in the sometimes (3) to often (4) range. For comparison purposes, the percent of mothers who endorsed each emotion during the emotion interview is presented as well. A higher proportion of mothers endorsed all emotions on the questionnaire than during the interview at both times.

Stability and Scale Inter-correlations

When examining correlation coefficients, Cohen's (1988) criteria for effect size was considered such that .10 reflects a small effect size, .30 a medium effect size, and .50 a large effect size. All five subscales demonstrated moderate stability from 6 months to 1 year postpartum (r s ranged from .38 to .45, all $p < .01$) as illustrated on the diagonal of the correlation matrix. Intercorrelations among subscales within time point are consistent with expectation in that the mother-oriented emotions amusement, anxiety, and frustration correlate positively (mean $r = .37$ at both 6 months and 1 year). Likewise, infant-oriented sympathy and protectiveness correlated positively, although the magnitude of the association was substantially stronger at 1 year ($r = .62$) than at 6 months ($r = .39$) suggesting that these factors may be less distinct with increased infant age. Sympathy correlated positively with mother-oriented anxiety and frustration but was not significantly associated with amusement. In contrast, protectiveness correlated negatively with amusement and was not significantly associated with anxiety and frustration.

Associations with Demographic Characteristics

Associations between mothers' self-reported emotional reactions to crying and maternal age, education, income to needs ratio, race (0 = African American, 1 = European American), and infant sex (0 = male, 1 = female) were calculated. Only 6 of 50 tested correlations were statistically significant and all were small effects. Five of these were in relation to sympathy, although most were not significant at both time points. Mothers who were more educated and had sons reported higher sympathy than mothers who were less educated or had daughters at 6 months only, $r(205) = .21$ and $-.14$, $ps < .05$, respectively. Mothers with higher income reported more sympathy at both time points, $r(205) = .14$, $p < .05$ and $r(201) = .19$, $p < .01$, at 6 months and 1 year respectively. European American mothers reported feeling less amused at 6 months and more sympathy at 1 year relative to African American mothers, $r(205) = -.14$, $p < .05$ and $r(201) = .24$, $p < .01$, respectively.

Convergent Validity

To examine convergent validity of the My Emotions Questionnaire, we first examined correlations with concurrent parallel emotion scores derived from the emotion interview (Table 3). Mother-reported anxiety, frustration and protection demonstrated convergent validity with parallel interview measures, albeit the correlations were in the small range, with the exception of frustration at 1 year which was a medium correlation. Sympathy at 6 months but not at 1 year demonstrated modest convergent validity.

Next, we examined convergent/divergent validity in relation to mothers' concurrent self-reported causal attributions and beliefs about crying. Mothers' self-reported amusement in response to crying correlated significantly with negative maternal cognitions about crying in all 6 correlations and all associations were of the expected valence and medium in effect size (mean $r = .32$). Likewise, amusement correlated negatively with infant-oriented beliefs in both tested correlations, with the mean correlation ($-.28$) approaching a medium effect size. Anxiety in response to crying correlated positively with negative maternal cognitions about crying in all 6 cases, and effect sizes were in the small to moderate range with a mean effect size of .24. One of two examined associations between anxiety and infant-oriented

cognitions was significant and the mean effect size was small, $-.13$. Frustration in response to crying correlated significantly with negative maternal cognitions about crying in 5 out of 6 tested correlations, all associations were of the expected valence and ranged from small to large effect sizes, with a mean effect size in the medium range, $.32$. Both correlations between frustration and infant-oriented cognitions were significant and negative, and the average effect size was $-.23$. Sympathy in response to crying correlated significantly with lower negative maternal cognitions about crying in 1 out of 6 correlations with a trivial mean effect size of $-.07$. Sympathy correlated significantly with higher infant-oriented cognitions in one out of two tested correlations and the mean effect size was small, $.12$. Protectiveness correlated significantly with lower maternal cognitions about crying in 3 out of 6 correlations and the mean effect size was small, $-.12$. However, protectiveness correlated positively and significantly with infant-oriented cognitions in both tested correlations, and the effect size approached large, $.47$.

Predictive Validity

To examine predictive validity, we assessed the degree to which emotion scales were associated with various measures of maternal sensitivity and parenting practices. These correlations are illustrated in Table 3. In our description we compare the average magnitude of associations (absolute value for observed measures of parenting) across time separately for observed indices of parenting and self-reported indices parenting which one would expect to be higher given shared method variance.

Beginning with mother-oriented emotions, mothers' self-reported amusement in response to crying correlated significantly with parenting outcomes in 8 out of 10 correlations and all associations were the expected valence. Mothers who reported more amusement in response to infant crying were rated as less sensitive to distress and non-distress and engaged in more overtly negative maternal behavior, albeit for 1-year amusement only; they also self-reported being more non-responsive to infant crying and engaging in more harsh discipline with their toddlers. The mean effect size between amusement and all observed parenting measures was small ($|.15|$), and the mean correlation with self-reported indices of parenting approached a medium effect ($.27$). Anxiety in response to crying correlated significantly with parenting outcomes in 5 out of 10 correlations, all but one of which was a self-reported parenting outcome and all associations were the expected valence. Mothers who reported more anxiety in response to infant crying at 1 year engaged in more overtly negative maternal behavior, and the mean correlation with all observed parenting measures was trivial ($|.08|$). Mothers who reported more anxiety in response to infant crying at both time points self-reported being more non-responsive to infant crying and engaging in more over-reactive discipline with their toddlers, and the mean correlation with all self-reported indices of parenting was small, $.21$. Likewise, frustration in response to crying correlated significantly with parenting outcomes in 5 out of 10 correlations, all but one of which was a self-reported parenting outcome and all associations were the expected valence. Mothers who reported more frustration in response to infant crying at 1 year engaged in more overtly negative maternal behavior, and the mean correlation with all observed parenting measures was small, $|.11|$. Mothers who reported more frustration in response to crying self-reported being more non-responsive to infant crying and engaging in more over-reactive discipline with their toddlers;

the mean correlation with all self-reported indices of parenting was .26, approaching a medium effect size.

Turning to infant-oriented emotions, mother reported sympathy correlated significantly with parenting outcomes in 4 out of 10 correlations, all of which involved maternal sympathy at 1 year, and 3 of the 4 were in relation to observed indices of parenting. Specifically, mothers who reported more sympathy at 1 year were rated as more sensitive to distress and non-distress, engaged in fewer overtly negative maternal behaviors, and reported engaging in less non-responsiveness. The mean correlation between sympathy and all observed and self-report measures was small, $|.13|$ and $.07$, respectively. Finally, protectiveness correlated significantly with parenting outcomes in 8 out of 10 correlations. Specifically, mothers who reported feeling more protective at both time points were rated as more sensitive to distress and non-distress and reported engaging in less non-responsiveness. Mothers who reported feeling more protective at 1 year engaged in less overtly negative maternal behavior and reported engaging in less over-reactive discipline. The mean correlation between protectiveness and both observed and reported measures was in the small range, $|.15|$ and $.20$ respectively.

Discussion

In the current report, we provide preliminary evidence for the factor structure, reliability, stability, and validity of a new measure of mothers' emotional reactions to their infants' cries. Exploratory and confirmatory factor analyses supported a 5-factor structure including amusement, anxiety, frustration, sympathy and protectiveness. Each of the scales demonstrated adequate internal reliability, stability over time, moderate convergent validity with cognitions about crying, and small to moderate predictive validity to maternal behaviors. The modest convergent validity with emotions derived from an interview measure likely reflects important context differences that may affect mothers' emotional reactions. That is, the interview measure was based on brief videos of their own infants during somewhat unusual tasks specifically designed to elicit infant distress, and most infants did in fact become distressed. In contrast, the self-report focuses on mothers' emotional reactions to crying in typical daily life. Below, we highlight the relative strengths of various subscales relative to one another and other measurement approaches.

Of the five subscales, amusement, frustration, and protectiveness demonstrated the best convergent and predictive validity when considering both the number and magnitude of significant correlations, followed by anxiety, and then sympathy. As expected, higher amusement, anxiety, and frustration were associated with maladaptive/negative parenting cognitions and behaviors, whereas higher protectiveness was associated with adaptive/infant-oriented parenting cognitions and behaviors. Consistent with most prior research, these associations were in the small to moderate range (Bryan and Dix, 2009; Dix et al., 2004; Leerkes et al., 2015, 2016; Lorber & O'Leary, 2005). Although amusement, anxiety, and frustration in response to crying were endorsed less frequently than infant-oriented sympathy and protective, their associations with relevant parenting outcomes underscore the importance of assessing these emotional reactions to crying. Notably, a higher proportion of women endorsed anxiety and frustration on the questionnaire than during the interview and

given the wording of the questionnaire we were able to identify women who felt amused in response to crying as opposed to the interview format in which women tended to note amusement that was unrelated to distress. We suspect social desirability pressures to not endorse mother-oriented emotions may be enhanced in a face-to-face interview format compared to a private self-report format underscoring the utility of a self-report measure to assess more negative maternal emotions. Each of these mother-oriented emotions, particularly amusement and frustration, which reflect a callousness toward infant needs, are likely of clinical significance and point to a need to enhance maternal awareness of infants' needs when crying. Anxiety, which was somewhat less consistently/strongly correlated with relevant parenting cognitions and behaviors may warrant a different approach. That is, mothers who feel anxious in response to crying may be aware of their infants' needs, but need assistance shifting focus away from concerns about the external evaluation of their performance as a parent so it does not undermine responsivity/sensitivity.

Sympathy demonstrated the least convergent and predictive validity and was also the scale that correlated most consistently with demographics. It may be the case that mothers feel strong social desirability pressure to report they feel sad or worried when their infants cry undermining the validity of the measure. That sympathy correlated with anxiety at both points and frustration at 6 months suggests that some mothers who report sympathy are also experiencing mother-oriented emotions which may undermine associations between sympathy and adaptive parenting cognitions and behavior. In contrast, protectiveness, did not correlate significantly with or was negatively correlated with indices of mother-oriented emotions and was the strongest predictor of infant-oriented parenting cognitions and the most consistent predictor of observed maternal sensitivity. This pattern is consistent with literature on empathy (Eisenberg & Eggum, 2008), in which it is noted that personal distress in response to others' distress is not related to prosocial behavior, whereas the other-oriented aspect of empathy is. Certainly, the items in the protective subscale reflect both concern and a desire to act on behalf of the baby which appear to prompt more sensitive behavioral responses. That sympathy and protectiveness were more strongly correlated at 1 year than at 6 months, and that sympathy at 1 year was a more consistent predictor of parenting than it was at 6 months, suggests that maternal sympathy may evolve over time with child age and/or acquired parenting experience such that it better reflects mothers' individual differences over time. Possible changes in all emotional reactions to crying over time should be examined in future research. For example, it may be that parents' expectations for their infants' self-regulated behavior increases with infant age leading to more frustration and less sympathy and protectiveness in response to crying over time. The pattern of means in this sample supports this proposition, but the possibility that infant and mother characteristics moderate these differences remains uncertain.

Limitations of this study include that many of the individual effect sizes were small, and although consistent with prior literature, larger effect sizes would certainly instill greater confidence in the validity of the measure. Further, the measure does not specify the context or reason for infant crying or the discrete underlying infant emotion, and there may be contextual differences in mothers' emotional responses that provide useful information. Certainly, the measure could be adapted for specific contexts that map onto specific areas of research. For example, assessing emotional reactions to infant crying at bedtime/nighttime

may prove useful in predicting maternal bedtime and nighttime behaviors (Phillbrook & Teti, 2016). Although the reasons we provided for each emotion item to distinguish between infant versus mother-orientation (e.g., feel worried others will think I am a bad parent vs. feel worried for baby, what baby might want or need) were derived from extensive prior interviews with mothers about their emotions when infants were distressed, they may not fit for some mothers, leading to under-reporting. And, alternative reasons for emotions may be needed if the scale was adapted for other contexts. Finally, the current study only focused on mothers. Additional research is needed to determine if this tool is reliable and valid among fathers or other caregivers.

Strengths of this study include the diversity of the sample, the inclusion of observed and carefully coded indices of maternal sensitivity/ behavior, and the use of both EFA and CFA. However, the results of the 1-year CFA demonstrated only mediocre to adequate fit. Although additional research in other samples is warranted, the results of the current study provide preliminary support for the utility of the My Emotions Questionnaire to reliably and validly assess maternal emotional reactions to infant crying in the first year of life. Given its brevity and ease of use, this measure could be used in clinical settings to identify mothers at risk of insensitive parenting, although additional research is needed to assess the practical value of such an approach given observed associations were small to moderate and assessed independent of potential covariates. It could also be used to determine if existing interventions alter mothers' emotional reactions to crying thereby identifying the mechanisms by which interventions enhance sensitivity. This is important given a number of interventions target maternal affect and affect regulation in response to infant cues including crying (e.g., Bick & Dozier, 2013; Cassidy et al., 2010; Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2008). However, in doing so, including a measure of social desirability as a covariate may be important to ensure any observed differences are not merely an artifact of having learned the more desirable answer via the intervention content (Mortel, 2008).

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Table 1:

Scale Items and Factor Loadings at 6 Months

When my baby cries, I: Scale/Item	Factor Loading at 6M				
	1	2	3	4	5
1. Amused					
Feel like laughing	.937	.014	-.053	-.117	.139
Feel like it's funny	.894	-.057	-.120	.088	-.036
Feel amused baby is upset	.513	.068	.091	.048	-.202
2. Mother-Oriented Anxiety					
Feel nervous that I won't know how to respond	-.024	.964	-.158	-.062	-.112
Feel anxious; like nothing I do will help	.104	.691	.174	-.002	-.053
Feel worried that others will think I'm a bad parent	.005	.415	.129	.104	-.057
Feel worried for me that baby might keep crying	-.073	.415	-.054	.071	.094
3. Mother-Oriented Frustration					
Feel annoyed that baby is pulling me away from other things	-.025	-.106	.837	.062	-.150
Feel frustrated with baby for not calming down	.005	.000	.708	-.126	.177
Feel irritated by sound	-.133	.095	.649	.056	-.059
Feel annoyed at baby for over-reacting	.237	.088	.383	-.192	.092
4. Infant-Oriented Sympathy					
Feel sorry for baby	.049	-.020	.057	.850	-.006
Feel sad for baby	-.063	-.025	-.121	.690	.002
Feel worried for baby-about what baby might want or need	-.027	.138	.095	.354	.265
5. Infant-Oriented Protection					
Feel protective of baby	-.038	-.098	.002	-.043	.743
Feel strong desire to make baby feel better	.006	-.057	-.066	.054	.696
Feel concerned for baby	.098	.076	.052	.304	.432

Table 2:

Internal consistency reliability, descriptive statistics, stability, and intercorrelations among subscales

	Amusement	Anxiety	Frustration	Sympathy	Protective
Amusement	.39**	.20**	.40**	-.06	-.15*
Anxiety	.17**	.44**	.52**	.28**	.04
Frustration	.46**	.49**	.45**	.16*	-.10
Sympathy	-.11	.27**	.08	.38**	.39**
Protective	-.17**	.05	-.10	.62**	.39**
6M α	.82	.76	.78	.67	.70
6M Mean (SD)	1.53 (.72)	2.01 (.74)	1.70 (.63)	3.35 (.81)	4.35 (.68)
6M ME % endorsed	50%	85%	78%	99%	99%
6M Int % endorsed	NA	61%	33%	79%	79%
1Y α	.78	.71	.81	.65	.70
1Y Mean (SD)	1.45 (.63)	1.89 (.71)	1.82 (.69)	3.18 (.80)	4.17 (.72)
1Y ME % endorsed	47%	83%	83%	99%	99%
1Y Int % endorsed	NA	44%	18%	66%	66%

Note: the intercorrelations between scales at 6 months above the diagonal and between 1-year scales below the diagonal, and within a scale across time (stability) on the diagonal (bolded numbers). Int = interview. ME = My Emotions Questionnaire. Interview-based infant-oriented empathy is the comparison for both ME sympathy and protective.

*
p < .05

**
p < .01

Table 3:

Convergent and predictive validity correlations

	Amusement		Anxiety		Frustration		Sympathy		Protective	
	6M	1Y	6M	1Y	6M	1Y	6M	1Y	6M	1Y
<u>Convergent Validity with Interview Measures</u>										
Parallel Int	NA	NA	.17 *	.17 *	.15 *	.30 **	.19 **	.12	.20 **	.13 *
<u>Convergent Validity with Beliefs about Crying</u>										
Min Att	.22 **	.33 **	.17 *	.33 *	.09	.29 **	.01	.08	-.10	-.02
Neg Att	.32 **	.24 **	.26 **	.24 **	.33 **	.26 **	-.09	-.01	-.20 **	-.01
MO Belief	.44 **	.38 **	.14 *	.27 **	.41 **	.54 **	-.14 *	.03	-.26 **	-.18 *
IO Belief	-.26 **	-.29 **	-.09	-.17 *	-.23 **	-.24 **	.18 *	.07	.47 **	.47 **
<u>Predictive Validity to Parenting Outcomes</u>										
Sen Distress	-.12 ^t	-.16 *	-.05	-.09	-.01	-.09	.10	.24 **	.13 *	.18 *
Sen-NonDis	-.16 *	-.21 *	-.05	-.09	-.06	-.12 ^t	.09	.20 **	.14 *	.17 *
Negative MB	.07	.16 *	.04	.13 *	.11	.24 **	-.02	-.14 *	.09	-.17 *
Nonrespons	.39 **	.32 **	.22 **	.13 *	.35 **	.24 **	-.05	-.14 *	-.31 **	-.25 **
Harsh Disc	.21 **	.17 *	.27 **	.22 **	.19 **	.27 **	-.02	-.09	-.06	-.19 **

Note: M = months, Y = year, Min = minimizing, Att = attributions, Neg = negative, IO = infant oriented, MO = mother oriented, Sen Distress = observed sensitivity to distress from 6 months to 2 years, Sen NonDis = observed sensitivity to non-distress from 6 months to 2 years, Negative MB = observed negative maternal behavior from 6 months to 2 years, Nonrespons = maternal reported nonresponsiveness from 6 months to 1 year, Harsh Disc = maternal reported harsh discipline at 2 years. Convergent validity correlations are with concurrent measures.

*
p < .05

**
p < .01