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The Infant Crying Questionnaire: Initial Factor Structure and Validation

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Abstract

The current project reports on an initial investigation into the factor structure of the Infant Crying Questionnaire (ICQ), a measure designed to assess parental beliefs about infant crying, in a sample of 259 primiparous mothers. Exploratory factor analyses yielded evidence for a five-factor structure to the ICQ, with two factors that may be conceptually viewed as *infant-oriented* beliefs regarding infant crying (Attachment/Comfort and Crying as Communication) and three factors conceptually reflecting *parent-oriented* beliefs regarding infant crying (Minimization, Directive Control, and Spoiling). Each of the scales demonstrated strong internal consistency and was associated with concurrent measures of mothers' causal attributions about emotional responses to infant crying. Predictive validity to observed maternal sensitivity at 6 months and mother-reported infant behavioral problems at one year was demonstrated. The importance of a questionnaire method to assess parents' beliefs regarding infant crying in developmental research is discussed and future methodological directions are outlined.

Keywords

Infant crying; maternal sensitivity; exploratory factor analysis; reliability; validity

1. Introduction

Infant crying is a salient social cue that elicits parental emotions and parenting behavior (Ainsworth, Bell, and Stayton, 1974; Leerkes, Gudmundson, & Burney, 2010) and represents an attachment-related challenge to parents (Bowlby, 1969). Sensitive responses to infant distress or needs for safety and protection are thought to be of great developmental significance in relation to children's social and emotional functioning (Ainsworth, Blehar, Waters, and Wall, 1978; Bowlby, 1969; Goldberg, Grusec, & Jenkins, 1999; Thompson, 1997). Parents' beliefs about infant crying are important predictors of their behavioral responses, such that parents who endorse beliefs that are focused on the infant's well-being respond more quickly and sensitively to infant crying (Crockenberg & McCluskey, 1986; Leerkes, 2010). In turn, maternal sensitivity to infant distress is associated with positive developmental outcomes, such as attachment security, emotion regulation skills, and social

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and behavioral competence (Del Carmen, Pedersen, Huffman, & Bryan, 1993; Leerkes, 2010; Leerkes, Blankson & O'Brien, 2009; McElwain & Booth La Force, 2006).

Despite the long held view that parental responses to infant crying are important in the context of child development, no questionnaire measure has been empirically developed to assess parental beliefs about infant crying. Such a measure would likely help predict individual variation in parenting behavior and related child outcomes during infancy and may augment current observational measures of parental sensitivity (Leerkes, Parade, & Gudmundson, 2011; Leerkes, Weaver, & O'Brien, in press). Although observational measures of maternal behavior in response to infant distress are currently the gold standard, they are constrained in that eliciting infant distress from all infants in a sample is difficult, and the duration of infant distress is often very brief providing limited opportunities for direct observation of parental response. Moreover, parents may engage in similar behaviors for varying reasons; some mothers may engage in comforting behaviors because they want their infants to feel better while others do so because they find crying aversive and simply want it to stop. The goal or belief underlying the response may be an important indicator of the extent to which the parent prioritizes infant needs, a key marker of sensitivity (Ainsworth et al., 1974). Thus, supplementing observational measures of parental responses to infant distress with a questionnaire of parents' beliefs regarding infant crying may enhance the predictive validity of sensitivity in relation to children's social and emotional adjustment (e.g., Leerkes et al., 2011).

Recently, Leerkes and colleagues (Leerkes, Gudmundson, & Burney, 2010; Leerkes, Parade, & Burney, 2010) developed the Infant Crying Questionnaire (ICQ) to assess global beliefs about infant crying (i.e., no context is provided regarding the occurrence of infant crying). Item content of the ICQ was generated based on earlier work in which 168 primparous mothers, across two studies, were interviewed about their beliefs and goals in relation to infant crying (Leerkes, 2010; Leerkes, Crockenberg, & Burrous, 2004). Mothers tended to describe *infant-oriented* beliefs that place a priority on infants' and toddler's needs, desires, and well-being (e.g., I want my child to be safe), and *parent-oriented* beliefs that place a priority on parents' needs and well-being (e.g., I want my child to stop crying because it bothers me; for more discussion of these orientations, see Dix, 1991;1992; Dix, Gershoff, Meunier, & Miller, 2004; Leerkes, Parade, & Burney, 2010).

Drawing from this qualitative work, the original ICQ was developed, consisting of 43 items (Leerkes, Gudmundson, & Burney, 2010). Items were designed to encompass six conceptually derived scales, three of which were infant-oriented, (Attachment, Crying as Communication, and Positive Adjustment) and three of which were parent-oriented (Minimization, Spoiling, and Parent Esteem). Prior work (Leerkes et al., 2010) has shown these scales to possess adequate internal reliability and predictive validity. ICQ scales that tap infant-oriented beliefs regarding infant crying have been positively associated with concurrent measures of observed maternal sensitivity and infants' use of adaptive regulatory behaviors and subsequent infant-mother attachment security, whereas ICQ scales that tap parent-oriented beliefs about crying are negatively associated with observed sensitivity (Leerkes et al., 2010). In the present analyses, we formally examine the factor structure of the ICQ using Exploratory Factor Analysis (EFA) and present initial reliability and validity information for the derived and retained factor scales in a larger and more diverse sample of mothers.

We assess the convergent validity of the ICQ scales by examining associations between empirically derived ICQ scales and expectant mothers' causal attributions about and emotional reactions in response to infant crying, elicited by showing mothers digitized video clips of crying infants. Based on prior research linking parents' broader parental beliefs with

the nature of their causal attributions about child behavior (Hastings & Grusec, 1998), we expected that parent-oriented ICQ scales would be positively associated with mothers' negative (e.g., the baby is spoiled) and minimizing (i.e. non-emotional) attributions regarding infant crying and that infant-oriented scales of the ICQ would demonstrate the opposite pattern. Likewise, drawing from prior research demonstrating that mothers' negative and self-oriented beliefs about crying are linked with more negative and less empathic self-reported emotional reactions to crying (Leerkes, Crockenberg, & Burrous, 2004; Leerkes, 2010), we expected that infant-oriented scales of the ICQ would be positively associated with maternal self-reports of empathy and negatively associated with maternal self-reports of anger and anxiety in response to infant crying, whereas the opposite pattern would be apparent for parent-oriented ICQ scales.

Secondly, we examine the predictive validity of empirically derived ICQ scales by assessing the relation between prenatal ICQ scales and observed maternal sensitivity with their own 6-month-old infants, and with maternal reports of infant problem behavior and social-emotional functioning at 1 year. Consistent with prior research linking parenting beliefs and behavior (Crockenberg & McCluskey, 1986; Leerkes, 2010; Leerkes et al., 2004; Zeifman, 2003), we expected infant-oriented scales of the ICQ to show positive associations and parent-oriented scales of the ICQ negative associations with observed maternal sensitivity. Relatedly, given established relations between sensitivity to distress and infant and child adaptation (Davidov & Grusec, 2006; Leerkes et al., 2009; McElwain & Booth-LaForce, 2006) we expected infant-oriented scales of the ICQ to predict positive child outcomes and parent-oriented scales to predict negative child outcomes.

2. Methods

2.1 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 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 had a high school degree or less, 27% had some college, and 46% had a 4-year college degree or beyond. The majority were married or living with their child's father (57%), 24% were in a relationship with their child's father, and 19% were single. Annual family income ranged from less than $2,000 to over $100,000; median income was $35,000. The analytic sample for the various analyses below varied due to missing data. Two participants did not complete the ICQ, thus the factor analytic sample was N = 257. At 6 months, observed sensitivity ratings were available for 38.9 % (N = 100) of the participants, and at 1 year, 62.6% (N = 161) of the participants had complete data from the measure of infant social-emotional functioning. ICQ scale scores for the subsamples for whom 6-month sensitivity and 1-year outcome data were available did not differ from those who had missing data.

2.2 Procedure

Upon enrollment, women were mailed consent forms and a packet of questionnaires including a demographic measure and the ICQ. Women returned their completed consent forms and questionnaires when they visited the laboratory for a prenatal interview 6 to 8 weeks prior to their due date. At this visit, mothers viewed four 1-minute video clips of crying infants, two of infants exhibiting anger (one White and one Black infant), and two of infants exhibiting fear (one White and one Black infant). These video clips had been recorded, with parental permission, during standard temperament assessments: an arm restraint procedure for the anger clips and a novel toy approach procedure for the fear clips

(see Leerkes & Crockenberg, 2003, for details). After viewing each clip, mothers were asked to report what emotions they felt watching the clip, to describe the reasons for their feelings, and to provide explanations for the infant's behavior.

Within 2 weeks of the infant's 6-month birthday, mothers and infants returned to the lab and were videotaped during a laboratory assessment that included caregiving (a diaper change and dressing), free play with age-appropriate toys, a transition period in preparation for physiological assessments (placement of electrodes on mothers and infants), an arm restraint task in which an experimenter held the arms of the infant who was in an infant seat, a novel toy procedure using a remote-controlled truck that approached the infant but which the infant could not touch, and the Face-to-Face Still/Face procedure (Tronick, Als, Adamson, Wise, & Brazelton, 1978). Prior to a 1-year assessment, mothers were mailed the Brief Infant-Toddler Social and Emotional Assessment (BITSEA; see Measures below) which they completed and returned when they visited the laboratory. Upon completion of the questionnaires and interview, participants received monetary compensation and small gifts. At the prenatal and six-month visits, parents received 50$, and at the 1-year visit they received 100$. All procedures were approved by the university's institutional review board.

2.3 Measures

2.3.1 The Infant Crying Questionnaire (ICQ; Leerkes et al., 2010)—Prior to use in the current study, the ICQ was modified to improve item wording and clarity and to avoid confounding beliefs and emotions. Five of the original items were removed and replaced with new items of the same conceptual content, six items were reworded for clarity, one item was deleted, and one item was added. This resulted in the same total item count (43) as the original measure. Items were designed to assess how often respondents believed they would think or feel about infant crying (e.g., I will think my baby is trying to communicate with me) and how often they believed they would respond in ways that met specific parenting goals (e.g., I will make my baby feel safe and secure). Each item is rated on a 5-point scale ranging from *never* (1) to *always* (5).

2.3.2 Parental Attributions for Infant Crying: Video Ratings (Leerkes & Siepak, 2006)—After watching each of the four 1-min video clips during the prenatal interview, mothers used a 4-point scale to rate the extent to which they agreed with 18 causal attribution statements about why the infant was crying. Following prior research using this scale (Leerkes & Siepak, 2006) three subscale scores were calculated for each clip: minimizing attributions (5 items: having a bad day, in a bad mood, tired, hungry, not feeling well); negative/internal attributions (7 items: spoiled, difficult temperament, trying to make mother's life difficult, unreasonable, crying on purpose, selfish, just wanted attention); and positive/external attributions (4 items: upset by the situation, no one was helping the baby, trying to show he/she needs help; had no way to feel better). Subscale scores correlated highly across the four clips (range of r's = .45 –.81, all p's < .01) and were averaged. Alphas were as follows: Minimize α = .95; Negative Attributions α = .92; and Positive/External Attributions α = .87.

2.3.3 Parental Emotions: Video Ratings—After watching each video clip, mothers were given a list of 17 emotions (e.g., sad, irritated, concerned) and asked to rate how strongly they felt each emotion using a 4-point scale ranging from (1) *not at all* to (4) very *strongly*. Five emotion ratings (amused, pleased, happy, interested, and neutral) were not used in the current report given our goals. Then, mothers were asked to elaborate on the reasons they felt each emotion; these explanations were transcribed for later coding. Following Dix et al. (2004), each open-ended explanation was coded as infant-oriented or mother-oriented. Infant-oriented explanations involved 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 (e.g., 'I felt sad for the baby'). Mother-oriented explanations involved self-focused concerns, negative reactions about the infant, or responses that are of interest or importance to the mother but not the infant (e.g., 'All that crying made feel nervous; like I am supposed to know what to do'). Reliability was calculated based on 40 (15%) interview transcripts using kappa to assess agreement for orientation (i.e., infant- or mother-oriented) on each of the distinct emotions. Kappas ranged from .65 – 1.0 (mean kappa = .85). These data were combined to yield three scores for each clip by averaging the extent to which mothers rated specific emotions that were later coded with a specific orientation: *empathy* (infant-oriented empathy, sympathy, sad; α =.87), *anger* (mother-oriented anger, irritation, frustration, annoyed, disgusted; α = .79), and *anxiety* (mother-oriented anxious, concerned, nervous, worried; α = .75). Empathy, anger, and anxiety scores were significantly correlated across clips (range of r's for parallel emotions across clips was .46 – .66, all p's < .01). Emotional reaction scores were averaged across all clips yielding three final scores with good internal reliability: empathy (α =.87), anger(α = .79), and anxiety (α = .75).

2.3.4 Observed Maternal Sensitivity (6 Months)—Trained raters rated maternal sensitivity separately for each task (caregiving, free play, transition, arm restraint, truck, face-to-face/still-face procedure [face-to-face and reunion episodes rated separately]) using Ainsworth's 9 point sensitivity scale from (1) *highly insensitive* to (9) *highly sensitive* (Ainsworth, et al., 1974). Twenty percent of the current sample was double-coded for reliability. Intraclass correlations across the interaction segments were high, ranging from . 77 to .93 (mean *ICC* = .87). Two sensitivity composites were created; sensitivity to distress was calculated by averaging sensitivity ratings across interaction segments which were designed to elicit infant distress (i.e., arm restraint, truck, the reunion episode of the still-face procedure; range r's .58 – .76, all p's < .01), and sensitivity to nondistress by averaging sensitivity ratings for those segments which were not (i.e., caregiving, free play, transition, the face-to-face episode of the still-face procedure; range r's .57 – .81, all p's < .01). Internal consistencies of each scale were high; for sensitivity to distress α = .85; for sensitivity to nondistress α = .89.

2.3.5 The Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan, et al., 2004)—When infants were 1 year of age, mothers completed the 42-item Brief Infant-Toddler Social and Emotional Assessment (BITSEA). Thirty-one items assess problem behavior and 11 items assessing social and emotional competence; all items are scored 0 = *Not True/Rarely* to 2 = *Very True/Often* and are summed within domain. The BITSEA Problem Total score and Competence Total score have good-to-excellent test-retest reliability and good interrater reliability, and there is strong empirical support for the validity of the measure(see Briggs-Gowan & Carter, 2006). The BITSEA Problem Total scale includes subsets of items which are intended to tap externalizing, internalizing, and general social/emotional dysregulation (e.g., sleep problems) symptomatology. Thus in addition to calculating the total problem score, we calculated these scale scores (Externalizing: 6 items, α= .60; Internalizing: 8 items, α = .65; Dysregulation: 8 items, α = . 67) by summing appropriate items.

3. Results

3.1 Factor Analyses

The 43 ICQ items were subjected to an exploratory factor analysis using maximum likelihood estimation with oblique (*Promax)* rotation. We specified an oblique rotation method, allowing the factors to correlate, given it was expected that the ICQ would be composed of different yet associated factors conceptually reflecting one or more aspects of

either infant or parent-oriented responses to crying. Given previous work (Leerkes, Gudmundson, & Burney, 2010) in the development and validation of an original set of 3 infant-oriented ICQ scales (Attachment, Crying as Communication, Positive Adjustment) and 3 parent-oriented ICQ scales (Minimize, Spoil, and Esteem), we specified in advance an upper boundary of the factor solution at six-factors. Items loading at an absolute value of .32 or higher (Comrey & Lee, 1992; Tabachnick & Fidell, 2001) were considered meaningful and retained as factor indicators. This model resulted in 2 non-loading items and 5 cross-loading items (i.e., items loading on more than one factor at an absolute value of .32 or higher), which were not retained. Moreover, following these item deletions, only one item loaded on the originally proposed Parent Esteem factor and it was not retained. We than ran two additional EFA's specifying a five-factor solution, sequentially deleting low-loaders and any cross-loaders as defined above until low or cross-loading items were no longer observed (cf. Brown, 2006; Floyd & Widaman, 1995). This resulted in the deletion of 3 additional items with low loadings and 1 cross-loading item, leaving a total of 31 items. The factor pattern-rotated loadings for the final five-factor solution are presented in Table 1. In the final solution, all items loaded on their primary factor at an absolute value of .32 or higher with no cross-loaders, thus demonstrating excellent simple structure (Thurstone, 1947). Prior to rotation, the extracted factors accounted for 40.14% of the item variance.

Thus, the following 5 subscales were developed as unweighted unit (mean) composites: two were infant-oriented (Attachment and Crying as Communication) and three were parent-oriented (Minimization, Directive Control, and Spoiling). Intercorrelations of the scales, shown in Table 2, indicated that conceptually anchored infant and parent-oriented scales were generally associated with one another. Specifically the Attachment and Crying as Communication scales were moderately positively associated with each other and negatively associated with the Minimization and Spoiling scales, which were correlated with each other. The exception to this general pattern was the parent-oriented Directive Control scale which evidenced modest positive associations with both the infant-oriented Attachment scale and the parent-oriented Spoiling scale.

3.2 Reliability & Validity

Cronbach's α was calculated to determine the internal consistency of the ICQ scales. As Table 1 illustrates, the five retained ICQ scales had adequate to high internal consistency with Cronbach's α's at or above .70. To provide preliminary data on the convergent validity of the ICQ, correlations between the empirically derived ICQ scale scores and mothers' self-reported attributions for and emotional reactions to infant crying were examined (see Table 3). As anticipated, the infant-oriented Attachment and Crying as Communication scales were significantly positively related to mothers' positive/external attributions and to empathy whereas the parent-oriented Minimization, Spoiling, and Directive Control scales were significantly positively associated with mothers' emotion minimizing and negative attributions and negatively associated with maternal empathy in response to the videos of crying infants. Similarly, mothers' scores on the Minimization scale of the ICQ were positively associated with maternal anger in response to the video clips of crying infants.

To examine predictive validity, we examined the degree to which empirically derived ICQ scales were associated with observed maternal sensitivity at 6 months and mother-reported infant problem behaviors and social/emotional competence when infants were 1 year of age (see Table 3). As hypothesized, there were theoretically anticipated associations between empirically derived ICQ scales and observed maternal sensitivity. That said, we did not find evidence that ICQ scales were differentially associated with sensitivity to distress versus sensitivity to nondistress. More specifically, the Crying as Communication scale was positively associated with both sensitivity composites and the Directive Control and Spoiling scales were negatively associated with both sensitivity composites. Moreover, the

magnitude of association with observed maternal sensitivity was similar for the Crying as Communication and Spoiling scales, with slightly larger (negative) associations observed for the Directive Control scale.

With respect to mother-reported problem behaviors and social/emotional competence when their children were 1-year of age, we also observed theoretically expectable relations between the ICQ scales and mother-reported infant problem behavior (see Table 3). Specifically, the Minimization scale was negatively associated with mother-reported infant social and emotional competence. In contrast, the Minimization and Directive Control scales were significantly positively associated with mother-reported infant problem behavior symptomatology. With respect to associations between empirically derived ICQ scales and the externalizing, internalizing, and dysregulation item subsets from the larger problem behaviors scale, a significant negative association was observed between the ICQ Crying as Communication scale and mother reports of 1-year child externalizing symptomatology. In contrast, a significant positive association was observed between the empirically derived ICQ Minimization scale and mother reports of 1-year child externalizing problem symptomatology.

4. Discussion

In the current report, we examined the factor structure of the ICQ and provided evidence for its convergent and predictive validity. Exploratory factor analyses provided evidence for a 5-factor latent structure to the ICQ which revealed 2 conceptually anchored infant-oriented factors (Attachment and Crying as Communication) and 3 conceptually anchored parent-oriented factors (Minimization, Directive Control, and Spoiling). Each scale demonstrated satisfactory internal consistency. In addition, associations with concurrent measures of maternal cognitive and emotional responses to infant distress as well as associations with subsequent observed maternal sensitivity and mother-reported infant problem behavior furnished initial evidence for the convergent and predictive validity of the ICQ scales.

The empirically derived Attachment and Crying as Communication factors may be viewed conceptually as infant-oriented in that high scores on these factor scales indicate a prioritization of infant needs, desires, and well-being. These scales reflect the notion that crying, like negative emotion, serves adaptive functions and provides an opportunity for closeness, sentiments expressed by parents described as having an emotion coaching meta-emotion philosophy (Gottman, Katz & Hooven, 1996). In contrast, the Minimization and Spoiling factors may be conceptually viewed as parent-oriented in that higher scores on these factor scales indicate a prioritization of parent needs and well-being and a view that dependence on the parent should be de-emphasized. Lastly, the empirically derived Directive Control factor was identified and scaled. This factor comprised some items that Leerkes et al. (2010) had originally proposed as loading on Positive Adjustment, an infant-oriented scale (e.g., teach baby about emotions, how to get along with others, to control emotions) which may account for its modest positive association with the infant-oriented Attachment scale. However, the remaining items on this scale emphasize parent-directed and firm control of infant crying rather than an effort to scaffold self-regulation or other long-term skill acquisition (e.g., crying doesn't get you what you want; I am in charge). Considered as a set, these three parent-oriented scales reflect the notion that crying serves little purpose and efforts should be made to ignore, minimize, or control crying, sentiments expressed by parents described as having dismissing meta-emotion philosophies (Gottman, Katz, & Hooven, 1996; 1997).

The pattern of associations between ICQ scales and measures of mothers' causal attributions about and emotional responses to, infant distress supported the convergent validity of the

ICQ. That is, expectant mothers with more parent-oriented beliefs about crying reported feeling more angry and less empathic in response to videos of crying infants and made more emotion minimizing (i.e., the baby was hungry) and negative (i.e., the baby is difficult) attributions about crying. Although the infant-oriented scales were less consistently associated with mothers' emotions and attributions, observed correlations were consistent with expectation. That is, mothers with higher scores on the Attachment and Crying as Communication scales were more likely to attribute infant crying to reasonable and potentially accurate causes (i.e., the situation, the lack of assistance), and mothers with higher scores on the Crying as Communication scale reported feeling more empathy in response to the videos of crying infants. Although primarily modest in magnitude, this patterning of associations is consistent with prior theory and research linking cognitions and emotions broadly (e.g., the social information processing perspective; Crick & Dodge, 1994) and between parent cognitions and emotions as organizers of observed parenting emotions and behaviors specifically (e.g., Lorber, 2007; Leerkes et al, 2011, Teti and Cole, 2011).

Moreover, that prospective associations between empirically derived ICQ scales and subsequent observed maternal sensitivity and mother-reported infant problem behavior were theoretically and significantly associated provides support for the predictive validity of the ICQ. The associations between beliefs and observed sensitivity are consistent with prior findings that mothers with infant-oriented beliefs about crying responded more sensitively to infant distress (Crockenberg & McCluskey, 1986; Leerkes, 2010; Leerkes, et al., 2004), whereas adults with parent-oriented, negative beliefs about crying reported they would wait longer before intervening when an infant was crying (Zeifman, 2003). The associations between ICQ scales and later mother-reported social and emotional adaptation is consistent with evidence that beliefs about crying are linked with adaptive infant emotion regulation and attachment security (Leerkes et al., 2010), and with evidence that parents' emotion coaching meta-emotion philosophies are linked with fewer internalizing symptoms and less peer aggression among older children (Hooven, Gottman & Katz, 1995).

Interestingly, of the five empirically derived ICQ scales, the Attachment scale demonstrated the fewest associations that supported its concurrent and predictive validity. It may be the case that mothers' endorsement of Attachment scale items differentially predicts other outcomes, such as infant attachment security. Another possibility is that other factors may moderate the extent to which this scale is associated with later social and emotional outcomes. For example, mothers who show elevations on both the Attachment and Directive Control scales may be oversolicitous (Barnett et al., 2011), whereas mothers who are high on the Attachment scale and low on the Directive Control scale may be more sensitive which could moderate the extent to which Attachment beliefs predict child outcomes. Future work with the ICQ should examine these possibilities.

4.1 Limitations and Future Directions

Despite preliminary findings that the ICQ has high internal consistency and adequate convergent and predictive validity, the present investigation has limitations that should be addressed in future work with the ICQ. First, cross-validation of the proposed factor structure using confirmatory factor analytic techniques (CFA; Jöreskog, 1969) should be conducted in an effort to further substantiate the factor structure of the ICQ identified in this report. Secondly, the current sample is a community sample of mothers and their children. As such, examination of the psychometric properties and factor structure of the ICQ among both fathers and at-risk samples is necessary. Relatedly, it will be important to investigate the psychometric integrity of the ICQ as expectant mothers make the transition to motherhood as well as whether the uncovered factors load on the higher-order infant and parent-oriented dimensions of parenting behavior proposed by Dix (1991; 1992). Such work

will encompass both higher-order factorial modeling and examination of the factorial and longitudinal measurement invariance of the ICQ.

In summary, the current report is the first to empirically identify and validate the factor structure of the Infant Crying Questionnaire (ICQ). In so doing, the results of the analyses provide formal evidence for five underlying latent ICQ factors. Two of these factors, labeled Attachment and Crying as Communication, may be viewed conceptually as infant-oriented and three other factors, Minimization, Directive Control, and Spoiling may be viewed as parent-oriented. Preliminary validation of the empirically derived ICQ factor structure, both concurrently as well as prospectively, opens up exciting new avenues for researchers seeking to understand the antecedents and consequences of parental responses to infant and child distress for children's social and emotional adaptation. Demonstrated links between ICQ scales and subsequent maternal sensitivity and infant outcomes suggest the measure may also be a potentially useful screening tool for clinicians in identifying parenting risk.

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Highlights

- We investigate the factor structure of a new measure, the Infant Crying Questionnaire (ICQ).
- Five factors emerged encompassing both infant and parent-oriented views towards infant crying.
- Reliability and validity of the ICQ factor scales is reported.
- The ICQ is an efficient and useful measurement tool with both basic and applied versatility.

Table 1

Factor Pattern Loadings for the 31 Items Included in the Final Five-Factor Exploratory Factor Analysis (*Promax* Rotation) of TCS Infant Crying Questionnaire (ICQ) data ($N = 257$).

Factor name/ICQ Item	Factor				
	1	2	3	4	5
Attachment (α = .83)					
C17. Want to make baby feel safe.	**.85**	.09	−.13	.00	−.13
C15. Want to make baby feel better.	**.79**	.08	−.13	.06	−.01
C19. Want to comfort baby.	**.73**	.02	−.04	.08	.07
C3. Want to make baby feel secure/care for.	**.68**	.06	−.02	.04	−.05
R11. I will make baby feel like he/she can rely on me.	**.53**	−.10	.07	.01	.07
C1. Want baby to know he/she can rely on me for help.	**.52**	−.01	.12	−.11	−.10
R15. I will make baby feel like I care about he/she feels.	**.45**	.00	.25	−.05	.18
R7. I will make baby feel safe and secure.	**.45**	−.09	.20	−.13	.02
Minimization (α = .76)					
C16. Want baby to stop b/c I can't get anything else done.	−.01	**.68**	−.07	−.02	.07
C4. Want to make baby stop so others aren't disturbed.	−.01	**.65**	−.07	−.07	.17
C18. Want baby to stop b/c crying doesn't accomplish anything.	.01	**.62**	.17	−.08	−.05
C2. Want to make baby stop quickly, crying is a nuisance.	.06	**.58**	.02	−.13	−.02
C8. Want baby to stop crying b/c I am not sure right way to respond.	.13	**.51**	−.17	−.01	.00
C14. Thank baby is trying to control or manipulate me.	−.19	**.51**	.06	−.02	.04
C12. Think baby just wants attention.	.11	**.43**	.01	.11	.07
R10. I will let baby know there is no good reason to cry.	−.04	**.40**	.19	.05	−.09
R9. I will let baby know it's okay to be upset. (Ref.)	.15	**−.35**	.22	−.03	.13
Directive Control (α = .75)					
R21. I will teach baby how to get along with other people.	.01	−.21	**.74**	.00	−.02
R17. I will teach baby to control his/her emotions.	−.08	.05	**.68**	−.03	−.03
R16. I will teach baby that it's not okay to throw a fit.	.00	.22	**.53**	.11	−.17
R13. I will help baby move on to important things like learning and exploring.	.00	.08	**.52**	−.08	.13
R20. I will teach baby that crying doesn't get you what you want.	−.02	.11	**.49**	.28	−.17
R3. I will teach baby about emotions.	.08	−.10	**.43**	−.17	.14

Factor name/ICQ Item	Factor				
	1	**2**	**3**	**4**	**5**
R19. I will help baby move on to having fun.	.01	−.13	**.42**	−.01	.11
R4. I will let baby know I am in charge.	.07	.12	**.37**	.17	.02
Spoiling (α = .70)					
C21. Let baby cry it out so he/she doesn't get too spoiled.	.00	−.06	−.03	**1.0**	.11
C5. Let baby cry it out so he/she doesn't get too dependent on me.	.00	−.15	−.05	**.72**	−.03
R1. I could spoil baby.	−.01	.16	.13	**.40**	.06
Crying as Communication (α = .74)					
C9. Think baby is trying to tell me something.	−.16	.02	.05	.01	**.85**
C13. Think baby is trying to communicate with me.	.00	.15	.04	.06	**.77**
C20. Think baby is crying for a reason.	.17	.01	−.04	.06	**.58**

Note. Bolded factor loadings reflect retained items. For ICQ question stems, leading alpha character 'C' refers to stem asking respondent to imagine how they might *think* when their infant cries; leading alpha character 'R' refers to stem asking respondent to imagine thinking when *responding* to their infant cries. Ref = Item reflected when creating scaled composite.

Table 2

Intercorrelations among ICQ scales.

	ICQ				
	Attachment	**Crying as Communication**	**Scale Minimization**	**Directive Control**	**Spoiling**
Attachment	--				
Crying as Communication	.42**	--			
Minimization	−.32**	−.24**	--		
Directive Control	.25**	.04	.10	--	
Spoiling	−.22**	−.19**	.35**	.24**	--

Note.

** $p < .01$;

* $p < .05$.

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Table 3

Convergent and predictive associations between ICQ scales, mothers' pre-birth attributions regarding and emotional reactions to infant distress, observed maternal sensitivity at six months, and mother reported infant problem behavior symptomatology at 1 year.

	ICQ Scales				
	Attachment	**Crying as Communication**	**Minimization**	**Directive Control**	**Spoiling**
Parental Reactions to Crying					
Cry Attributions (N = 257)					
Minimizing	.05	−.10	.21**	.14*	.15*
Negative	−.06	−.14	.30**	.13*	.24**
Positive/External	.14*	.26**	−.07	−.05	−.13*
Emotional Reactions (N = 257)					
Empathy	.12	.26**	−.15*	−.12	−.20**
Anger	−.08	−.04	.14*	−.06	.01
Anxiety	.07	.03	.00	.03	.02
6-Month Maternal Sensitivity (N = 100)					
Sensitivity to Non Distress	−.08	.21*	−.06	−.42**	−.23*
Sensitivity to Distress	−.02	.23*	−.10	−.33**	−.20*
1-Year BITSEA					
Problem Behavior (N = 161)	.03	−.06	.27**	.24**	.13
Externalizing	−.13	−.18*	.33**	.09	.18*
Internalizing	.17*	.03	.17*	.18*	.06
Dysregulation	.01	−.02	.15	.19*	.03
Social/Emotional Competence (N = 162)	.09	.15	−.17*	.01	−.09

Note.

** $p < .01$;

* $p < .05$.