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Frightened Versus Not Frightened Disorganized Infant Attachment: Newborn Characteristics and Maternal Caregiving

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Abstract

The disorganized infant has been described as experiencing "fright without solution" (Hesse & Main, 1999, p. 484) within the attachment relationship. Using a sample at risk because of poverty (*n*=157), this study evaluated the role of newborn characteristics in predicting disorganized attachment and explored the existence of two subgroups of disorganized infants, based on whether they display direct indices of fear. For the entire sample, regression analyses revealed that newborn characteristics did not predict ratings of disorganization directly or via moderation by caregiving. Regarding subgroups, it was hypothesized that, if direct expressions of fear resulted from interaction with a frightening or frightened caregiver, it could be expected that infants in the Not Frightened subgroup would become disorganized in part because of other factors, such as compromised regulatory abilities at birth. Results supported this hypothesis for emotional regulation, but not for orientation; infants in the Not Frightened subgroup displayed limited emotional regulation as newborns. Findings suggest that the disorganized attachment category may be comprised of two subgroups, with direct expressions of fear as the key differentiating factor. Specifically, disorganized infants who do not display direct fear in the presence of the caregiver may have started out with compromised emotional regulation abilities at birth.

Attachment theory, put forth by Bowlby (1969/1979/1980/1982), posits that during the first year of life, the attachment behavioral system increases the likelihood that, in a situation of perceived danger, a child will tend to exhibit proximity-seeking behaviors toward a more competent protective figure. The Strange Situation, developed by Ainsworth and Wittig (1969), is a widely used laboratory procedure that enables assessment of individual differences in quality of attachment. The assessment is based on observation of the infant's reactions to a series of short separations and reunions with the mother in a novel room in which age-appropriate toys are provided to stimulate the child to explore.

This procedure has now been used in many different samples from different countries, and studies have found that there is indeed a correspondence between the type of caregiving provided by the mother and the quality of the infant's attachment behavior in the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978; De Wolff & van IJzendoorn, 1997). Approximately two thirds of infants are able to effectively seek proximity or interaction with

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the mother upon reunion and then return to explore the toys—a group that has been termed "securely attached" (Ainsworth et al., 1978). Prior research demonstrated that the mothers of securely attached children are more sensitive in responding to the child's signals in the home. Infants who are securely attached to their mothers are able to focus on the attachment figure until contact is achieved and, once their need for safety has been met, turn attention to the environment for exploration.

The remaining group is comprised partly of infants denoted as "insecurely attached" because they do not exhibit the attachment-exploration balance observed in secure children. These children either have great difficulty being settled (termed "anxious ambivalent" or "resistant") or show a tendency to avoid the mother upon reunion (termed "avoidant"). Prior research has shown that these patterns of insecure attachment are related to unpredictable responding by the mothers of anxious ambivalent children and rejection of signals of distress by the mothers of avoidant children (Ainsworth, Bell, & Stayton, 1971; Main & Stadtman, 1981). However, both secure and insecure infants are thought to exhibit "organized" attachment responses, i.e., their attachment is organized around identifiable patterns that are coherent.

In contrast, a portion of infants—as low as 15% in low-risk samples (Main & Solomon, 1990), and approximately 80% in maltreatment samples (Carlson, Cicchetti, Barnett, & Braunwald, 1989; Lyons-Ruth, Repacholi, McLeod, & Silva, 1991)—comprises a fourth attachment group termed "disorganized." Some examples of the disorganized attachment behaviors described by Main and Solomon (1990) in their coding scheme include: contradictory behaviors, such as a mixture of avoidance and resistance, or a direct approach followed by avoidance; misdirected or incomplete movements, such as moving away from (instead of toward) the parent when distressed, or failure to move toward the parent when distressed; anomalous postures, stereotypies and mistimed movements; freezing or stilling; and direct expressions of fear of the parent, or signs of confusion. Disorganized attachment places children at risk for negative outcomes, including behavior problems, internalizing and externalizing symptoms in childhood, and dissociation in childhood and at age 17 (Carlson, 1998; Lyons-Ruth, & Jacobvitz, 1999; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999).

Disorganized Subgroups

Some work has been done following up disorganized infants into childhood, and it has been found that they tend to exhibit subpatterns of disorganization in the form of controlling strategies. Main and Cassidy (1988) found that infants classified as disorganized in the Strange Situation at age 1 showed a pattern of responses following a 1-hr separation at age 6 that was notably different from those of organized infants. They described the children as falling into subgroups at age 6, both showing role-reversal with the child exerting control over the mother—the subgroup termed Controlling-Punitive directed the mother's behavior in a rejecting or humiliating manner, while the Controlling-Caregiving subgroup was inappropriately protective of the mother and offered her guidance. Similar findings regarding controlling subgroups in childhood have been reported with samples of children ages 3 and 5 (Moss, Cyr, Bureau, Tarabulsy, & Dubois-Comtois, 2005), 6 (Wartner,

Grossmann, Fremmer-Bombik, & Suess, 1994) and 8 (Bureau, Easterbrooks, & Lyons-Ruth, 2009). Some studies suggest a third subcategory of disorganized attachment in which the children are unable to maintain a consistent strategy and instead show confused, dissociated, or fearful behavior with the mother (Bureau, Easterbrooks & Lyons-Ruth, 2009; Moss, Cyr, Bureau, Tarabulsy, & Dubois-Comtois, 2005; see Moss et al., 2011 for review).

Unlike older children, infants have not been examined in terms of the different subtypes of disorganization that they display. Other authors have stated that disorganized infants do not display a coherent strategy in the Strange Situation, but rather exhibit “bouts or sequences of behavior which [seem] to lack a readily observable intention or explanation” (Main & Solomon, 1990, p. 122). Their behavior has been described as “odd, inexplicable” (Hesse & Main, 1999, p. 485). Perhaps this has moved researchers away from attempting to examine patterns in the attachment behavior of disorganized infants. However, the existence of subgroupings in later childhood suggests that disorganized infants may not be a unitary group; instead, this group may be comprised of different types of infants, who develop along differing pathways in their attempt to self-regulate in the presence of a disorganizing caregiver. Early identification of such patterns could yield more effective intervention strategies, as this heterogeneous group comes to be better understood.

Main and Hesse (1990, 1992) have pointed to a history of interaction with a frightening or frightened parent as the main antecedent to attachment disorganization. According to these authors, in a situation of perceived stress the attachment system is activated, leading the child to seek contact with his attachment figure. However, when the attachment figure, expected to provide safety, instead provides cues to danger, the infant may experience conflicting behavioral propensities of approach and withdrawal. Main and Hesse state that this is what leads to a breakdown at the level of behavioral strategies in disorganized infants, observed as misdirected, confused, and frightened behavior toward the caregiver.

Hesse and Main (1999) have described the central experience of the disorganized infant as one of “fright without solution” (p. 484). The authors explain that the attachment system represents the infant’s first protection against danger, and that therefore the attachment system is inextricably linked with the fear system. Given Main’s hypothesis regarding the frightening or frightened quality of the disorganized child’s experience with his attachment figure, direct signs of fear or apprehension are given special attention when coding for disorganized infant behavior in the Strange Situation. In fact, indices of disorganization are categorized along six dimensions in the coding scheme. Two of the six dimensions are indicative of direct expressions of fear or disorganization in response to the parent: direct indices of apprehension regarding the parent, and direct indices of disorganization or disorientation (Main & Solomon, 1990). Therefore, it is possible to distinguish among disorganized infants on the basis of whether they directly exhibit apprehension in the Strange Situation.

The field has yet to determine whether there are aspects of the infant’s behavioral expression early on that can be crucial in determining differences among those in the disorganized group. In this study, I examined the potential existence of two subgroups of infants with disorganized attachment. Specifically, I investigated the infant’s direct expression of fear

versus lack of expression of fear in the presence of the mother as a factor distinguishing subgroups of disorganized infants. Therefore, in the current study, infants who displayed direct fear were grouped together, while the remaining group predominantly displayed other disorganized or anomalous behaviors in the absence of direct fear or apprehension.

Newborn Characteristics

To date, studies have yielded mixed results concerning the role of temperament and other endogenous factors on the development of disorganization. In a meta-analysis, van IJzendoorn, Schuengel, and Bakerman-Kranenberg (1999) evaluated data from nine studies that included measurements of temperament as well as Strange Situation scores of disorganization with a sample of 1,790 infants. They found no association between difficult temperament and attachment disorganization. Additionally, there were no significant associations with medical or health problems such as cleft palate and brain injury (four studies). Further, after reviewing three studies to examine the association between disorganized attachment to both mother and father, the authors found a combined effect of r=.10 (n.s.). As argued by some attachment theorists, high concordance would be expected if child constitutional factors accounted for disorganization. The authors concluded that “there is no reason to assume that disorganized attachment is the consequence of the infant’s difficult temperament” (Van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999, p. 234).

Spangler et al. conducted a study that combined two longitudinal samples (*N*=86). This study used the Strange Situation, the Brazelton Neonatal Assessment Scale (NBAS, Brazelton, 1984), and also measured maternal sensitivity during the first year of life (Spangler, Fremmer-Bombik, & Grossmann, 1996). Results showed that newborn behavioral characteristics predicted disorganized attachment status, with newborns in the disorganized group displaying lower orientation and emotional regulation (measured using subscales created by the authors by combining original Brazelton items). The authors interpreted these findings as evidence that “the security dimension may represent the relationship part within attachment. In contrast, signs of disorganization during the Strange Situation may be because of a somewhat lower behavioral regulation ability, which can already be observed during the newborn period” (Spangler, Fremmer-Bombik, & Grossmann, 1996, pp. 136–137).

A previously published longitudinal study using the current study’s data (Carlson, 1998) found no association between endogenous variables —such as infant anomalies, Brazelton (1984), and Carey (1970) scores— and attachment disorganization. Specifically, contrary to Spangler et al.’s findings, Carlson found that NBAS *global* scores did *not* relate to disorganization. However, Spangler et. al (1996) did not use NBAS global scores, but rather constructed subscales regarding orientation and emotional regulation, which they found to be significantly associated with disorganization. One of the aims of the present study was to replicate the methodology used by Spangler et al., with the same sample used by Carlson, to clarify whether differing operational definitions or different samples might account for contradictory findings.

Further, a specific hypothesis was examined with respect to potential subgroups of disorganized infants. Given the primacy generally attributed to caregiving experience in the prediction of attachment patterns, it was expected that, if indeed there are newborn endogenous characteristics that predict attachment disorganization in infancy, this prediction would not hold for the disorganized group as a whole. If direct expressions of apprehension are thought to be the result of interaction with a frightening or frightened caregiver, then those infants who displayed contradictory or anomalous behaviors in the absence of fear might have become disorganized in part because of compromised regulatory abilities at birth. Therefore, it was expected that the prediction based on newborn characteristics would only hold for disorganized infants who primarily displayed disorganization in the absence of fear. Newborn measures were evaluated in the current study with regard to their ability to predict both the Disorganized-Not Disorganized attachment grouping, as well as Frightened-Not Frightened disorganized subgrouping.

Maternal Caregiving

Developmental theorists have placed great emphasis on the role of the attachment figure as a regulator of experience for the developing child. It is within the context of the caregiving relationship that the child begins to form expectations about the future and to develop strategies for emotional regulation. Therefore, the key to advancing our understanding of attachment disorganization lies in the study of the dynamic interplay between the child's and the parent's capacities to organize their emotional experience.

Maternal sensitivity has not fared as well in predicting disorganized attachment as it has fared in predicting organized attachment categories. In fact, Spangler et al. (1996) found that maternal sensitivity predicted attachment security versus insecurity, but not attachment disorganization. Further, in a meta-analysis, van IJzendoorn, Schuengel, & Bakermans-Kranenberg (1999) reported that the correlation between parental insensitivity and infant disorganization across nearly 2000 parent-child dyads was "significant but small" ($r=.10$, $p< .004$). They concluded that "within the normal, non-clinical range of parenting, insensitive parental behavior does not seem to be sufficient to evoke disorganized attachment" (p. 243). More recently, Out, Bakermans-Kranenburg, and van IJzendoorn (2009) also found that extreme maternal insensitivity was not predictive of attachment disorganization. Therefore, it appears that caregiving insensitivity alone does not seem to hold the key to understanding the development of disorganized attachment.

Main and Hesse (1992) devised guidelines for coding frightening maternal behavior to examine its predictive role with regard to disorganized attachment. Examples of behaviors considered in the coding system include: directly frightening behaviors (such as looming or sudden movements toward the infant's face and eyes), frightened behavior (backing away from the infant and startle responses to the infant's movements), and dissociated behaviors (trance-like positions or sudden changes in voice pitch). There is indeed evidence in support of the hypothesis that maternal frightening behavior predicts infant disorganization (Abrams, Rifkin, & Hesse, 2006; Schuengel, Bakermans-Kranenburg, & van IJzendoorn, 1999; True, Pisani, & Oumar, 2001).

Lyons-Ruth, Bronfman, and Parsons (1999) examined additional atypical caregiving behaviors in association with attachment disorganization and termed them “affective communication errors.” These behaviors included competing caregiving behaviors (both eliciting and rejecting of the infant), role confusion, and intrusiveness. The authors found that the mothers of disorganized infants displayed elevations in both frightening behaviors and affective communication errors. Madigan et al. (2006) and Madigan, Moran, and Pederson (2006) also found that the mothers of disorganized infants displayed affective communication errors or anomalous behaviors. The authors suggest that the two systems should be seen as complementary. However, Madigan et al. (2006) state that only a small portion of the variance in disorganization is explained by anomalous maternal behavior; they recommend that other parental and infant factors need to be evaluated with respect to their potential role in the development of disorganization. This evidence indicates that maternal caregiving relevant to the development of disorganization may include several different kinds of behaviors that bring about fear or confusion in child-caregiver interactions, and that new aspects of maternal behavior also need to be explored.

In a previous study using the same sample as that of the current study, Carlson (1998) used a combined index of Ainsworth’s Sensitivity/Insensitivity and Cooperation/Interference scales (Ainsworth, Blehar, Waters, & Wall, 1978) and found that it significantly predicted disorganized attachment. The two scales were highly correlated with each other as well. It is likely that this combined index offers a broader and more robust measure, and I propose that this may be especially because of its inclusion of interference as a potentially disorganizing maternal behavior.

The Sensitivity/Insensitivity Scale was designed by Ainsworth (1969) to measure “the mother’s ability to perceive and to interpret accurately the signals and communications implicit in her infant’s behavior, and given this understanding, to respond to them appropriately and promptly” (p. 2). An insensitive mother lacks awareness and understanding of her infant’s subtle signals; she could miss the signals altogether and fail to provide a response, provide a delayed response, or ineffectively respond in a way that does not meet the child’s needs.

In contrast, low scores on Ainsworth’s (1969) Cooperation/Interference scale are assigned when “the mother’s interventions or initiations of interaction break into, interrupt or cut across the baby’s ongoing activity” and when she displays behavior that is “instructing, training, eliciting, directing, controlling” (p. 5). Therefore, even though it is to be expected that these two scales would be related to one another, they appear to be tapping two theoretically distinct dimensions. It is possible that, by interrupting naturally occurring cause-and-effect sequences of events in the child’s experience, maternal interference may render the child confused regarding the origins and effects of his own behavior and that of the caregiver, thereby yielding disorganized behavioral patterns. In the current study, it was evaluated whether this combined caregiving index played a role in moderating the effects of newborn characteristics on disorganized infant attachment.

In sum, this study explored three questions: (a) Do newborn endogenous characteristics, as operationalized by Spangler et al. (1996), predict Disorganized versus Not Disorganized

attachment status in the current sample?; (b) Does caregiving serve as a moderator of the effects of newborn characteristics on later attachment disorganization?; and (c) Do newborn characteristics differ between subgroups of disorganized infants, created on the basis of their Strange Situation behavior, with infants in the Not Frightened subgroup exhibiting significantly lower orientation and emotional regulation than those in the Frightened subgroup?

Method

Participants

Participants were drawn from a larger sample of the Minnesota Longitudinal Study of Risk and Adaptation, a prospective longitudinal study of risk and adaptation (Egeland & Brunnquell, 1979). The original total sample consisted of the first-born children of 267 women (ages 12 to 34 years) who received care at public health care clinics in Minneapolis between the years of 1975 and 1977. A majority of the mothers were single (68%), 39% had not completed high school, and 36% were unemployed when their infants were born. In the original sample, 80% of the mothers were European American, 13% were African American, and 7% were Asian, Latino, or Native American.

Participants in the current study consisted of a subsample of 157 infants (92 males, 65 females) for whom ratings of attachment disorganization were available during infancy at either 12 months (n = 122), or 18 months (n = 83). A longitudinal study of disorganized attachment based on the current subsample was previously published by Carlson (1998). As reported by the author, this subsample was found to be representative of the larger original sample, both with regard to demographic factors and attrition.

Procedures

Newborn characteristics—The Neonatal Behavioral Assessment Scale (NBAS) (Brazelton, 1973) was administered in the home when infants were 7 and 10 days old. The NBAS consists of 27 behavioral items rated on a 9-point scale and 17 reflex items rated as low, medium, or high. The items cover areas such as habituation to visual, auditory, and tactile stimuli; orientation toward visual and auditory stimuli; alertness, muscle tone, irritability, activity, and consolability. Five examiners administered the NBAS. Two of the examiners were trained by Brazelton associates, and three examiners established reliability with the trainees (no more than one disagreement on reflex items or no more than one scale score disagreement of more than one point). Using the previously stated criteria, interrater agreement of the two main examiners trained by Brazelton was .93 based on 67% of the cases from the total sample.

Following the procedures outlined by Spangler, Fremmer-Bombik, and Grossmannn (1996), two measures were created by averaging item scores: (a) orientation to external stimuli (e.g., inanimate and animate visual, auditory and visual auditory orientation, and alertness) and (b) emotional regulation (e.g., cuddliness, consolability, self-quieting, irritability, and lability of states). Original scale scores were first z-scored and then averaged to produce each measure. For the emotional regulation measure, the arousability scales, which were negatively poled,

were first inverted, then z-scored, and finally averaged. The mean of z-scores on each of these two measures was calculated for each infant, yielding two measures of newborn characteristics, intended to be indicative of the newborn's ability to cope with external stimuli (orientation) and internal stimuli (emotional regulation).

It should be noted that there were fewer infants for whom emotional regulation scores (n=92), as opposed to orientation scores (n=130), were available, for whom disorganization was also assessed. It is unclear what the reason is for this difference. As explained previously, these were not part of the original measure, but were instead constructed by Spangler et al. (1996) by combining individual items. It is possible that the subsample restriction was because emotional regulation behaviors were especially challenging to code, and therefore many items that composed this measure could simply not be scored for some infants in this sample. Alternatively, this result could have been because of chance, given that the current subsample required both disorganization and newborn characteristics to have been assessed longitudinally.

Maternal caregiving—When infants were 6 months of age, they were observed in feeding and play interaction with their mothers in the home. Dyads were observed for 30 min during two feeding situations, and for 20 min during a standardized play situation. During the play situation, mothers were first asked to engage in physical play with the infant. Following this, mothers were asked to teach the infant how to pull on a string attached to a toy truck to retrieve the toy truck. Finally, mothers were asked to engage in free play with the infant using several toys.

Maternal sensitivity: Interactions were rated according to Ainsworth's Sensitivity/ Insensitivity scales (Ainsworth, Blehar, Waters and Wall, 1978). Scores on the 9-point Sensitivity scale were used as a measure of maternal awareness of and responsiveness to infant signals. Interrater agreement (defined as a discrepancy of two points or less), based on 24 cases, for the sensitivity/insensitivity scale was .60 (see Carlson, 1998, for details).

Maternal cooperation: Interactions were rated according to Ainsworth's Cooperation/ Interference scales (Ainsworth, Blehar, Waters and Wall, 1978). The 9-point cooperation/ interference scale is designed to assess the extent to which the mother's behavior breaks into, interrupts, or cuts across the infant's ongoing activity, rather than adapting to the baby's timing and interests. Scoring on this scale considers both the extent of actual physical interference and the frequency of interruptions. Interrater agreement (defined as a discrepancy of two points or less), based on 24 cases, for the cooperation/interference scale was .80 (see Carlson, 1998 for details).

Combined caregiving scores: Sensitivity/Insensitivity and Cooperation/Interference scores were highly correlated with each other (r=.80, p<.001). Scores were averaged to create a combined index.

Infant disorganized attachment—Mother-child attachment was assessed at 12 and 18 months using the Strange Situation (Ainsworth & Wittig, 1969), a widely used standardized sequence of eight episodes involving brief separations from the mother and contact with a

stranger. Initially, dyads were classified solely according to Ainsworth's guidelines (Ainsworth, Blehar, Waters, & Wall, 1978) and were based on the infant's response to the stress of separation, response to reunion, and response to the stranger, with and without the mother present. Each dyad was categorized at each of the two assessments as secure, insecure-avoidant, or insecure-resistant.

Once the coding system for disorganization became available (Main & Solomon, 1990), dyads whose videotaped assessments (at either 12 months or 18 months) remained in good condition were also coded for disorganization. Of the 157 dyads, 74 had 12-month assessments, 35 had 18-month assessments, and 48 had both 12- and 18-month assessments. The percentages of infants classified as disorganized were 35% at 12 months and 43% at 18 months.

Indices of disorganization/disorientation included in the Main and Solomon (1990) coding scheme are divided in seven categories: (a) sequential display of contradictory behaviors, (b) simultaneous display of contradictory behaviors, (c) undirected, misdirected, incomplete, or interrupted behaviors, (d) stereotypies, asymmetrical movements, mistimed movements, and anomalous postures, (e) freezing, stilling and slowed movements, (f) direct indices of apprehension regarding the parent, and (g) direct indices of disorganization or disorientation.

Continuous ratings of disorganization: Disorganization was rated on a 9-point scale, yielding a continuous score. Coders were trained by Mary Main, and interrater agreement was 86% based on 35 cases, with a Kappa of .72. In cases where assessments were available at both 12 and 18 months, the highest rating assigned across both time points was used (per personal communication from Mary Main, as cited in Carlson, 1998). For this sample, with both 12 and 18 months ratings available, scores for disorganization were positively correlated (see Carlson, 1998, for details).

Disorganized versus Not Disorganized groups: A categorical disorganization score was calculated by assigning the "D" classification to infants who scored 5 or higher on the 9-point continuous scale. "Not D" was assigned to those scoring 1–4.

Frightened versus Not Frightened subtypes of disorganization: Subtypes of disorganization were created by dividing infants in the disorganized group *only* (ratings of 5 or above) into two groups. Presence or absence of direct indices of fear were used as the critical factors for classification, yielding two disorganized subgroups: presence of direct fear ("frightened" group) versus absence of these direct indices ("not frightened" group).

The Frightened group was comprised of infants who exhibited disorganized behaviors directly, connoting apprehension toward the parent or behavioral disorganization clearly related to the parent. Such behaviors are listed in the last two categories of the Main and Solomon (1990) coding scheme: direct indices of apprehension regarding the parent and direct indices of disorganization or disorientation. The Direct Indices of Apprehension Category includes behaviors such as jerking back or flinging hands about face or dashing away upon parent's entrance with fearful expression, fearful expression while being picked up by parent, moving out of parent's sight –such as behind a piece of furniture- without

rationale, offering objects to parent with a tense arm and from a distance, a hesitant approach to parent followed by a tense and rapid move away, tensing shoulders when parent approaches or makes contact, and a vigilant posture in parent's presence. The Direct Indices of Disorganization or Disorientation category includes behaviors such as greeting or approaching stranger brightly upon parent's return, flinging hands near face in response to parent's return, raising hands to mouth with confused or wary expression upon parent's return, confused sequences of rapid affective change, unexplained falls while approaching parents, disorganized wandering with a disoriented expression, and disoriented facial expressions.

The Not Frightened group was comprised of infants who did not display any of the direct indices of fear or disorientation described above. Instead, they displayed contradictory behaviors (such as strong anger or clinging followed by avoidance, or approaching parent in a parabolic pathway), misdirected or incomplete movements (such as moving away from parent while distressed, failure to approach parent when crying, withdrawing hand quickly just before touching parent, interrupting approach by falling prone to the floor), stereotypes, asymmetrical movements, mistimed movements and anomalous postures, freezing, stilling and slowed movements. Note that infants in the Frightened group may have also exhibited some anomalous behaviors in conjunction with the indices of fear.

Results

Preliminary Analyses

Sixty-two infants were classified as Disorganized (39.5%), while 95 were classified as Not Disorganized (60.5%). Pearson product-moment correlations were calculated among study variables. Newborn Orientation was significantly related to Newborn Emotional Regulation (r=.308, p< .001). This correlation was moderate, suggesting that, while the two measures are related, they are likely measuring different constructs.

In terms of the relationships between newborn characteristics and caregiving, the only significant analysis was a negligible correlation between caregiving and newborn orientation (r=.155, p< .05). Disorganization ratings were only correlated to caregiving (r= −.351, p< .001) and not to newborn characteristics.

Disorganized versus Not Disorganized Groups

Analyses were conducted to replicate those performed by Spangler et al. (1996), examining the relationship between newborn characteristics and disorganized attachment status. Spangler and colleagues performed a MANOVA using both newborn measures as independent variables. However, I elected to perform two separate ANOVAS, one for each newborn variable, because the number of cases for which both emotional regulation and disorganization were scored was notably smaller than that for orientation. When the ANOVA was based on unequal cell sizes, or when the assumption of homogeneity of variances was violated, robust F statistics are reported.

Results showed no significant differences in the means of disorganized and not-Disorganized groups on newborn orientation, F (1,128) = 0.27, p=.869. Results were

similarly nonsignificant for emotional regulation F (1,90) = .008, p=.931. Therefore, findings differed from Spangler et al.'s (1996).

Moderation Analyses

A regression analysis was performed to evaluate the relative contributions of newborn characteristics and caregiving in the prediction of ratings of disorganization, as well as to evaluate whether caregiving served as a moderator of the effect of newborn characteristics on disorganization. Newborn orientation and emotional regulation were entered together in the first step, and caregiving was entered in the second step. Finally, the interaction terms between newborn measures and caregiving were entered in the third step.

Results revealed that, when considered simultaneously, newborn orientation and emotional regulation did not predict ratings of disorganization. When considered in conjunction with caregiving in the same step, only caregiving was predictive of disorganization. Finally, the regression analysis showed that caregiving did not serve as a moderator of the effect of newborn characteristics on disorganization (see Table 1).

Frightened versus Not Frightened Disorganized Subtypes

In order to examine the relationship between newborn variables and subtypes of disorganization (Frightened vs. Not Frightened groups) two One-way Analyses of Variance (ANOVAs) were performed using disorganized subtype as the independent variables and newborn orientation and emotional regulation as the dependent variables. A MANOVA was not performed because of a violation of the assumption of homogeneity of variances in orientation only for which the robust F statistics is reported.

No significant group effects were found for orientation, F (1,48) = 1.533, p=.223. However, significant group differences were found for emotional regulation, with the Not Frightened group scoring significantly lower than the Frightened group, F (1,35) = 9.190, p<.01. Therefore, the hypothesis that newborn characteristics would be lower specifically for the Not Frightened group was partially supported, for emotional regulation only.

Discussion

The principal aim of the current study was to evaluate whether two subgroups of disorganized infants exist, based on the types of disorganized behaviors they display in the Strange Situation. Given Main's theoretical description of the disorganized infant as experiencing "fright without solution" (Hesse & Main, 1999, p. 484), it was thought that the presence of direct indices of fear in the Strange Situation could be a key to distinguishing among subgroups of disorganized infants. It was proposed that if endogenous infant characteristics did indeed predict disorganized attachment, they would do so only for a subgroup of disorganized infants, the Not Frightened subgroup. This was based on the hypothesis that the direct indices of fear and apprehension displayed by infants in the Frightened group were more likely to have emerged in response to exposure to frightening caregiving behavior from the external environment. On the other hand, it was thought that infants who primarily displayed other disorganized behaviors, in the absence of fear, might have been more likely to have had compromised internal regulatory abilities at birth.

Findings did support the hypothesis that the Not Frightened subgroup of disorganized infants displayed significantly lower newborn characteristics scores, specifically for the dimension of emotional regulation, though not for orientation. It is noteworthy that this difference was found despite the relatively small number of disorganized infants in this group (*n*= 37). Interestingly, Spangler et al. (1996) explained that the orientation score was a measure of the newborn's ability to cope with external stimuli, while emotional regulation measured the ability to cope with internal stimuli. Results of the present study suggest that the subgroup of Not Frightened disorganized infants may have had a compromised capacity to manage internal stimuli at birth. Their pathway into disorganized attachment later in infancy may therefore have been different from that of infants who displayed fear or apprehension in the presence of the mother. Presumably, this lends credence to the hypothesis that infants who display direct fear may do so as a result of exposure to frightening external stimuli provided by the caregiver (though this possibility was not directly tested in the current study). Future studies with larger samples should examine temperamental differences among the two disorganized infant subgroups to further increase confidence in this finding.

In contrast to results regarding disorganized subgroups, findings on newborn characteristics were not significant with regard to the disorganized group as a whole. In the present study, newborn characteristics did not predict disorganized attachment status. Furthermore, newborn characteristics scores did not predict continuous ratings of disorganization, nor did they interact with caregiving to predict disorganization. Therefore, results of this study did not support the findings of Spangler et al. (1996), who reported that both newborn orientation and emotional regulation were associated with Disorganized versus Not Disorganized classifications. Hence, it appears that differing methodology in the two studies did not account for contradictory results. Recently, and based in part on the findings of Spangler et al. (1996), Spangler (2011) concluded that "attachment disorganization might also be conceived as an, at least partly, individual construct, in contrast to attachment security being perceived as a relationship characteristic" (p. 115). However, given that a meta-analysis of nine studies failed to find a connection between newborn measures and overall disorganization (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), and that the current study failed to replicate Spanger et al,'s (1996) results, extant research does not appear to support the claim that newborn characteristics play an important role in the development of disorganization as a whole. The current study does suggest that emotional regulation, specifically, may play a role in the development of disorganization for a subgroup of disorganized infants.

Regarding caregiving, in the current sample, a combined index of sensitivity and cooperation was directly associated with disorganization –a result that was first reported by Carlson (1998) – and did not serve as a moderator of the effects of newborn characteristics on disorganization. Results from this study support the possibility that maternal interfering behaviors may contribute to the development of disorganization. Ainsworth (1969) stated that "the highly interfering mother has no respect for her baby as a separate, active, and autonomous person, whose wishes and activities have a validity of their own" (p. 5). This author described interfering maternal behavior as being arbitrary from the infant's

perspective and potentially alien to the infant's ongoing activity or mood and, therefore, incomprehensible (Ainsworth et al., 1978).

These qualities of maternal interference may compete with the infant's strivings to abstract a coherent sense of self. During the vulnerable infancy period, when the child's sense of self is beginning to emerge, he is dependent on exploring the contingencies of the environment, including those related to interactive social behavior, to internalize a coherent understanding of himself and the world. Regularities in experience are indeed crucial to the basic organization of the self (Sroufe, 1989). The self can be seen as both the process which allows for, as well as the structure which results from, the integration of experience into a coherent organization (Ryan, Deci, & Grolnick, 1998). Therefore, when the naturally occurring effects of the child's behavior are interrupted or broken into by the attachment figure, it is possible that the child may have great difficulty abstracting coherent working models of himself and the world around him. Interaction with a highly insensitive and interfering caregiver is likely characterized by incoherent cause-and-effect sequences that cannot be internalized into a coherent working model of attachment. This is consistent with the notion that disorganized or unresolved states of mind are characterized by confusion, contradiction, and dissociation.

It should be noted that, although the present study included observational measures of maternal sensitivity and interference, it was limited in that other behaviors that have been implicated in the development of disorganization, such as frightening or frightened maternal behaviors, were not measured. Studies with measures of disorganized infant attachment that have also coded frightening or frightened (Main & Hesse, 1992–2005) and atypical maternal behaviors (Bronfman, Parsons, & Lyons-Ruth, 1999), could test whether the Frightened subgroup is indeed exposed to more frightening and hostile maternal behavior. Additionally, future studies should explore whether caregiving behaviors other than insensitivity and interference interact with this newborn emotional regulation vulnerability in a manner that places an infant in a pathway leading to disorganized attachment.

Given the results of the present study, as well as the central role of fear in the development of disorganized attachment, the presence or absence of the infant's direct expressions of fear in response to the caregiver might merit further examination. Further, limited newborn emotional regulation abilities may place a subgroup of infants at risk for later disorganization. The hope is that the results of this study can contribute to our understanding of the multiple developmental pathways implicated in this heterogeneous infant attachment category, and that this can then be translated into more effective early intervention efforts.

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Table 1

Multiple regression analysis for newborn characteristics and caregiving predicting ratings of Disorganization (*N*=76)

Predictor	ΔR^2	*B*	*SE*	β
Step 1	.002			
Orientation		.126	.370	.044
Emotional Regulation		.017	.656	.003
Step 2	.083*			
Orientation		.223	.359	.077
Emotional Regulation		.036	.633	.007
Caregiving		−.427	.167	−.291*
Step 3	.006			
Orientation		−.693	1.483	−.240
Emotional Regulation		−.040	3.094	−.008
Caregiving		−.451	.185	−.307*
Orientation X Caregiving		.163	.256	.331
Emotional Regulation X Caregiving		.009	.518	.010

* $p<.05$.