

ASSESSMENT OF REPRESENTATIONAL RISK (ARR)

The Assessment of Representational Risk (ARR): Development and Psychometric Properties of a New Coding System for Assessing Risk in the Parent–Infant Relationship

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Abstract

There are few clinically valid tools that can be used to assess potential parent-infant relational risk. This study describes the development and initial validation of the Assessment of Representational Risk (ARR) coding system to be applied to the Parent Development Interview (PDI; Slade et al., 2004) for assessing potential risk in caregivers' representations of their infant, themselves as parents, and their relationship. The ARR was developed and validated in three samples in England. A review of the literature informed the selection of 10 items. It had a 3-factor structure which was used to inform subscales: Hostile, Helpless and Idealizing caregiving representations. The subscales and total risk scores showed good criterion validity for discriminating between high and low risk samples, and good concurrent validity with measures of parental psychopathology and parent-infant interaction. The ARR is a potentially valuable coding system for identifying risk in early attachment relationships.

Keywords: Parenting assessment, parental representations, parent-infant relationship, Parent Development Interview, disorganized attachment

Key findings and implications:

1. The ARR is a promising new coding system that can detect potential difficulties in early parent-infant relationships.
2. Three typologies of parental representations were found to signify relational problems: Hostile, Helpless and Idealizing.

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3. Idealizing representations, characterized by extreme idealization and role reversal in how the child is seen by the parent, are unlikely to be detected by parent-report methods but are clinically important indicators of risk.

Statement of relevance to infant and early childhood mental health: Psychometrically robust methods for assessing possible risk in early parent-infant relationships can inform clinical decision-making and research relating to infant mental health. The ARR is derived from theoretical and empirical literature relating to disorganized attachment and is designed to identify those infants most at risk of later psychological and social difficulties. This can aid the early detection of problems and provision of targeted support.

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The Assessment of Representational Risk (ARR): Development and Psychometric Properties of a New Coding System for Assessing Risk in the Parent–Infant Relationship

The early identification of disruptions in parent-infant relationships is a priority for health and social care services (Judd et al., 2018). It has been well established that caregiving representations are central organizers of caregiving behavior (Bretherton & Mulholland, 2008), and that distortions and disruptions in caregiving representations are associated with relational risk (Dayton et al., 2010; George & Solomon, 2008a; Guyon-Harris et al., 2021; Huth-Bocks et al., 2011, Solomon & George, 2006), and – in particular - with disorganized attachment. To date, however, there are few clinically valid methods for evaluating parent-infant relational risk. In this paper, we describe an approach to assessing relational risk that is based upon an evaluation of parental caregiving representations using the Parent Development Interview (PDI; Slade et al., 2004). The Assessment of Representational Risk (ARR) identifies those risks in parental representations of themselves as caregivers, their child, and their relationship to that child that are specifically associated with infant disorganized attachment. We begin by describing the theoretical and empirical bases for the instrument and the process of its development. We then describe an evaluation of the ARR's psychometric properties; specifically its factor structure, as well as tests of criterion and concurrent validity.

Caregiving Behavior and Disorganized Attachment

Infant disorganized attachment is highly prevalent among high-risk groups and strongly predicts later psychopathology (Carlson, 1998; Cyr et al., 2010; Lyons-Ruth & Jacobvitz, 2008). It is now well established that caregiver behavior that is frightening to the child is what leads to

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disorganized attachment (Main & Hesse, 1990). Features of parenting behavior, such as sensitivity, that distinguish between securely and insecurely attached infants have been shown to be relatively weak indicators of more extreme relational risk and attachment disorganization (van IJzendoorn et al., 1999). Instead, studies show that caregiving behavior that heightens infants' fear or distress is what precedes attachment disorganization. Frightening, frightened, and/or dissociative caregiving behavior (FR behavior; Hesse & Main, 2006; Main & Hesse, 1990; Schuengel et al., 1999), or disoriented, role-confusing, affectively contradictory, intrusive, and withdrawn behaviors (Goldberg et al., 2003; Lyons-Ruth et al., 1999; Madigan et al., 2007) are all associated with disorganization.

Adult Attachment Representations and Disorganized Attachment

Key mechanisms underpinning the behavioral correlates described above are mental representations of attachment relationships. Current research shows that Hostile and Helpless states of mind are clearly associated with disorganized attachment. Lyons-Ruth and colleagues (2005) developed the Hostile-Helpless (HH) coding system for the Adult Attachment Interview (AAI; George et al., 1984) to elucidate the mechanisms underpinning attachment disorganization. The HH coding system picks up on contradictory but unintegrated states of mind in evaluating relationships with one or more globally devalued attachment figures. HH states of mind are highly predictive of parental anomalous behaviors and infant disorganization (Finger et al., 2015; Lyons-Ruth et al., 2005) and subsequent risk to the next generation (Barone et al., 2014). Presumably, such internal working models that are based on the caregiver's disrupted attachment experiences are the intergenerational driving force for the atypical behavior observed in parents of disorganized infants. More recently, researchers have applied the HH coding to the Pregnancy Interview (PI; Slade, 2011) and found that prenatal HH states of mind predicts child

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removal within two years following the birth of the child (Terry et al., 2020). Thus, unintegrated hostile and helpless attachment representations appear to be good indicators of potential relational risk. However, the research into HH states of mind has, to date, focused on either parents' rather stable representations of their own childhood relationships (AAI) or prenatal representations of the unborn baby (PI) and not the current parent-child relationship in the postnatal period that is most usually of clinical concern.

Caregiving Representations and Disorganized Attachment

Several coding protocols have been developed also for assessing parents' representations of themselves as caregivers to a specific child and of that child (e.g., Biringen & Bretherton, 1988; George & Solomon, 2008b; Oppenheim & Koren-Karie, 2002; Slade et al., 1999; Slade, Bernbach, et al., 2004; Zeanah et al., 1986). However, some of these coding systems were developed before the concept of attachment disorganization was widely described in the literature (Biringen & Bretherton, 1988; Zeanah, et al., 1986). Hence, although these measures are associated with child attachment security and maternal sensitivity (Biringen et al., 2000; Zeanah et al., 1994), they may not be sensitive in detecting representational features that underlie the most high-risk (disorganized) attachment relationships.

Some of the most promising recent research into parental representations has been in the assessment of the capacity for mentalization, assessed by the Reflective Functioning (RF) coding system (Fonagy et al., 1998; Slade, Bernbach, et al., 2004). This measure has been linked with several other indicators of risk in the parent-infant relationship, such as insecure/disorganized attachment and disrupted maternal behavior linked with infant disorganization (Grienenberger et al., 2005). Although RF provides a valuable insight into the parent's capacity to engage with their child's mind, the coding system is unidimensional, and it yields only a single overall score.

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Two interview transcripts may yield the same overall RF score, but they can show qualitatively very different representational content and the dyads may require very different intervention strategies. This is particularly the case in high-risk cohorts where the parent's capacity for mentalization is moderate to low in the vast majority of cases (Sleed et al., 2018).

Some coding systems have been developed for assessing features of caregiving representations that are likely to be linked with attachment disorganization, and they have shown promising results in the prediction of risk. For example, Crawford and Benoit (2009) applied Lyons-Ruth's and colleagues (1999; 2005) conceptualization of disrupted caregiving behavior (including FR behaviors) to formulate a "disrupted" representation classification for the Working Model of the Child Interview (WMCI; Zeanah, Benoit, & Barton, 1986). They showed that prenatal disrupted representations were associated with both anomalous caregiving behaviors and child disorganized attachment at the age of 12 months. In addition, using a modified version of the Parent Development Interview (PDI; Slade et al., 2004), George and Solomon showed that "segregated systems" of parental representations (either flooded: out of control and helpless, or constricted: dissociated/ splitting and glorification) predicted child disorganized attachment at age six (George & Solomon, 2008a; Solomon & George, 2006).

The problem

As important as this work has been, the need for a clinically useful way of evaluating parental caregiving representations remains. The Crawford & Benoit and George & Solomon coding systems are complex and require extensive training and prior knowledge of attachment and developmental psychopathology. Thus, such instruments tend to be used more in attachment research settings than in clinical work with families. Another drawback for many existing measures is that they categorize the parental representations into somewhat artificial typologies,

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synonymous with attachment classifications. The usefulness of such categorical representations has been questioned (Fraley & Spieker, 2003), and the need to use continuous variables in analyzing representations in high-risk groups has been emphasized (Isosävi et al., 2016). Discrete clusters of caregiving representations do not provide the depth of information that can inform clinical assessments and intervention.

The current study presents a new screening tool for the assessment of risks in parents' caregiving representations. The aim is to provide researchers and practitioners with a comprehensive multi-dimensional coding system that not only detects the content, but also the severity of the representational risks.

Development of the Assessment of Representational Risk (ARR) Coding System

The Assessment of Representational Risk (ARR) was developed to be applied to the Parent Development Interview (Slade et al., 2004), a semi-structured clinical interview that asks parents to reflect upon their relationship with a specific child. Parents are asked to provide general descriptions as well as specific examples of their emotional experiences of parenting, their representation of the child, and the relationship between them.

In developing the ARR, we began by extensively reviewing measures that have successfully identified patterns of parental behavior and representation associated with infant disorganized attachment. These included the Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE; Bronfman et al., 1999), and the Frightened/Frightening coding system (FR; Main & Hesse, 2005). The measures of parental representations examined included the original PDI coding system (Slade et al., 1999), the Parent Attachment Interview coding system (Biringen et al., 2000), the Caregiving Interview coding system (George & Solomon, 2008b), the Working Model of the Child Interview coding system

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(Zeanah et al., 1993), the Adult Attachment Interview (AAI) coding system (Main & Goldwyn, 1991), the Hostile/Helpless coding of the AAI (Lyons-Ruth, et al., 2005), the Maternal Insightfulness Assessment (Oppenheim & Koren-Karie, 2002), and the adapted version of the AMBIANCE coding system applied to parents' narratives (Crawford & Benoit, 2009).

On the basis of this review, we extracted 15 dimensions of common correlates of relational risk. In order to examine the face validity of these dimensions, we then coded a set of 15 PDI transcripts selected to ensure a broad range of RF levels and clinical presentations, and developed an initial coding manual that included examples and descriptions of each dimension. After reviewing the coding manual and consulting with attachment experts, we reduced the original set of dimensions to ten. Dimensions were discarded due to overlap or combined with others to create a single concept. For example, "Warmth" was combined with "Comfort and Safety" to create one theme (Supportive Presence), and a complex description recognizing both positive and negative aspects of the relationship was discarded, as the reverse of the concept was captured by either/both "Idealization" and "Hostile parenting experience". The descriptions of the dimensions and the coding instructions were clarified and elaborated and examples from interviews were extracted. The final manual was used in the initial validation study and the current study. Two initial studies applying this coding system to data from subsamples of the current study found that the ARR coding system discriminated between high risk and low risk samples and is associated with concurrent and later parent-infant interaction quality (Sockett, 2011; Wain, 2010).

Description of the Assessment of Representational Risk Coding System

The ten final dimensions are described below. The first eight subscales reflect high-risk features of representations that have been shown to be associated with problematic relational and

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child outcomes. Two of the scales reflect positive/protective factors that have been previously linked to secure attachments, and the lack of which also indicates risk.

Hostile Behavior. Hostile behavior has consistently been associated with infant attachment disorganization (Abrams, et al., 2006; Goldberg, et al., 2003; Schuengel, et al., 1999) and poor long-term outcomes for children (Franz et al., 1991; Tremblay et al., 2004). The mechanism by which parental hostility leads to a disorganized attachment strategy is thought to be the infant's fearful arousal without resolution. When a parent behaves in a hostile manner which is frightening to their infant, the child is in a paradoxical position of seeking comfort from the very source of the threat (Main & Hesse, 1990).

On the ARR, hostile behavior refers to parents' descriptions of physically harsh, rough, punitive, and derogatory behavior. In narratives, caregivers may give accounts of moments that they have displayed overt physical, emotional, or verbal aggression or derogation directly towards or in the presence of the child. For example, descriptions of shouting, physically disciplining, or teasing the child will be coded on this dimension.

Hostile Experiences. The tendency to talk about parenting in socially desirable ways in assessment contexts means that parents may not describe hostile actions towards their children during the interview (Bornstein et al., 2015). However, descriptions of their caregiving experiences can indicate more subtle underlying hostility. Such negative experiences of the child or the parenting role are associated with physical abuse and poor outcomes for the child (Young et al., 2018) and this is most likely mediated by harsh parenting behavior (Nix et al., 1999).

On the ARR, hostile parental experiences include negative attributions of the infant's temperament, behavior or intentions, or negative feelings concerning the parenting role and the impact of the child on their life. For example, descriptions of a child who is seen to be

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particularly difficult or fussy would be coded on this dimension. Equally, very negative descriptions of being a parent (e.g., “like being handicapped”) would also contribute to higher scores on this dimension.

Fearful Affect. Young children rely on their caregivers’ evaluations of whether there are threats within the environment that require them to seek safety. Thus, a caregiver’s unmodulated fearful arousal simultaneously signals to the infant that s/he should approach his/her caregiver for safety and that the caregiver is not available/ the source of fear (Abrams, et al., 2006; Hesse & Main, 2006). Thus, fearful affect in the parent is considered to be one of the factors that can lead to attachment disorganization. Frightened parental behavior has frequently been found to associate with disorganized attachment relationships (Bronfman, et al., 1999; Hesse & Main, 2006; Main & Hesse, 2005).

On the ARR, fearful affect refers to descriptions of thoughts or events that the parent experiences as frightening. The level of scoring is determined by how proportionate the fearful affect seems to be in relation to the event or thought, and also the extent to which the parent protects the child from- or exposes the child to- their fearful affect. For example, high scores on this dimension would be given if a parent repeatedly talks about fearing for the child’s life or safety without any clear reason for this fear or suggestion that they can process this away from their infant.

Helplessness. Parental helplessness has consistently been associated with child attachment disorganization (George & Solomon, 2008a; Lyons-Ruth & Jacobvitz, 2008; Lyons-Ruth, et al., 2005). When parents experience overwhelming and unregulated arousal in response to the child’s attachment needs, the caregiving system, instead of being activated, can become paralyzed in response to the child’s cues (Liotti, 2017). This response may be a perpetuation of

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the parent's own early attachment experiences if these have been characterized by inconsistent and/or unresponsive caregiving, thus impinging on the development of effective affect regulatory capacities (Fonagy et al., 2002). These feelings may be further compounded by repeatedly ineffective interactions between the parent and infant, where the dissatisfactory and hard-to-soothe interactions with the infant amplify the parents' experience of powerlessness and impossibility to help the child.

On the ARR, helpless parental representation may include descriptions of a sense of victimization, reduced power over one's parenting, and descriptions of not knowing what the child wants and needs and what the parent should do. At extreme levels, helplessness may lead to parents reporting a wish to abdicate from the caregiving role (George & Solomon, 2008a). For example, descriptions of a child that "has the upper hand" or descriptions of wishing that they "never had any children" would be coded for Helplessness.

Emotional Distress. High levels of parental emotional distress and difficulties with emotion regulation may disrupt a parents' availability to regulate their infant's emotions and to participate in positive and playful interactions. Emotional distress is likely to be a correlate of parental mood disorders, which have been widely acknowledged to impinge on the parent-infant relationship (Cornish et al., 2008; Murray et al., 1996; Paris et al., 2009). Furthermore, exposure to the caregiver's unmodulated distress can be in and of itself is dysregulating for the infant (Liotti, 2017).

In the ARR coding, emotional distress refers to parents' descriptions of negative emotions that they have experienced. The level of score for this dimension will be determined by the pervasiveness of the negative emotions, and the extent to which the parent appears to expose the child to their feelings. For example, parents' descriptions of feeling low, sad, anxious, or

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depressed would be coded on this dimension. Descriptions of parental behaviors that indicate unmodulated negative emotions, such as periods of crying, or not wanting to leave the house would also be picked up by this dimension.

Enmeshment/Role Reversal. Enmeshment refers to the parent's difficulty in separating their own thoughts, needs, emotions or sense of self from those of their infant, and difficulty in acting in the parental role while allowing the child to be a child. Extreme enmeshment may take the form of role reversal, where the parent looks to the child for support and protection. Parents who do not see their infants' needs and communications as separate from their own are not likely to offer adequate contingent marked mirroring of the infant's self-states in their interactions (Gergely, 2007). Accordingly, enmeshment may lead to a "false self" development where the infant internalizes the parent's affective states as self-experiences that are, however, alien to him/her (Fonagy et al., 2007; Winnicott, 1965). Such a trajectory has been associated with later psychopathology, particularly Borderline Personality Disorder which is characterized by an incohesive sense of self and an inability to maintain emotional boundaries between the self and other (Bender & Skodol, 2007). Several attachment theorists have linked behavioral indicators of role reversal with infant disorganization (Abrams, et al., 2006; Bronfman, et al., 1999; Hesse & Main, 2006). Role reversal has also found to be associated with parental substance misuse, mental illness, marital conflict, history of sexual abuse, sexually abusive behavior, and later dissociation and unresolved/fearful attachment in the child (Alexander, 2003; Kelley et al., 2007).

Enmeshment or role reversed distortions in the ARR coding include direct descriptions of the child in a caregiving/ spousal role, age-inappropriate attributions, or through blurred boundaries between self and child. For example, descriptions of the child soothing the parent,

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slips of the tongue where self and child are conflated, sexualized attributions to the child, or descriptions of the child that do not seem developmentally plausible would all be coded on this dimension.

Incoherence. Several attachment scholars have identified the coherence of attachment-related narratives as a key indicator of the quality of those attachment relationships (Main, et al., 1985; Vaughn et al., 2006). In the AAI, the coherence of the overall narrative is a central criterion for an autonomous/secure classification, and these adults are likely to have children that show secure attachment at one year (Main et al., 1985). Parents of disorganized infants, instead, exhibit “lapses in the monitoring of discourse or of reasoning” when discussing attachment-related loss or trauma (Main & Hesse, 1990). Such lapses represent activation and interference from normally dissociated memory systems but that may emerge when the attachment/caregiving systems are activated (Liotti, 1999; Main, 1991).

Incoherence on the ARR refers to contradictions, confusion, non-sequiturs and bizarre parenting narratives. For example, descriptions of the child that are highly idealizing in one moment and then highly denigrating the next and without any explanation for the ambiguity would be coded on this dimension. Long interviews that are confusing and often go off-topic would also score high on this dimension.

Idealization. The attribution of exaggeratedly positive qualities to the self or significant others is common in high-risk parenting populations (Baradon et al., 2008). Studies using the AAI have revealed the idealization of attachment objects as characteristic of insecure/dismissing attachment style in the parent and attachment avoidance in the child (van IJzendoorn, 1995). At extreme levels, and more predictive of infant disorganization, parental idealization may be indicative of the mental segregation (splitting), or dissociation, of overwhelming affects or

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threatening self/other schemas linked with trauma (Lyons-Ruth, et al., 2005). Parental idealization which stems from a process of splitting, or defensive segregation of attachment-related systems, is unstable and the caregiver may oscillate very rapidly between idealization and devaluation (George & Solomon, 2008a; Lyons-Ruth, et al., 2005). Thus, idealization, whether in the more stable form evident in parents with a dismissing attachment style or the more unstable form associated with trauma and unresolved states of mind, is likely to be an indicator of inadequate parent-infant attachment relationships.

Idealization in the ARR refers to overly positive descriptions of the child and/or themselves as parents. The parent may describe the infant as an exceptionally good child, and they may make global statements that are unrealistic. For example, the parent may say that the child is always happy and never upset, or they may deny having any negative feelings as a parent. At extreme levels, the idealization might be so distorted that the statements are developmentally inappropriate or bizarre, for example describing an infant as “so strong he can lift things heavier than himself”.

Mutual Enjoyment. This dimension is one of the two positive/protective factors in the ARR coding system. Most systems assessing the quality of parent-infant interactions include a rating of observed pleasure and enthusiasm that each partner demonstrates in the interaction (Barnard, 1978; Clark, 1999; Feldman, 1998; Murray, et al., 1996). A parent who finds pleasure in positive interactions with their child and from their child’s pleasure is likely to invest in eliciting pleasurable, playful interactions. Indeed, the infant’s developing abilities for reciprocity, for example social smiling, are intuitively rewarding for parents and usually strengthen their sense of parental competence and the young child’s developing positive sense of self (Stern, 1995). Experiences of joy and pleasure are characteristic for autonomous/secure parents’

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interactions with their child (Slade et al, 1999), whilst a lack of mutual enjoyment has been reported to mark high-risk dyads' interactions (Burns et al., 1997).

In the ARR, mutual enjoyment refers to descriptions of the reciprocity of pleasure that the parent and child have from each other. For example, the parent may describe a pleasurable moment they shared with their child or they may describe how positive feelings in their child give them pleasure, happiness or fulfilment.

Supportive Presence. The second positive dimension measures the parent's overall availability and sensitivity to the infant's communications and needs in a representational level. The earliest in-depth studies of parent-infant attachment relationships demonstrated that the most important parental correlate of infant attachment security was maternal sensitivity: the capacity to recognize the infants' cues and respond to them in a contingent and appropriate manner (Isabella, 1993). The supportive presence dimension relates to the concept of sensitivity, but also refers to the parent's general availability and capacity to balance the need for protection of the infant and promoting exploration. The parent's ability to sensitively respond to the infant's needs has been consistently linked with the formation of a secure attachment relationship (De Wolff & van IJzendoorn, 1997). Although parental sensitivity is not a strong predictor of infant disorganized attachment (van IJzendoorn et al., 1999), the caregiver's capacity to respond to the child in a sensitive manner is considered an ameliorating or protective factor for the child's emotional development (Buck, 2015).

In the ARR, supportive presence refers to parents' descriptions of their ability to notice, make sense of, and respond to their child's needs. For example, parents' descriptions of how they attempted to soothe their infant when distressed (even if this took time or was difficult), complex

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descriptions of the child's different needs and how they try to make sense of them, and examples of helping their child to learn or do something new would all be coded on this dimension.

Applying the ARR Coding

In order to code the level of relational risk, the coder first reviews the verbatim PDI transcript and identifies words, phrases, or passages that provide evidence or counterevidence for each of the 10 ARR dimensions. The coding can be done electronically so that quotes can be cut and pasted into the coding sheet as the rater reads through the interview. Then, on the basis of the extent to which a particular dimension is present in the narrative, they use a 5-point Likert scale (1= no evidence, 5 = lots of evidence) to assign a score. Coding one interview takes 20-45 minutes, depending on the length of the interview. Parental discourse and its appropriateness is always evaluated in the context of the child's age.

The Current Study

The overall aim of the current study was to explore the psychometric properties of the ARR in a large sample of parents and infants. The specific research objectives and hypotheses were:

1. To examine the factor structure of the ARR. Based on the literature, we expected a two-factor structure indicating hostile and helpless representations.
2. To examine the criterion validity of the ARR coding with respect to how well it discriminates high-risk mothers and babies from low-risk dyads. We expected that mothers in the prison sample would have higher ARR scores than both the clinical and normative samples. We expected the mothers in the clinical sample to have higher ARR scores than the normative sample.

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3. To examine the concurrent validity of the ARR in relation to other measures of parent-infant relational risk (parental mentalization, parental psychopathology and parent-infant interaction). We hypothesised that the ARR would be associated with lower parental RF, higher depression, higher borderline personality disorder traits, higher general psychopathology, and poorer quality parent-infant interaction.

Methods

Participants

A total of 184 mother-infant dyads were drawn from three samples: a non-referred normative sample of mothers and babies (normative sample; $n = 54$), a clinical group of mothers with mental health problems and their babies (clinical sample, $n = 77$), and a sample of mothers and babies staying on Mother-Baby Units in prison (prison sample, $n = 53$). Table 1 presents a description of the baseline demographic characteristics of the samples used in this study. There were significant differences between the three samples on several sociodemographic variables (see Table 1). The mothers in the prison group were younger, less well-educated and more likely to be from a black or minority ethnic background than the other groups. The mothers in the normative sample were more highly educated and had older infants than the other groups. The clinical sample included more male infants than the other groups. The baseline data for all three samples were pooled ($N = 184$) for the development of the ARR, the assessment of its factor structure, and for examining the concurrent validity of the measure against measures of parent-infant interaction. The criterion validity was assessed by comparing ARR scores between the three different risk groups.

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-----*Table 1 about here*-----

Procedure

Participants in the three sub-samples were recruited as part of three separate wider studies (references blinded). The dyads in the clinical and prison samples participated in trials of attachment-based interventions, while the dyads in the normative sample participated in a general study of early parent-infant relationships. The detailed inclusion criteria and recruitment procedures for each study have been reported elsewhere (references blinded for peer review). The mothers in the prison sample represented a high-risk group in terms of relational disturbances with their infants; the average levels of RF and sensitivity were low for this group, although the mothers reported few problems on self-reported measures of their own wellbeing and parenting. In contrast, the clinical sample of mothers reported very high levels of depression, parenting stress and poor overall psychological wellbeing. They were relatively heterogeneous in terms of overall RF and sensitivity with wide variance in these measures. The mothers in the normative sample, on average, showed low levels of psychopathology and average to high levels of RF and sensitivity. In all cases, participation was voluntary and informed consent was sought. Only baseline (pre-treatment) data were used for this study. All participants for whom baseline PDI data were available were included in the current sample. Ethical approval was granted for the three studies separately.

The data collection was carried out by a team of researchers, all of whom had at least an undergraduate degree in Psychology. All were trained and supervised to administer the interviews and questionnaires. At the baseline visits all infants were under 18 months old. At

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each assessment, mothers were interviewed, asked to complete a set of standardized questionnaires, and video-recorded interacting with their babies.

Measures

Caregiving representations. The Assessment of Representational Risk coding system (ARR, reference blinded) was applied to the Parent Development Interview transcripts. The system is comprised of ten dimensions as described in detail above.

For the current study, three raters coded a randomly selected sub-set of 30 reliability interviews from all three samples. The coders were the first author and two clinical psychology doctoral students who assisted in the development of the coding system. The raters were all blind to the interviewee sample. The interrater reliability for all subscales was good, with intraclass correlations ranging from .72 to .92.

Parental Reflective Functioning was coded from the PDI transcripts using the PDI-RF coding manual (Slade, Bernbach, et al., 2004). The PDI-RF coding system has been shown to have adequate psychometric properties (Sleed et al., 2018). The overall score has a potential range of -1 (low) to 9 (high). Very low scores (-1 to 1) indicate distorted attributions of mental states or an absence of mental state language. Moderately low scores (2 - 3) indicate some basic recognition of mental states but a poor capacity to reflect on these. Moderate scores (4 -6) indicate that the parent is usually able to mentalize adequately, while high scores (7-9) indicate remarkable sophistication in mentalizing.

The transcripts were rated by four coders who were trained to reliable standards in the coding system and were blind to all other participant information, apart from child age. For each subsample, at least 20% of the transcripts were double coded for interrater reliability, which was shown to be good (ICC = .76 - .83).

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Maternal psychopathology was assessed using the following:

Maternal depression was assessed with the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a widely used 20-item self-report questionnaire with good psychometric properties. Each item is rated on a scale from 0 to 3 in terms of frequency of occurrence during the past week, with higher scores indicating higher levels of depressive symptoms (potential range 0 - 60).

Maternal psychological well-being was assessed with the Brief Symptom Inventory (BSI; Derogatis, 1993), a widely used self-report measure of psychopathology. This measure is comprised of 53 items rated on a 5-point scale. The General Severity Index (GSI), an indicator of current overall symptomatology across multiple domains, was used in this study.

Borderline personality features were assessed with the Borderline Personality Inventory (BPI; Leichsenring, 1999). This is a self-report questionnaire comprised of 53 true/false statements that tap into borderline personality features (e.g. “If a relationship gets close, I feel trapped”, and “I often wonder who I really am”). The authors recommend a cut-off score (cut-20) based the sum of the 20 most discriminatory items. This score, which was used in the current study, is likely to suggest a diagnosis of BPD according to the DSM-III-R (Leichsenring, 1999).

Mother-infant interaction quality was rated from ten-minute video-recorded free play interactions where mothers were asked to “spend time with your baby as you usually would”.

The Coding Interactive Behavior Scales (CIB; Feldman, 1998) was used to rate the interactions. The CIB is comprised of 45 discrete items which are rated on a 5-point scale for the frequency and intensity that the behavior is observed (22 items relating to parental behavior, 16 items relating to the child’s behavior, and 5 items relating to the quality of dyadic interaction). For this study, three subscales based on a factor analysis of the data were computed from these

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items: Dyadic Attunement (reflecting overall mutuality between mother and infant, potential range of scores 11-55), Parental Positive Engagement (reflecting positive verbal and non-verbal maternal behaviors towards child; potential range of 5-25) and Child Involvement (reflecting positive verbal and non-verbal infant behaviors towards parent; potential range 6-30).

The CIB coding was carried out by trained and reliable coders who were blind to all other participant data. A subset of 10% of the videos was rated by all coders, and the interrater reliabilities for each subscale were high (ICC = .756 - .961).

Data analysis

The data were analyzed statistically using SPSS. All data were adequately normally distributed. A principle components analysis (PCA) with varimax rotation was used to explore the factor structure of the ARR. The internal consistency of subscales and total scores was estimated using Cronbach's alpha. To examine the criterion validity, between-group comparisons were carried out using ANOVA and post-hoc LSD tests to examine differences between mean ARR scores for the three sub-samples. Correlations were computed to estimate the concurrent validity of the ARR with other measures and Fisher r-to-z transformations were carried out to compare the strength of correlations between RF and the ARR subscales and the validation measures.

Results

Factor structure of the ARR

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The PCA resulted in a three-factor solution, based on both eigenvalues and visual analysis of the scree plot. The three factors were named “Hostile”, “Helpless” and “Idealizing” parental representations. The rotated component matrix is presented in Table 2.

-----*Table 2 about here*-----

The three latent factors identified by the PCA provided the basis for computing three subscales for the ARR. A total risk composite score, the sum of all ten items, was also computed. One ARR variable, “Incoherence” did not load highly on any of the factors and was therefore excluded from the computation of subscales. However, this item was included in the total risk score as concurrent validity was better when this was included. The subscales and their composite items were:

1. ARR Hostile (sum of Hostile Experience, Hostile Behavior, Mutual Enjoyment- reversed score and Supportive Presence- reversed score).
2. ARR Helpless (sum of Fearful Affect, Helplessness and Emotional Distress).
3. ARR Idealizing (sum of Enmeshment and Idealization).
4. ARR Risk (sum of all ten ARR items, with reverse scores for Supportive Presence and Mutual Enjoyment).

The correlation between the ARR hostile and ARR helpless subscales was significant, $r(184) = .35, p < .000$, indicating that the two representational dimensions were not mutually exclusive. The ARR Idealizing subscale did not correlate significantly with the hostile and helpless subscales, indicating that this parental representation dimension is independent of hostility and helplessness.

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The Cronbach's alpha coefficients for the Hostile factor and the total score were adequate ($\alpha = .807$, and $\alpha = .736$ respectively). The Helpless and Idealizing factors were only comprised of three and two items respectively, and therefore only had moderate levels of internal consistency ($\alpha = .587$ for Helpless and $\alpha = .420$ for Idealizing).

Criterion Validity

Table 3 summarizes the mean ARR scores for each group. In line with our hypotheses, the results showed a difference in all three ARR scales and in the total risk score for the normative, clinical, and prison samples ($F(2,183) = 11.05$, $p < .001$ for ARR-Hostile; $F(2,183) = 20.05$, $p < .001$ for ARR-Helpless, $F(2,183) = 16.87$, $p < .001$ for ARR-Idealizing, and $F(2,183) = 17.23$, $p < .001$ for ARR-Risk). The effect sizes were moderate for all subscales. Post hoc Tukey HSD tests revealed that mothers in the clinical sample had higher ARR-Hostile scores than those in the normative and prison samples ($p < .001$ and $p = .006$, respectively). The difference between the prison and normative mothers on ARR-Hostile was not significant ($p = .100$).

Like Hostility, clinical mothers showed more Helpless representations than mothers in the normative and prison samples ($p < .000$ in both cases). Again, the prison mothers did not differ from the normative group ($p = .21$). In contrast, the prison mothers scored higher on the ARR-Idealizing scale than the normative and clinical sample's mothers ($p < .000$ in both cases). There were no differences between the clinical and normative groups in the Idealizing score ($p = .52$). For the overall ARR-Risk scores, mothers in the normative sample scored lower than the clinical and prison groups ($p < .001$ in both cases), and the clinical sample scored higher than the prison sample ($p = .022$).

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-----Table 3 about here-----

Concurrent Validity

Table 4 shows the Pearson's correlations between the ARR and parental RF, parent-infant interaction and maternal psychopathology. The total ARR-Risk score was, as hypothesized, significantly associated with low RF, poorer quality parent-infant interactions, and maternal psychopathology. The ARR subscales differed in how they were related to the concurrent measures. The Hostile scale was strongly negatively correlated with all measures of RF, parent-infant interaction and maternal psychopathology, whereas the Helpless scale was mostly only strongly correlated with maternal psychopathology. By contrast, the Idealizing subscale was associated more with parent-child interaction and RF than with the measures of maternal psychopathology.

Further analyses compared the ARR and RF in how strongly they were associated with the concurrent measures. In relation to the parent-infant interaction measures, the ARR-Hostile, ARR-Idealizing, ARR-Risk and RF measures showed equally strong associations. The ARR-Helpless subscale had lower correlations than RF with concurrent measures of Dyadic Attunement ($z = -2.78, p < .001$) and Parent Positive Involvement ($z = -1.86, p < .05$).

The ARR scores were generally more strongly associated with maternal psychopathology than RF was. Specifically, ARR-Hostile, ARR-Helpless and ARR-Risk scores were more strongly associated with maternal psychopathology than RF scores (CES-D [$z = 2.24, p < .01; z = 2.51, p < .01; \text{and } z = 2.63, p < .01$ for ARR-Hostile, ARR-Helpless and ARR-Risk respectively] and BPI Cut-20 scores [$z = 1.68, p < .05; z = 2.74, p < .01; \text{and } z = 2.28, p < .01$ for ARR-Hostile, ARR-Helpless and ARR-Risk respectively]).

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----- *Table 4 about here*-----

Discussion

This study examined the psychometric properties of a new coding system for assessing risk in parents' caregiving representations. Overall, the ARR was found to have good internal consistency, criterion validity and concurrent validity.

The factor structure of the ARR

Three dimensions of high-risk caregiving representations were identified: Hostile, Helpless, and Idealizing. The Hostile and Helpless dimensions were associated with each other, suggesting that some mothers who were derisive and hostile in their parenting representations also described a sense of powerlessness, fear and distress. This finding corroborates the suggestion that these states of mind are in fact two ends of the same continuum and may be indicative of the internalization of self in relation to other as both victim and perpetrator (Lyons-Ruth, et al., 2005). However, the association was moderate and there were clearly some mothers who showed hostile only representations and others with helpless only representations. Thus, it is important to look at these profiles in their own right.

While hostile and helpless representational risks have been extensively described in previous studies, Idealizing representations have received scarce attention. Idealizing narratives were characterized by the mothers' glorified and unrealistically positive representations of their baby and/or themselves as parents, paired with age-inappropriate distortions in their

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representations of their infants. These states of mind were found particularly prevalent among the most high-risk group of prison mothers, and they were relatively independent of the Hostile and Helpless representations. It is likely that the inclusion of the prison sub-sample in this study resulted in the identification of Idealizing states of mind as an independent factor. As this is a group of mothers who are in a position of powerlessness and who are closely monitored in their parenting, the extreme idealization is not an unexpected finding for this group. However, it is important to note that the distortions in these mothers' representations seemed to go beyond simply "faking good". The combination of idealizing and role reversed representations suggest that these parents held distorted representations that were often developmentally inappropriate. In this way, these mothers' babies were less likely to be seen for who they were, adequately "mentalized" and sensitively responded to. The fact that this subscale was strongly associated with low RF and poorer interactions supports this notion. Accordingly, identifying such distinctive/unique risk profile is likely an important information in treatment planning. It is likely that similar profiles would be seen in other very high-risk groups- such as parents known to child welfare- who would also be- understandably- idealizing but possibly also highly distorting.

The two profiles of hostile-helpless and idealizing representation match with the description of high-risk caregiving representations proposed by George and Solomon (2008a). Building on Bowlby's (1980) description of "segregated systems of consciousness"- a breakdown of normative defenses so that attachment-related trauma, memories and affects are tightly blocked from consciousness. They describe two profiles of caregiving representations associated with attachment disorganization: dysregulated and constricted. "Dysregulated" states of mind emerge when the brittle defenses break down so that the parent becomes flooded, overwhelmed and frightened by themselves as caregiver and/or by their child. Such narratives

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are marked by helplessness, powerlessness, hostility and frightening content. The ARR hostile and helpless states of mind fit with this profile. At extreme levels they are often seen in the same narratives together. “Constricted” caregiving representations are seen when the segregated systems are so tightly blocked and compartmentalized from consciousness to guard against any dysregulated affect from emerging (Solomon & George, 2006). These representations are characterized by role reversal (parentification or spousification of the child, abdication from caregiving role themselves, attribution of caregiving behaviors or responsibilities to the child, idealization and glorification of the child, and a merging of self and child). In this state of mind, George and Solomon (2008) posit that “mothers can think of the child only in relation to themselves – the child is invisible” (p.37). Such invisibility allows the parent to block off the potentially overwhelming and dysregulated states of mind that may emerge when the child’s attachment needs are perceived. These constricted states of mind match onto the Idealizing states of mind seen in the ARR. Thus, the ARR appears sensitive to picking up the hostile-helpless states of mind as well as the two forms of segregated systems of consciousness that have been described in relation to attachment disorganization.

Reliability and Validity of the ARR

The ARR subscales and total risk score discriminated at least one of the high-risk groups from the normative sample. The clinical group were more likely to present with hostile and helpless states of mind and the prison group were more likely to have Idealizing states of mind than the normative group. The total risk score discriminated both high risk groups from the normative sample, providing evidence of good criterion validity. The inclusion of the Idealizing subscale appears to be particularly sensitive to some of the subtle representational distortions seen in the cohort of mothers in prison. As this group of mothers tended to talk about their

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relationships in overly positive terms, indicators of hostility and helplessness were not always present in their narratives. Thus, this population presents a particular profile of potential relational risk that is unlikely to be detected by indicators of maternal emotional functioning. Indeed, this group of mothers had very low scores of self-reported depression and maternal representations of their babies, although relational risk was indicated by the low levels of maternal reflective functioning and less optimal dyadic interactions (Sleed, Baradon, & Fonagy, 2013).

It was interesting that the mothers in the prison sample did not differ significantly from the normative mothers in terms of hostility or helplessness/ distress- despite showing much more relational risk on other measures. Similarly, the mothers in the clinical group did not have more idealizing states of mind than those in the normative sample, despite showing more risk on other measures. However, the ARR Total Risk score did differentiate the two high-risk samples from the normative group. Thus, it is this score that is likely to be the most valid and robust indicator of relational risk.

This study also provided evidence for the concurrent validity of the ARR. The most robust evidence of concurrent validity with the ARR was with the total Risk score, which was associated with poor RF, poorer parent-infant interactions, and maternal psychopathology.

The Hostile and Idealizing subscales and overall Risk scores were associated with significantly poorer quality observed parent-infant interactions. The Helpless subscale was not strongly related to measures of parent-infant interaction, suggesting that this typology of maternal representation is not as evident in brief episodes of behavioral interaction. This does not necessarily imply that such helpless representations do not pose a risk for the attachment relationship, but rather that the behavioral manifestation may be more subtle. Helpless states of

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mind are likely to be associated with maternal withdrawal and subtle behaviors of hesitation and fearfulness (Lyons-Ruth, Lyubchik, Wolfe, & Bronfman, 2002); behaviors which are more difficult to assess in dyadic interactions than those seen for more intrusive or negative parenting styles. As the criterion measures used in this study were assessing general sensitivity and overall quality of interaction rather than frightened or frightening behavior or infant attachment disorganization, it is possible that more subtle behaviors associated with this construct were not picked up. Further studies comparing ARR scores and atypical caregiving behavior are needed.

An interesting and important finding is that the ARR demonstrated better concurrent validity against measures of self-reported maternal psychopathology than maternal RF did. Maternal psychopathology, particularly depression and BPD have been repeatedly linked with impairments in the quality of parenting and poor outcomes for young children (Hobson et al., 2005; Murray et al., 1996). Although parental RF is important and useful for predicting relational outcomes, the RF coding may not fully capture the impact of parental psychopathology on the parent-child relationship (Fonagy et al., 2016). This may be due to the single scale scoring system which could conflate different types of risk at the lower end of the scale. Thus, the ARR can have important clinical implications for assessing the impact of maternal mental health difficulties on the parent-infant relationship and may provide a useful adjunct to the RF coding to differentiate different types of mentalizing difficulties.

Although the ARR hostile, helpless and total risk scores were strongly related to maternal psychopathology, the ARR Idealizing and the RF scores were not. It is likely that the glorification and idealization in the parents' narratives that resulted in both low RF and high ARR Idealizing scores also resulted in overly positive and defensive responses on the self-report questionnaires. It is likely that this finding relates most to the prison sample, possibly because

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these mothers are subject to high levels of scrutiny and therefore providing socially desirable responses. Indeed, other studies with incarcerated mothers and their children have reported similar biases in mother-report questionnaires (Goshin, 2010; Slead et al., 2013). In-depth independent assessments of parent-infant relational functioning- such as the PDI and observational measures- are likely to be more valid instruments for use with some high-risk parenting populations than self-report measures. Parent-report screening questionnaires of parents' representations of their infants do not have subscales/ factor structures demonstrating idealized distortions (Newman-Morris et al., 2019; Oates et al., 2018). Although much less resource intensive than interview methods, these questionnaires may be insensitive to risk in particular subgroups of dyads.

Strengths, Limitations and future research

This study introduces a new coding system that addresses the need for a multi-dimensional instrument for assessing relational risk. The study includes data from a relatively large number of mother-infant dyads from two high-risk parenting groups as well as a normative comparison group. The results show the ARR to be a psychometrically sound measure that can have great clinical and research application. However, there are several limitations to the current study. The small number of items in the ARR limits the conclusions that can be drawn about the factor structure of the measure. The final model of Hostile, Helpless and Idealizing representations was found to be robust for this study, but the small number of items, especially on the Idealizing subscale limits the internal consistency of these measures. Future developments of the ARR may include more items, particularly those that point to the Idealizing states of mind. It is also likely that different factor structures are evident in different samples. Indeed, this has been shown to be the case in a recent application of the ARR coding in a sample of war-exposed

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Palestinian mothers (Isosävi et al., 2020). Given the low internal consistency of some subscales and the likelihood of very different factor structures for different parenting populations, we recommend that the ARR total score be taken as the most robust indicator of risk. This was supported by the strong criterion and concurrent validity and internal consistency of this score.

Although the three diverse groups of dyads enabled an assessment of the criterion validity of the measure, it is important to note that there were significant demographic differences between the samples that may confound the findings. For example, the prison sample included mothers who were overall less educated, less likely to be of white ethnicity and who were younger. Further research into the discriminant validity of the ARR is needed to rule out the possibility that such sociodemographic variables account for the between group differences reported here.

A further limitation of this study is the criteria against which the ARR was validated, particularly the parent-infant interaction ratings. The ARR is intended to be sensitive to severe disruptions in the parent-infant relationship and some forms of such disruptions can be subtle at a behavioral level (Lyons-Ruth, et al., 2002; van IJzendoorn, et al., 1999). Future studies are needed to investigate its concurrent and predictive validity against infant attachment disorganization and infant developmental outcomes.

Implications

The ARR has several potential applications. The authors have trained several coders to reliable standards in a two-day training followed by practice. Graduate students with little background knowledge of attachment theory have successfully reached reliable standards. Although the coding system will never substitute thorough clinical assessments and judgement, it can be used, along with a standardized interview schedule such as the PDI, as an aid to identify

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“red flags” in a parent’s representations of their child. This provides a systematic tool that can be used in parenting assessments. The robust psychometric properties of the overall risk score- in relation to criterion and concurrent validity as internal consistency- suggest that this score may be the most robust and clinically meaningful assessment of relational risk. A coding system that results in a simple total score of 10 items can provide an efficient and rapid assessment tool.

Future research is needed to determine clinical thresholds in large parenting samples.

As a multidimensional coding system, it also has the potential to be used to identify specific areas of difficulty for parent-infant dyads and can therefore inform intervention strategies. Finally, the ARR may be a useful outcome measure for assessing the impact of interventions on parents and their children. One study found it to be sensitive to treatment change when RF coding of the same interviews did not show treatment effects (Fonagy et al., 2016). Thus, it may be a valuable coding system to be used alongside the RF measure, especially in high-risk samples where RF levels may be low for most of the sample but the representations are qualitatively different.

Conclusions

This study indicates that the ARR may be a useful tool for identifying early disruptions in the parent-infant relationship. It is a comprehensive coding system that can identify sometimes subtle disruptions and distortions that can disorganize the early attachment relationship. It has applications in research, assessment and treatment planning and evaluation to support parents and their babies.

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Table 1. Description of sample

	Normative group n = 54	Clinical group n = 77	Prison group n = 53	Total sample n = 184
Mother age in years¹:				
Mean (SD)	33.3 (4.4)	31.5 (5.9)	25.8 (6.0)	30.4 (6.3)
Range	21.3 – 43.7	19.1 – 41.8	17.8 – 41.5	17.8 – 43.7
Child age in months²:				
Mean (SD)	7.2 (2.5)	3.4 (3.2)	5.4 (3.9)	5.3 (3.5)
Range	0.9 – 12.6	0.5 – 11.4	0.2 – 18.5	0.2 – 18.5
Child gender: N (%)³				
Female	26 (48%)	28 (36%)	31 (59%)	85 (46%)
Male	28 (52%)	49 (64%)	22 (41%)	99 (54%)
Number of other children: N (%)				
First time mothers	28 (52%)	48 (62%)	33 (64%)	122 (67%)
More than one child	26 (48%)	29 (38%)	19 (36%)	61 (33%)
Mother ethnicity: N (%)⁴				
White	41 (76%)	46 (60%)	28 (53%)	115 (63%)
Black	0 (0%)	12 (16%)	19 (36%)	31 (17%)
Asian	6 (11%)	8 (10%)	1 (2%)	15 (8%)
Mixed	5 (9%)	4 (5%)	5 (9%)	14 (8%)
Other	2 (4%)	9 (9%)	0 (0%)	9 (5%)
Mothers' education: N (%)⁵				
None	0 (0%)	5 (7%)	14 (28%)	19 (11%)
Basic (high school equivalent)	8 (15%)	27 (35%)	23 (46%)	58 (32%)
Further (vocational training)	5 (9%)	10 (13%)	9 (18%)	24 (13%)
Higher (bachelor's degree or higher)	41 (76%)	35 (46%)	4 (8%)	80 (44%)

1. Mothers in the prison group were significantly younger than those in the clinical ($t = 5.4$; $p < .001$) and normative groups ($t = 7.3$, $p < .001$).

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2. Infants in the normative group were significantly older than in the clinical ($t = -6.7, p < .001$) and prison groups ($t = 2.8, p = .006$). Infants in the prison group were also significantly older than those in the clinical group ($t = -2.5, p = .015$).
3. There were significant differences between groups in child gender, with proportionally more male infants in the clinical group ($X^2(2) = 6.3, p = .043$).
4. There were significant differences between groups in ethnicity, with proportionally more white mothers in the normative sample and more black mothers in the prison sample ($X^2(8) = 33.1, p < .001$).
5. There were significant differences between groups in maternal education, with more mothers in the normative sample having a university degree and fewer mothers in the prison sample having an education beyond high school ($X^2(6) = 58.3, p < .001$).

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Table 2. Principle Component Factor Analysis of ARR items showing item loadings

	Hostile	Helpless	Idealizing
Hostility: Experience	.723*	.400	-.272
Hostility: Behavior	.786*	.246	-.191
Fearful Affect	.001	.773*	.131
Helplessness	.132	.742*	-.040
Emotional Distress	.166	.795*	-.023
Idealization	-.044	-.123	.788*
Enmeshment	.191	.248	.689*
Incoherence	.477	-.036	.357
Supportive Presence (reversed)	-.838*	.065	-.175
Mutual Enjoyment (reversed)	-.717*	.005	.322
Eigenvalue	3.26	1.68	1.30
% of Variance	33%	17%	13%

* Factor loading > .500

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Table 3. Mean (SD) ARR scores for the normative, clinical and prison groups

	Normative (n = 54) Mean (SD)	Clinical (n = 77) Mean (SD)	Prison (n = 53) Mean (SD)	F (p)	Effect size (η^2)
ARR Hostile:	8.02 (2.72)	10.77 (4.20)	9.09 (2.47)	11.05 (p < .001) ^a	.109
ARR Helpless:	5.06 (1.92)	7.35 (2.58)	5.58 (1.50)	20.05 (p < .001) ^b	.181
ARR Idealizing:	3.13 (1.53)	3.31 (1.49)	4.71 (1.74)	16.87 (p < .001) ^c	.157
ARR Risk:	17.91 (4.88)	23.51 (6.55)	21.28 (3.69)	17.23 (p < .001) ^d	.160

a. Clinical group > Normative group (p < .001) and Prison group (p = .006); Normative and Prison groups not significantly different (p = .100)

b. Clinical group > Normative group (p < .001) and Prison group (p < .001); Normative and Prison groups not significantly different (p = .213)

c. Prison group > Normative group (p < .001) and Clinical group (p < .001); Normative and Prison groups not significantly different (p = .516)

d. Clinical group > Normative group (p < .001) and Prison group (p = .022); Prison group > Normative group (p = .001)

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Table 4. Correlations between ARR scales, PDI-RF and concurrent measures of the quality of parent-infant relationship and maternal psychopathology

	ARR Hostile	ARR Helpless	ARR Idealizing	ARR Risk	PDI-RF
	Pearson's r (p)	Pearson's r (p)	Pearson's r (p)	Pearson's r (p)	Pearson's r (p)
ARR (n = 184)					
ARR Hostile					
ARR Helpless	.345 (<.001)				
ARR Idealizing	.134 (.069)	.064 (.385)			
ARR Risk	.849 (< .001)	.655 (< .001)	.441 (< .001)		
RF (n = 183)					
PDI-RF	-.280 (< .001)	.134 (.071)	-.260 (<.001)	-.227 (.002)	
Parent-infant interaction (n = 143)					
CIB Dyadic Attunement	-.275 (< .001)	.021 (.795)	-.360 (< .001)	-.296 (< .001)	.322 (< .001)
CIB Parent Positive Involvement	-.289 (< .001)	-.023 (.768)	-.283 (.009)	-.278 (< .001)	.227 (.004)
CIB Child Involvement	-.205 (.009)	-.121 (.126)	-.182 (.021)	-.248 (.001)	.141 (.074)
Maternal psychopathology					
CES-D (n = 175)	.323 (< .001)	.349 (< .001)	.041 (.593)	.360 (< .001)	-.093 (.223)
BSI GSI (n = 103)	.334 (.001)	.375 (< .001)	.219 (.045)	.387 (< .001)	-.190 (.054)
BPI cut 20 (n = 108)	.320 (.001)	.444 (< .001)	.150 (.122)	.392 (< .001)	-.099 (.309)

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