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Evaluation of Early Relational Disturbance in High-Risk Populations:
Borderline Personality Disorder Features, Maternal Mental State and Observed Interaction

This research is part of a dissertation to be submitted for the degree of Doctor of Philosophy, Monash University, Melbourne, Australia.

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Abstract

Despite the longstanding theoretical association in the attachment literature between maternal trauma history and disturbances in the mother-infant interaction, few studies have investigated mechanisms of transmission of traumatogenic relational patterns in high-risk mother-infant dyads. This study investigated interrelationships between maternal trauma history, distorted maternal representations (DMRs i.e., disturbed thoughts and feelings about the infant and self-as-parent), maternal mentalisation (i.e., capacity to conceive of self and other's intentions in terms of mental states including thoughts, feelings and desires), and quality of interaction in a clinical sample of mothers with BPD features and their infants (N=61). Measures used included the Childhood Trauma Questionnaire, Parent Development Interview, Mother-Infant Relationship Scale, Borderline Symptom Checklist-23, and the Emotional Availability Scales. The results indicated BPD features mediated the relationship between maternal trauma history and DMRs predicting disturbance in interaction. In addition, analyses showed that maternal mentalisation had a buffering effect between DMRs and maternal non-hostility and yet the severity of BPD features moderated the relationship between mentalisation and DMRs. The findings suggest postpartum borderline pathology may adversely impact the experience of being a parent for women with a relational trauma

history including deficits in mentalisation (i.e., hypermentalising) and disturbances in the mother-infant interaction. Implications for research and clinical practice are discussed.

Keywords: borderline personality disorder, relational trauma, distorted maternal representations, maternal mentalisation, disturbance in the mother-infant interaction

Introduction

In recent decades, emerging evidence of harmful effects of early relational disturbance and adversity on a range of infant neurological, cognitive, and socioemotional developmental has proliferated (Feldman, 2015; Fox, Levitt, & Nelson, 2010; Madigan et al., 2019). However, mechanisms of transmission of traumatogenic relational patterns in high-risk populations remain under researched. In this study, we sought to examine whether the inclusion of a brief self-report measure of distorted maternal representations (DMRs), the Mother Infant Relationship Scale (MIRS; Newman-Morris, Gray, Simpson, & Newman, 2020), could elucidate mechanisms of relational disturbance in a high-risk sample of women with features of Borderline Personality Disorder (BPD) and their infants.

Mothers with features of Borderline Personality Disorder

Mothers with features of BPD have been identified as a high-risk group likely to have disrupted interactions with their infants. There is consensus that BPD has a complex aetiology, including genetic and environmental factors, with a significant role played by early relational trauma and its subsequent developmental impacts (Lieb, Zanarini, Schmahl, & Bohus, 2004). BPD is characterised by mood and identity disturbance, and significant interpersonal challenges including fears of abandonment and rejection (American Psychiatric Association, 2013). Once women with BPD become mothers, interpersonal features of the disorder often extend to the relationship with the infant (Hobson, Patrick, Crandell, Grazia-Perez, & Lee, 2005). Specifically, this group of mothers is at high-risk of relational disturbance with their infants including insensitivity, inconsistent responsiveness, and neglectful parenting. Severe disturbance of this process is a critical clinical and child-protection issue (Brockington, Fraser, & Wilson, 2006; Judd, Newman & Komiti, 2017) with evidence of its negative impact on infant neurodevelopmental and psychological sequelae including poor stress regulation, attachment disorganisation and impact on self-development (Eyden, Winsper, Wolke, Broome, & MacCallum, 2016; Madigan, Bakermans-Kranenburg, van Ijzendoorn, Moran, Pederson, & Benoit, 2006). Some research has suggested that improving maternal representations (i.e., internal working models of caregiving) and mentalisation (i.e.,

capacity to conceive of the infant as an intentional being) could improve outcomes otherwise associated with high-risk parenting (Grienenberger, Kelley, & Slade, 2005). However, the detailed mechanisms of transmission of traumatogenic relational patterns from mother to infant, or mechanisms of therapeutic change, remain poorly understood.

Disturbance in the Mother-Infant Interaction and BPD features

Studies evaluating the significance of BPD features on the mother-infant interaction have found evidence of disturbances involving both maternal and infant factors. Specifically, this group of mothers has been found to be more likely to engage in insensitive, inconsistent, controlling/intrusive, hostile, frightened/frightening, withdrawn, disoriented, and boundary/role confused parenting behaviours compared to healthy controls (for a review see Eyden et al., 2016). In turn, infants of mothers with BPD have been shown to have withdrawn and depressed affect as early as 2-months-old, to be more likely classified as disorganised in their attachment, and to be less likely to engage and respond to their mothers than infants of healthy controls (Crandell, Patrick, & Hobson, 2003; Hobson et al, 2005; 2009; Newman, Stevenson, Bergman, & Boyce, 2007).

Studies using chronic complex trauma populations (i.e., women with relational trauma histories and/or drug-abuse) have yielded similar findings to studies using BPD populations. This is not surprising given the shared complex trauma history that is characteristic of vulnerable parents in high-risk populations. In summary, research using Atypical Maternal Behaviour Instrument for Assessment and Classification (AMBIANCE; Bronfman, Parsons, & Lyons-Ruth, 1999) has categorised women with relational trauma histories into hostile (intrusive and harsh) or helpless (withdrawn and disengaged) parenting groups (Lyons-Ruth, Melnick, Bronfman, Sherry, & Llanas, 2004). Similarly, research using the Emotional Availability Scales (EAS; Biringen, 2008) has found that mothers with complex trauma histories display low or problematic emotional availability (EA) in interactions with their infants characterised by low sensitivity, intrusiveness, hostility and poor structuring, and their infants in turn show low responsiveness and involvement of the parent (Flykt et al., 2012; Pajulo et al., 2012). Taken together, this research suggests that women with complex trauma histories and/or BPD features are likely to experience vulnerability with emotional aspects of parenting in the mother-infant interaction which contribute to intergenerational transmission of relational trauma. It is possible this is due to the distorted internal representations of caregiving that are characteristic of women with relational trauma histories.

Role of Distorted Maternal Representations

Distorted maternal representations (DMRs) can be defined as disturbed ideas and feelings about the infant and self-as-parent and are thought to be influenced by the mother's

early and unresolved attachment-related trauma history. As such, they include traumatic meanings associated with being an infant and parent (Slade, 2005). DMRs are characterised by maternal hostility and rejection of the infant and the parental role, anxiety and helplessness in caregiving, and ambivalence about parenting and attachment (Newman-Morris et al., 2020). DMRs are thought not to be easily accessible to conscious awareness, however, they impact on a woman's subjective experience of being a mother and negatively influence her perceptions of, and capacity for sensitive caregiving (Lyons-Ruth, Yellin, Melnick, & Atwood, 2005; Lyons-Ruth, Melnick, Patrick, & Hobson, 2007; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005).

Coined 'ghosts in the nursery', that is, unresolved or denied attachment issues in the mind of the mother, DMRs negatively impact the emerging relationship with the infant (Fraiberg, 1975). Times of infant distress or physical and emotional contact needs trigger a range of trauma-associated affects in the mother. These manifest as intrusions of childhood memories and interrupt the caregiving in form of dissociation, for example, disorientation, withdrawal, or neglect; or blatant repetition of abuse and neglect in form of aggression, rejection, or abandonment (Dayton, Levendosky, Davidson, & Bogat, 2010; Lyons-Ruth, Dutra, Schruder, & Bianchi, 2006; Lyons-Ruth & Spielman, 2004). Such caregiving and interpersonal stances towards the infant are consistent with BPD features in complex trauma populations. It is possible that BPD features are uniquely associated with the experience of becoming a parent due to the activation of DMRs and the re-emergence of traumatic memories that were possibly dormant or defended against prior to the confrontation with the actual infant who acts as a trigger for the recall of traumatic memories.

Most previous research has used interview coding schemes to evaluate distorted representations and their role in the transmission of traumatogenic relationship patterns. Some examples include the Hostile/Helpless coding system of the Adult Attachment Interview (George, Kaplan, & Main, 1984-1996; Lyons-Ruth et al., 2005), the Caregiving Helplessness Interview (George & Solomon, 2011) and the more recent Assessment of Representational Risk (ARR; Sneed, 2014) coding system of the Parent Development Interview (PDI; Aber, Slade, Berger, Bresgi, & Kaplan, 1985; Slade, Aber, Bresgi, Berger, & Kaplan, 2004). Studies have shown that disrupted caregiving mediates the relationship between unresolved maternal mental states in relation to attachment (i.e., DMRs) and infant attachment (Madigan et al., 2006). It has also been shown that hostile/helpless states of mind mediate the relationship between trauma history and BPD features in an adult sample (Finger, Byun, Melnick, & Lyons-Ruth, 2015). However, these mechanisms have not been tested in high-risk mother-infant dyads. This could in part be due to the complexity in measurement of relational constructs which often involve elaborate interview and video coding schemes of data that may be particularly difficult to obtain from women in challenging psychosocial circumstances during a short time period of infant childrearing (Hobson et al., 2009). A

recent development and psychometrics study of a new screening measure of DMRs, the Mother-Infant Relationship Scale, has shown good promise in evaluating DMRs via self-report in sample of mothers with complex trauma history (MIRS; Newman-Morris et al., 2020). In further evaluating its utility as a tool for research purposes, we use it in the current study to examine mechanisms of relational trauma and BPD features in high-risk dyads.

Maternal Mentalisation

Mentalisation operationalised as Reflective Function (RF; Fonagy, Gergely, Jurist, & Target, 2004) is defined as a largely imaginative capacity to regard the self and other in terms of intentional mental states, such as thoughts, feelings, and desires. Maternal mentalisation refers to mentalisation in the context of parenting i.e., it is a mother's capacity to imagine, link and predict her own and infant mental states with observed behaviours, including subtle and opaque interpersonal gestures, preferences and reservations (Slade, 2005). It is a complex process of transmitting affective and unconscious aspects of social cognition from parent to child considered to be critical for the development of healthy personality function. Maternal mentalisation has been found to be associated with the quality of maternal caregiving and infant attachment security and shown to be a protective factor in the intergenerational transmission of attachment (Grienenberger et al., 2005; Slade et al., 2005). Some studies using high-risk samples have found that parenting sensitivity mediates the relationship between RF and infant attachment (Stacks et al., 2014) and that RF mediates the relationship between maternal representations and caregiving sensitivity (Alvarez-Monjarás, McMahon, & Suchman, 2016). However, few studies have focused on maternal mentalisation in mothers with BPD features.

Maternal Mentalisation in mothers with BPD

Studies of maternal mentalisation for women with BPD features have reported mixed and counterintuitive findings. One study that has investigated maternal mentalisation in BPD during the early postnatal period has reported that maternal mentalisation was not significantly different for mothers with BPD compared to healthy controls (Marcoux, Bernier, Seguin, Armerding, & Lyons-Ruth, 2016). Similarly, maternal mentalisation has been found not to be significantly different between mothers with postnatal depression, when compared to mothers with depression comorbid with BPD, or when compared to healthy controls (Cordes, Smith-Nielsen, Thamen, Katznelson, Steele, & Vaever, 2017). In the context of current consensus that an increase in RF is suggestive of improved mentalisation or a heightened curiosity about the child's interiority (i.e., mental states) and by implication

more sensitive parenting, these findings would suggest that a mother with BPD may be mentalising frequently, or even as well, as someone without BPD.

Moreover, in the abovementioned development and psychometrics study of the Mother-Infant Relationship Scale (MIRS; Newman-Morris et al., 2020), maternal mentalisation was found to be strongly and positively correlated with DMRs. Maternal mentalisation was measured on the PDI (Slade et al., 2004) and the DMRs were measured on the MIRS. Both the PDI and the MIRS capture distorted thinking about the infant and the meanings associated with being a parent. Whilst the MIRS captures distortions at the level of content (i.e., via self-report), the scoring of the PDI also incorporates interview process (e.g., defence mechanisms such as denial). This paradoxical finding suggests that a mother with BPD features could exhibit relatively high level of mentalising capacity and yet hold DMRs. An interesting caveat of findings in that study was that associations between the measure of DMRs with measures of other clinically relevant features of the mother-infant interaction emerged in predicted directions e.g., DMRs were negatively associated with maternal non-hostility in interaction with the infant. The question is whether the paradoxical link between maternal mentalisation and DMRs could be indicative of (a) DMRs and mentalisation deficits specific to BPD features, or (b) issues related to measurement of closely related constructs.

The current study

Overall, the previous literature on mother infant-interaction in mothers with BPD features raises important questions. First, although the relationship between maternal trauma history and the distorted thinking about the infant is well researched, it remains unclear whether this relationship holds for mothers with BPD features. To answer this question, the first objective was to evaluate the interrelationships between maternal trauma history, BPD features, DMRs (MIRS), maternal mentalisation and the quality of the mother-infant interaction. It was hypothesised that (1) the level of dyadic emotional availability (EA) in the mother-infant interaction will be inversely correlated with ratings of maternal trauma history, BPD features, DMRs and maternal mentalisation. A second gap refers to the utility of using a self-report measure when most previous research has used discursive measures to evaluate DMRs. Given maternal trauma history is thought to lead to deficits in mentalisation and BPD which in turn influence the development of DMRs and poor interaction with the infant, it was hypothesised that (2a) BPD features would mediate the association between maternal trauma history and DMRs; and that (2b) DMRs would mediate the association between BPD features and low EA. A third gap refers to questions regarding the protective nature of RF in high-risk populations. Important findings from research conducted in a low risk sample have suggested that RF may be a protective factor between maternal mental state and observed interaction (Grienberger et al., 2005). Hence, we hypothesised that (3) RF would moderate the

association between DMRs and poor interaction in mothers with BPD features. Finally, in order to examine the paradoxical association between maternal mentalisation and DMRs, it was hypothesised that (4) the severity of BPD features would moderate the association between RF and DMRs.

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Method

Participants

The total sample consisted of 61 mothers and their infants who ranged in age between 0-12 months. Data were pooled from two separate sites. Twenty-seven women were recruited from Monash Health, a metropolitan hospital in Victoria, Australia with inpatient and outpatient specialist services for parents who are at-risk of harming their children (e.g., maltreatment, neglect) in the context of mental illness and/or significant psychosocial risk - (Sample 1). Thirty-four women were recruited during the pre-treatment assessment phase from Drug and Alcohol Clinical Services, Hunter New England Local Health, New South Wales, Australia - a community-based intervention program for vulnerable parents (Sample 2). Both services are linked to their respective communities via multiple referral pathways including maternal and child health services, child protection services, and self-referral. The data for the psychometrics study of the MIRS (Newman-Morris et al., 2020) were pooled from the same sample.

Exclusion criteria for participation included active risk of suicide, infanticide, and history of psychotic symptoms. Within each of the services, decisions on eligibility to participate were made in weekly clinical case review meetings supervised by a consultant psychiatrist. In terms of primary clinical diagnoses 29 mothers (48%) had an existing diagnosis of BPD, 13 mothers (21%) had a diagnosis of postnatal depression, 4 mothers (6%) had a diagnosis of PTSD, 2 (3%) mothers had a diagnosis of bipolar disorder, 11 mothers (18%) had a secondary diagnosis of depression/anxiety (comorbid with BPD and PTSD), and 13 mothers (21%) did not yet have a formal diagnosis at the time of recruitment into the study, however, were engaged in clinical assessments. In terms of social risk, 22% of families had current involvement with Child Protection Services, 4 mothers (6%) had forensic history, and 34 mothers (55%) had substance abuse history. All the mothers (100%) had reported difficulties in their relationship with their babies.

Procedure

Ethics approval for the study was granted from the Monash Health Human Research Ethics Committees and Hunter New England Local Health. Informed consent was provided by the mothers. The full study protocol involved filling out a survey, taking part in the Parent Development Interview (PDI; Aber et al., 1985; Slade et al., 2004) and a video-recorded mother-infant interaction to be coded with the Emotional Availability Scales (EAS; Biringen, 2008). Participants were given options to complete the study survey only (no reimbursement), or the full study protocol including the interview and the video for which a reimbursement was provided due to the time commitment required (2 - 3 hours).

Measures

A family background questionnaire was developed to obtain demographic information about the mothers, infants, and their families. The questionnaire collected information on ethnicity, languages spoken at home, education, occupation/employment, medical and mental health conditions, and postcode of the suburb where they lived to evaluate sociodemographic status. Education was divided into 3 categories where *low* indicated attended some secondary level education, *medium* indicated completed secondary education or vocational training, and *high* indicated completed tertiary education. Questions regarding the infants concerned age, gender, developmental, and medical conditions. Information about families regarded marital/relationship status, family income, government benefits, and perceived financial stability (i.e., *Do you have enough money to meet your needs?*). Income was asked at the family level and divided into categories where *low* indicated below the 2017 minimum national wage of AU\$40 000, *medium* from \$40-80,000, and *high* >\$80,000 per annum.

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item questionnaire that assesses severity of anxiety including somatic and cognitive-affective symptoms. Items are rated on a 3-point Likert scale ranging from 0 to 3, with a score of 0 indicating minimal and a score of 3 indicating high anxiety. The total scores are classified as *minimal anxiety* (0 to 7), *mild anxiety* (8 to 15) and *severe anxiety* (30-65). The BAI has high internal consistency (Cronbach's alpha = .92), good test-retest reliability ($ICC = .73$), and good discriminant validity from measures of depression (De Ayala, Vonderharr-Carlson, & Kim, 2005). The BAI was used to measure anxiety.

Borderline Symptom List-23 (BSL-23; Bohus et al., 2009). The BSL-23 is a 23-item self-report instrument for the assessment of borderline symptomatology based on the DSM-IV (American Psychiatric Association, 1994) criteria. Items are rated on a 5-point Likert scale *not at all* (0), *very strong* (4) that added together generate a global factor score. The BSL-23 has high internal consistency (Cronbach's alpha = 0.94-0.97) and good discriminant validity of BPD patients from DSM-IV axis 1 disorders (Bohus et al., 2009). The BSL-23 was used to measure BPD features.

Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). The CTQ is a 28-item questionnaire that retrospectively assesses experiences of abuse and neglect in childhood. Items are rated on a 5-point Likert scale from *never true* (1) to *very often true* (5). The CTQ includes 5 subscales: emotional, physical, and sexual abuse, and emotional and physical neglects. Total score is generated by summing scores on all items for each subscale. Each subscale score ranges from 5 to 25 with higher scores indicating more extreme history of abuse or neglect. Internal consistency of the subscales is moderate to high (Cronbach's alphas between .79 and .94), the measure has good test-retest reliability, and high convergent and discriminant validity in clinical and nonclinical populations (Bernstein et al, 1997; Scher

et al., 2001). A total CTQ score was used for the purposes of this study, due to the study focus on overall maternal trauma history rather than type of trauma history (MacDonald et al., 2016).

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987). The EPDS is a self-report screen of depression symptoms after childbirth. It excludes somatic dimensions of depression such as fatigue and appetite variations which are normal during the ante- and postnatal periods. Each item is rated on a 4-point Likert scale with a minimum total score of 0 indicating low depression and a maximum of 30 indicating severe depression. The EPDS has been shown to be a valid (Gibson, McKenzie-McHarg, Shakespeare, Price, & Gray 2009) and reliable measure, correctly identifying 90.7% of mothers with depression (Kernot, Olds, Lewis, & Maher, 2015).

The Emotional Availability Scales 4th edition (EAS; Biringen, 2008). The EAS is an observational measure that assesses quality of observed mother-infant interactions along six dimensions of emotional availability. It consists of four parent scales (sensitivity, structuring, non-intrusiveness, and non-hostility) and two child scales (responsiveness and involvement). Administration involves a video of the mother-infant interaction. The mother is invited to play with her baby for eight minutes, as she would at home, as suggested in the EAS manual (Biringen, 2008). Interactions are rated by reliable coders on the appropriateness of mothers' responses to their child's cues, display of appropriate and authentic affect, and structuring their child's activities. Children are rated on their response to their mother's interaction both overtly and affectively, and their ability to engage their mother. Each of the subscales is coded on a Likert scale, from 1 to 7; 1 indicating low or problematic EA, and 7 indicating high EA. Reliability and validity of the EAS are well established (Biringen, 2005). In terms of internal consistency, intercorrelations of EAS dimensions range from .48 to .88, with the lowest correlations for the non-intrusiveness dimension. Within this study, the videos were coded by 2 coders; author (VNM) coded 44% of the cases and the remaining 56% of the cases were coded by the rater at the second site. The raters were trained to a reliable standard by the author of the scales. In terms of inter-rater reliability, a subset of 20% of videos was double coded with high intraclass correlation coefficients (sensitivity $ICC = .86$, structuring $ICC = .87$, non-intrusiveness $ICC = .88$, non-hostility $ICC = .78$, responsiveness $ICC = .77$, and involvement $ICC = .80$). In this study the composite EA score was used as we were interested in the overall quality of the mother-infant relationship quality. The composite was derived as the Mean score of the six subscales as an overall measure of total dyadic EA (composite EA $ICC = .83$).

The Mother-Infant Relationship Scale (MIRS; Newman-Morris et al., 2020). The MIRS is 19-item self-report measure of Distorted Maternal Representations (DMRs). DMRs are disturbed thoughts and feelings that a mother holds about her infant and herself as parent that influence parenting behaviours and caregiving. The MIRS can be used as a clinical

screen for problematic/disrupted mother-infant relationships or a continuous scale for research. Items refer to *baby* and *parent* and capture representations concerning (1) hostility/rejection (2) apprehension about parenting and attachment and (3) helplessness/anxiety about infant care. Items are scored on a 4-point Likert scale from *never* (0) to *always* (3) with a minimum score of 15 and a maximum score of 45; scores of >30 indicate risk of disturbance. The MIRS has excellent internal consistency (Cronbach's alpha = .91) in clinical samples, and adequate internal consistency (.78) in nonclinical samples. It has excellent test-retest reliability (ICC .81), and good concurrent validity with an observational measure (-.35 to -.54) and an interview measure (.53) (Newman-Morris et al., 2020).

Parenting Stress Index – Short Form (PSI-SF; Abidin, 1990). The PSI is a 36-item questionnaire that assesses three dimensions of parenting stress: parental distress, parent-child dysfunctional interaction and child difficulty; these three dimensions sum up to a total score. These are then converted to percentiles with normal range between the 15th – 80th percentile. Scores at or above the 85th percentile are considered high and Defensive Responding scores at 10 or below are considered extremely low. The scales have demonstrated adequate internal consistency (Cronbach's alpha = .80-.91) and test-retest reliability (ICC = .68 - .85) (Abidin, 1990).

The Parent Development Interview (PDI; Aber et al., 1985; Slade et al., 2004). The PDI is a 45-item semi-structured clinical interview intended to examine mentalisation operationalised as Reflective Function (RF). The interview assesses the mother's understanding of her infant's behaviour, thoughts and feelings by asking her to provide real life examples of affectively charged interpersonal situations. For example, *Describe a time in the last week when you and your child really clicked or didn't click*. The PDI was audiotaped and transcribed, (author VNM conducted 44% of the interviews, 56 % were collected by another trained research psychologist at the second site), and then coded by a trained coder (LN). A subset of 20% of interviews were double coded by the RF raters who contributed to this data set. The intraclass correlation coefficient for the overall RF score was satisfactory (ICC = .77). The PDI is coded across four dimensions: (1) awareness of the nature of mental states, (2) the explicit effort to tease out mental states underlying behaviour; (3) recognition of the developmental aspects of mental states; and (4) mental states in relation to the interviewer. Scores on the PDI range from -1 to 9, with exceptionally low scores (-1) indicating bizarre and distorted RF, and exceptionally high scores (9) indicating superior RF capacity. The PDI has adequate interrater (ICC $>.75$) reliability and high internal consistency with a single factor solution (Cronbach's alpha = .91) confirming that all scores contribute relatively equally to the overall RF score (Sleed, Slade, & Fonagy, 2018). In terms of infant factors, maternal RF can be potentially confounded by infant age for infants younger than 2 months (Sleed et al., 2018).

Data analyses

IBM SPSS Statistics for Windows version 22.0 (2015) was used to conduct all data analyses. Firstly, data were screened to identify missing cases and checked for normality; transformations of variables were not necessary. Secondly, descriptive statistics and Pearson's correlation matrix were calculated for the study variables. Pearson's correlations were also used to determine which potential cofounders needed to be controlled for. Next, SPSS PROCESS macro (version 2.16) was used to conduct regression analyses. This program provides estimates of direct and indirect effects of mediating variables, interaction effects of moderating variables, levels of significance, and confidence intervals from bootstrap calculations. Unstandardized coefficients were used to represent these estimated effects and all analyses were conducted within 5,000 bootstrap samples. In order to determine that predictors were not affected by multicollinearity and that assumptions of linearity and homoscedasticity were met; regression analyses were performed within each model. Given mediation analyses using cross-sectional data can be subject to confounding effects (Hayes, 2013), additional models were tested to determine whether the primary paths remained statistically significant after controlling for demographic and clinical covariates.

Results

Sample Characteristics

Table 1 presents sample characteristics for Samples 1 and 2, differences between the two samples, and the total sample combined. Mothers in Sample 1 were significantly older, more likely to be married, and more likely to report above minimum wage for family income than mothers in Sample 2. Samples 1 and 2 were combined for the purposes of the current study.

Insert Table 1 about here

Table 2 presents means and standard deviations of clinical symptoms including anxiety (BAI), BPD features (BSL-23), depression (EPDS), parental stress (PSI), the severity of maternal trauma history (CTQ), distorted maternal representations (measured on the MIRS), maternal mentalisation (RF on the PDI), and emotional availability scales (EAS) for the study samples separately and the total sample combined. Mothers in Sample 1 had significantly higher RF and lower PSI scores compared to mothers in Sample 2. Mothers in Sample 1 had significantly lower EA structuring, non-intrusiveness and non-hostility scores compared to mothers in Sample 2. There were no other significant differences between the samples. Samples 1 and 2 were combined into the total sample for the purposes of the study in order to increase statistical power for the analyses.

Insert Table 2 about here

Associations between Maternal Trauma, Distorted Maternal Representations, Reflective Function, Emotional Availability and BPD features

It was hypothesised that (1) the level of dyadic emotional availability (EA) in the mother-infant interaction would be inversely correlated with ratings of maternal trauma history, BPD features, DMRs and maternal mentalisation. Correlations are presented in Table 3. Statistically significant inverse moderate correlations were found between total dyadic EA and BPD features ($r = -0.40, p < .01$), and total EA and DMRs ($r = -0.43, p < .01$). BPD features and DMRs were strongly correlated ($r = 0.83, p < .01$). Maternal trauma history was significantly positively correlated with both BPD features ($r = 0.43, p < .01$) and DMRs ($r = 0.30, p < .01$) showing data were suitable for subsequent regression analyses. No significant correlations were found between total EA and ratings of maternal trauma history, or total EA and RF. However, EA non-hostility subscale scores were inversely correlated with DMRs ($r = -0.54, p < .001$) and RF ($r = -0.40, p < .01$) showing this set of variables was also suitable for the proposed moderation analysis.

Correlations between key study variables and potential clinical covariates (depression, anxiety, and parental stress) and demographic covariates (infant age, marital status, education level and) were also evaluated. Due to significant correlations between key study variables and clinical covariates, these were controlled for in the regression analyses. In terms of demographic variables, infant age was not significantly correlated with any of the study variables, and therefore was not included as a covariate in analyses. Marital status was significantly moderately correlated with maternal trauma ($r = -.37, p < .05$) and DMRs ($r = .37, p < .05$), and education level was significantly moderately correlated with reflective function ($r = -.38, p < .01$) and DMRs ($r = -.39, p < .01$) (Cohen, 1988). Thus, the potential confounding effects of marital status and education level were also controlled for in the subsequent analyses.

Insert Table 3 about here

Regression analyses evaluating the impact of maternal trauma, BPD features and DMRs on the Mother-Infant Interaction

Mediation may occur when an association exists between the predictor and outcome variable but a third variable, in this case the mediator, explains part or all the strength of the association. In light of previously established theoretical and empirical relations among maternal trauma history, BPD features, DMRs and disturbance in interaction, we tested if (2a) BPD features would mediate the association between maternal trauma history and DMRs; (2b) DMRs would mediate the association between BPD features and poor interaction (low dyadic EA). The use of structural equation modelling or *k* PROCESS (i.e., including multiple independent, dependent and mediating variables) was not used due to modest sample size. Nevertheless, effect sizes and ultimate results remain unaffected using simple regression models with cross-sectional data compared to more complex modelling techniques (Hayes, 2013). The sample size was adequate for testing the following simple mediation models using multiple regression analysis (Hayes, 2013).

Results of the first path analysis are summarised in Figure 1a. Maternal trauma history had an indirect effect on DMRs through its effect on BPD features. Mothers who reported higher levels of trauma history endorsed more BPD features ($a = .58, p < .01$); and those that endorsed more BPD features endorsed more DMRs ($b = .27, p < .01$). A 95% bias-corrected and accelerated bootstrap confidence interval (BCA CI) for the indirect effect of DMRs was entirely above zero which means that the model was significant ($ab = .15, 95\% \text{ CI } [.063-.288]$). The direct effect was no longer significant when the mediator was controlled for ($c' = -.029, p = .42$) suggesting complete mediation (Hayes, 2013). The total model accounted for 18% of variance in DMRs ($R^2 = .18$). Moreover, the indirect effect of maternal trauma on DMRs remained significant even after controlling for the effects of marital status and level of education ($ab = .15, 95\% \text{ CI } [.075-.276]$); and maternal depression, anxiety, and stress ($ab = .12, 95\% \text{ CI } [.022-.251]$).

Insert Figure 1a about here

Results of the second path analysis, testing if DMRs mediate the association between BPD features and the mother-infant interaction (dyadic EA), are presented in Figure 1b. BPD features had an indirect effect on dyadic EA through their effect on DMRs. Specifically, those mothers who reported more BPD features endorsed more DMRs ($a = .26, p < .01$), and those who endorsed more DMRs displayed lower dyadic EA ($b = -.08, p < .05$). The indirect effect of DMRs was entirely below zero which means that the model was significant ($ab = .02, 95\% \text{ CI} [-.043 - (-.004)]$). The direct effect was no longer significant when the mediator was controlled for ($c' = .003, p = .78$) suggesting a complete mediation (Hayes, 2013). The total model accounted for 20% of variance in dyadic EA ($R^2 = .20$). The indirect effects of BPD features on dyadic EA remained significant even after controlling for confounding effects of demographic ($ab = -0.03, 95\% \text{ CI} [-.08 - (-.003)]$) and clinical variables ($ab = -.02, 95\% \text{ CI} [-.04 - (-.002)]$).

Insert Figure 1b about here

Regression analyses evaluating the impact of Maternal Mentalisation on the association between DMRs and Disturbance in Interaction

Moderation implies an interaction effect where introducing a moderating variable changes the direction or magnitude of the relationship between variables i.e., a moderator specifies conditions under which a given predictor is related to an outcome. Previous research has suggested that RF may play a buffering role between maternal mental state and observed disturbance in interaction (e.g., Grienenberger et al., 2005). In this study, it was hypothesised that (3) RF would moderate the association between DMRs and poor interaction (maternal non-hostility). DMRs significantly predicted maternal non-hostility in interaction $R^2 = .33, F(2, 60) = 9.8, p < .001$. Once the interaction term was added to the model, it accounted for a significant proportion of the variance in maternal non-hostility $\Delta R^2 = .058 \Delta F(1, 60) = 5.14, p = 0.027, b = .04, t(60) = 2.27, p < .05$. Examination of the interaction plot presented in Figure 2 shows a buffering effect, where increasing the moderator decreases the effect of the predictor. The interaction was probed by testing the conditional effects of DMRs at three levels of RF, one standard deviation below the mean, at the mean, and one standard deviation above the mean. In this high-risk sample, RF had a buffering effect only when RF was low to moderate. Specifically, DMRs were significantly related to non-hostility in interaction when RF was one standard deviation below the mean and when at the mean ($p < .01$), but not when RF was one standard deviation above the mean ($p = .059$). The Johnson-Neyman technique

showed that the association between DMRs and non-hostility was significant when RF was less than .23 standard deviations above the mean but not significant with higher values of RF. In short, the results show the worst outcome in terms of the quality of the interaction is for mothers with lowest RF scores, who endorse the most DMRs and who have the lowest non-hostility scores (i.e., are hostile in interaction with their infants).

Insert Figure 2 about here

Regression analyses evaluating the impact of severity of BPD features on associations between DMRs and Maternal Mentalisation

In order to examine the positive association between RF and the measure of DMRs in more detail, it was hypothesised that (4) the severity of BPD features would moderate this link. RF was significantly associated with DMRs $R^2=.66$, $F(2, 55) = 34.9$, $p < .001$). The interaction between RF and BPD features accounted for a significant proportion of the variance in DMRs $\Delta R^2=.03$ $\Delta F(1, 55) = 4.91$, $p = 0.031$, $b = .05$, $t(55) = 2.21$, $p < .01$. Examination of the interaction plot presented in Figure 3 shows an antagonistic effect, where increasing the moderator reverses the effect of the predictor on the outcome variable. The interaction was probed by testing the conditional effects of severity of BPD features at three levels, one standard deviation below the mean, at the mean, and one standard deviation above the mean. In this high-risk sample, RF had an effect only when BPD features were moderate to high. Specifically, RF was significantly related to DMRs when BPD was one standard deviation below the mean and above the mean ($p < .01$), but not when BPD features were below the mean ($p = .48$). The Johnson-Neyman technique showed that the association between RF and DMRs was significant when BPD was less than .42 standard deviations above the mean but not significant with smaller values of BPD. In short, the results show the worst outcome in terms of distorted thinking about the infant is for mothers with highest BPD feature scores, who endorsed high levels of DMRs and have paradoxically high RF.

Insert Figure 3 about here

Discussion

This study aimed to examine the links between maternal mental states and the quality of observed mother-infant interaction in high risk populations for women with BPD features and their infants. The total study sample comprised of two separate samples of women recruited from at-risk services including inpatient and outpatient perinatal and infant mental health services, and services for mothers with drug and alcohol abuse issues, i.e., psychosocial risk. Significant differences between samples were identified for maternal mentalisation, structuring, non-intrusiveness, and non-hostility in interaction, the implications of which are reported in a forthcoming companion study. In the present study, the total sample was used to increase statistical power and to allow for examination of mechanisms which perpetuate disturbed maternal mental state in relation to caregiving representations, BPD features (i.e., clinical symptoms) and disrupted interactions. A key attribute of this study is the use of a self-report measure the MIRS (Newman-Morris et al., 2020) in conjunction with an interview measure of maternal mentalisation the PDI (Aber et al., 1985; Slade et al., 2004), both of which tap into distorted representations. The findings are discussed in terms of their theoretical and empirical implications.

Maternal Trauma History, DMRs and Disturbance in Interaction

Consistent with the first hypothesis, BPD features and DMRs showed statistically significant inverse correlations with dyadic emotional availability (EA). Maternal trauma history did not show significant correlations with maternal mentalisation or EA which precluded the impact of clinical features on maternal mentalisation and EA following maternal trauma to be examined. However, maternal trauma history was significantly correlated with BPD features and DMRs. A possible explanation for this discrepancy in findings could be due to the level of measurement. While trauma, BPD features and DMRs were captured via self-report, maternal mentalisation and EA are discursive and observational measures respectively. It is possible that the conscious and readily self-disclosed aspects of past and present difficulties are not consistent with the narrative and the quality of the observed interaction. It is not uncommon to observe contradictory behaviours and incongruent discourse about caregiving during clinical interviews with high-risk dyads (Fraiberg, 1980). A common example may be a mother who is aware of her trauma history and distress (e.g., anxiety, BPD symptoms), experiences herself as a 'bad mother' in representational terms, and is seemingly warm yet apprehensive and timid in her interaction with the infant. Another reason may be that delineating this level of nuance in high-risk trauma populations requires a higher degree of measurement complexity that captures both conscious and unconscious elements, at the level of representation and observation. Rustin

(2019), for example, argues that these conscious and unconscious elements may add up to a whole which is quite different in its quality from the individual constituents.

Consistent with the second hypothesis, BPD features were found to completely mediate the relationship between maternal trauma history and DMRs. Further, DMRs were found to completely mediate the relationship between BPD features and low dyadic EA. The findings suggest that maternal trauma history is associated with borderline pathology and this has a subsequent effect on the mother's relational thinking about the infant and the quality of the interaction. These findings are consistent with previous research that has found associations between maternal trauma history and BPD (Finger et al., 2015; Fonagy & Bateman, 2008); and maternal trauma history, DMRs, and poor infant outcomes in terms of attachment organisation and the quality of interaction (Crawford & Benoit, 2009; Lyons-Ruth et al., 2004; Lyons-Ruth et al., 2005; Madigan et al., 2006; Slade et al., 2005). However, the current DMRs data is based on a self-report measure. Notwithstanding the loss of richness provided by the more elaborate interview measures that can also capture unconscious meanings and defensive processes, this study provides evidence that using this simpler and more economical way of measuring distortions may be feasible in research with high-risk populations.

A very strong correlation ($r > .8$) appeared between the measure of BPD features (BSL-23) and DMRs (MIRS). While this finding suggests that the two measures may be capturing the same construct on a conceptual level (Cohen, 1988), it is important to note that they are different even if both measure aspects of maternal mental state. The BSL-23 measures BPD symptomatology (mood lability, affect, identity related to self and the general other) and the MIRS measures thoughts and feelings associated with being a parent, and understanding and tolerating infant needs for attachment and affective communication. Thus, the strong correlation likely points to a high risk of DMRs in complex trauma and BPD populations, for which the MIRS was specifically designed as a screening tool (Newman-Morris et al., 2020). This notion is further supported by the strong intercorrelations between BPD features and DMRs with other clinically relevant aspects of maternal mental health including anxiety, depression and parental stress. The challenge of adaptation to parenthood and of establishing a relationship with the infant are particularly acute for women with BPD and trauma history (Newman, 2020). This is also substantiated by a large number of diagnoses and sub-threshold borderline presentations during this psychologically and developmentally vulnerable time period (Wedland et al., 2014). While this idea has been widely discussed in psychotherapy literature (e.g., Fraiberg, 1975; Isosavi et al., 2019), the present study provides empirical evidence into the possible psychological mechanisms that could allow for maternal mental state to be understood from a relational perspective, as well as reflecting a specific psychopathology. The baby's presence and the challenges associated with the developmental task of adjusting to parenting could activate unresolved

traumatogenic relational patterns from the mother's past and influence her experience in terms of increased borderline symptomatology, e.g., distress and anxiety manifesting as DMRs, and disturbance in interaction (Newman & Stevenson, 2008).

In terms of EA, the current findings show mothers with BPD features are likely to display insensitive, incongruent, inauthentic maternal affect, inconsistent or mistimed responsiveness, poor structuring, and high hostility and intrusiveness. Correspondingly their infants tend to be low in responsivity to maternal bids for interaction, and with low involvement of the parent. The findings support previous EA research in high-risk trauma and BPD populations (Flykt et al., 2012; Newman et al., 2007). Flykt and colleagues reported distorted representations (both negative and idealising) in a drug-abusing sample were detrimental to the quality of the mother-infant EA. Thus, the current findings suggest that early interventions that focus on addressing low dyadic EA and approaches aimed at modification of DMRs may improve child psychosocial outcomes. However, this hypothesis remains to be tested.

Interestingly, the mean EA scores were midrange (around 4) indicating complexity, inconsistency in interaction, affective lability and contradictory behaviour patterns in both mother and baby (Saunders, Biringen, Benton, Closson, Herndon, & Posser, 2017). Indeed, caregiving in complex trauma populations and BPD has been mostly described as inconsistent and erratic (Levy, 2005), with maternal difficulties in maintaining an emotional focus on the infant and overall lower levels of emotionally sensitive responses compared to healthy relationships (Lyons-Ruth et al., 2004; Newman et al., 2007). It is not merely the lack of maternal sensitivity that has been found to be traumatic for the infant but the unpredictable and erratic intrusion of maternal traumatic affect manifest as disorientation, dissociation, inconsistent and incongruent maternal mirroring and caregiving (Beebe et al., 2010; Slade, 2005; Lyons-Ruth & Spielman, 2004; Lyons-Ruth et al., 2005). Currently, the EAS qualify high-risk interactions at the lowest end of the scales, including low and traumatic affect characteristic of perhaps the most troubled dyads. However, the EAS do not include an overt index score for traumatogenic relational patterns (Biringen, personal communication, August 2017; November 2019). At medium levels (i.e., scores around 4), the scales typically signify issues of sub-optimal maternal sensitivity, medium levels of non-intrusiveness, inconsistent structuring, or covert hostility. While non-intrusiveness, for example, may be interpreted as a positive caregiving behaviour in normative samples, in high-risk trauma populations it may point to defensive maternal withdrawal which has been found to be detrimental in terms of later child development, e.g., dissociative states in adolescence (Lyons-Ruth, Bureau, Easterbrooks, Obsuth, & Hennighausen, 2013). One of the reasons for the scores being in the mid-range compared to much lower scores in the current trauma sample, could be that the current EAS data was based on relatively short 8-minute videos of free play. Longer observational periods or episodes which could include a deliberate research stress condition

(e.g., separation or feeding) are typically more stressful to parents and hence may have elicited more atypical affective behaviours. Nonetheless, the findings of the current study point to important areas for further research in determining the correlates of EA and trauma zones for high-risk dyads in this medium and ‘complicated’ range (Saunders et al., 2017).

Maternal Mentalisation, DMRs and Disturbance in Interaction

Consistent with the third hypothesis, maternal mentalisation was found to be a significant moderator, i.e., a buffer between DMRs and maternal non-hostility. This finding is congruent with previous findings regarding the protective nature of maternal mentalisation against the intergenerational transmission of traumatic relational patterns (Grienenberger et al., 2005; Luyten, Nijssens, Fonagy, & Mayes, 2017; Slade et al., 2005; Slade et al., 2020). It is also consistent with recent EA research with older children (5-12 years old) which reported maternal non-hostility mediated the relationship between maternal BPD and child behavioural problems (Kluczniok et al., 2018). Thus, maternal mentalisation may play an especially important protective role in the intergenerational transmission of BPD features through maternal non-hostility. However, more longitudinal research is required.

Consistent with the fourth hypothesis, the severity of BPD features moderated the relationship between maternal mentalisation and DMRs. Hence, the findings suggest that maternal mentalisation may only play a buffering role relative to the severity of BPD features. The impact of BPD symptom severity on maternal mentalisation may have an antagonistic, paradoxical effect. In this sample, the positive association between maternal mentalisation and distorted representations was counterintuitive, revealing that mothers appearing to have relatively high reflective capacity also endorsed many distorted ideas about their infants and themselves as parents. This finding builds on limited previous research that has found unusually high mentalising in the context of maternal BPD (Marcoux et al., 2016; Newman-Morris et al., 2019). Intuitively, ‘high’ mentalisation could be interpreted as a protective factor for a woman who may, despite her difficulties, parent well (Grienenberger et al., 2005). However, the current findings suggest that the impact of BPD features severity is such that it may produce pseudomentalising; i.e., hypermentalising, erroneous and intrusive focus on mental states reflecting deficits in understanding the infant’s inner states and subjectivity (Sharp & Fonagy, 2008).

The current findings provide further insight into the paradoxical and unstable nature of mental states in complex trauma and BPD populations both in terms of the *content* of DMRs and the underlying mental *processes*, i.e., hypermentalisation. Although the extent and content of DMRs are idiosyncratic, the experience of the infant is mostly narrated as ‘needy’, ‘bad’, or ‘manipulative’, and of the mother herself as ‘bad’ or ‘helpless’ (Slade, 2005). The infant may also be seen as the vulnerable and needy part of the maternal self with a

corresponding anxious need to protect the infant from harm (Newman, 2015, 2020; Newman & Stevenson, 2008). The ‘bad’ aspects are defensively split off and assigned to the self during infancy, while the other (mother) remains omnipotent and good in the infant’s mind, or vice versa (Klein, 1952).

Regarding *process*, BPD features impose a specific and heightened stress relating to mentalisation during the transition to parenthood. The presence of the infant may activate the mother’s own attachment system, triggering traumatic memories which in turn may limit her empathic and sensitive thinking about the infant’s subjectivity (Byrne et al., 2018; Slade et al., 2005). Instead, she could become self-referential or assign unlikely mental states to a very young infant (e.g. elaborate and speculative motives to a two-month-old baby). The current findings suggest this process may be contingent upon the degree of the mother’s borderline symptoms. The more severe the mother’s BPD features, the more excessive her unconscious need to defend against the associated psychic pain is likely to be. This may result in maternal hypermentalising and DMRs.

While previous research has shown splitting and projection as primary defensive modes characteristic of populations with chronic trauma and BPD (Lyons-Ruth et al., 2007), the current study adds to the literature by elucidating the paradoxical nature of mentalisation in this population. Maternal mentalisation can be a buffer against hostility in interaction and yet its quality can be reduced to pseudomentalsing depending on the symptom severity. Simultaneously, the findings raise important methodological considerations with regards to measurement of pseudomentalsing, including the sensitivity of RF coding systems of the PDI in different clinical samples, and their links to measures of disturbance in the mother-infant interaction.

Limitations

While the current findings provide contributions to the knowledge and measurement of aspects of the mother-infant relationship quality in high-risk populations, they should be interpreted with consideration of some limitations. First, the findings are based on cross-sectional data and thus preclude temporal and causal interpretations. Second, in terms of the sample, although the mother-infant dyads were recruited from clinical settings and in the context of indicated relationship difficulties, the relatively heterogenous sample and a lack of control group prevents diagnosis-based interpretations. While drug and alcohol abuse history (55%) may have confounded the results, this was addressed by recruiting only those in remission. The effects of possible drug and alcohol abuse were not controlled for due to not having adequate data about this aspect of the participants’ history. However, high comorbidity is a clinical reality in high-risk samples. Consequently, it cannot be determined whether the findings of the present study are specific to borderline pathology or other forms of psychopathology. Nonetheless, the findings provide evidence about the importance of

DMRs and distorted interactions as a primary concern for relational and infant factors. Third, in terms of measures, it has been suggested that retrospective measures of trauma are susceptible to report and recall biases. However, the CTQ measure used in this research has been well validated and shown to be a reliable indicator of severe trauma and abuse across different populations (Baker & Maiorino, 2010). Finally, the modest sample size could limit the generalisability of the findings. Given it is a challenge to obtain observational, discursive and self-report data during the sensitive postnatal period for women with significant psychosocial challenges, collaborative approaches to data collection should be considered.

Clinical implications

The findings of the current study highlight DMRs may be implicated in the transmission of traumatogenic relational patterns from mother to infant and could be a helpful target in early intervention treatment programs designed for high-risk parents. Attending to DMRs therapeutically includes understanding maternal trauma history, but with a focus on the present relationship with the infant and the experience of being a parent (Newman & Stevenson, 2008). The therapeutic focus on supporting the development of an organised attachment with the infant and sensitive emotional interaction may better support the development of attuned maternal mentalisation. Relational approaches that focus on the infant and parenting experience could support vulnerable parents in improving confidence, reducing stress and improving adjustment (Newman, 2015). Interventions aimed at improving maternal mentalisation and her understanding of the inner world of the infant may also focus on the quality of emotional interactions and responsivity to infant signals where these processes are potentially disrupted by DMRs. Further, the findings suggest improved maternal mentalising could mitigate the transmission of relational trauma and prevent child maltreatment. However, mixed methods should be used to evaluate outcomes, including observational and representational measures of relationship quality, in order to determine whether a potential increase in mentalisation is denoting overall improvement or hypermentalising.

Directions for future research

Further research is required regarding conceptual and measurement overlap between maternal representations and mentalisation. DMRs have been assumed to be a component of mentalising deficits. However, the current research suggests maternal mentalisation in clinical populations may also have a pseudo quality. Clinically, this may be challenging to predict because the mother may appear as though she is reflecting about her

own or the infant's mental state when she may instead be hypermentalising in an intrusive or overly speculative manner. Although numerous measures are available that tap into distorted representations and mentalisation (Schribbor et al., 2013; Sharp & Fonagy, 2008), studies using concurrent measures including both constructs could help determine their overlap, redundancy or risk factors, and hence refine their application. This remains imperative given the challenges of accurately capturing distorted aspects of mentalising in clinical samples which could be associated with conceptual and operationalisation issues. Alternatively, they could be associated with a specific psychopathology that may not necessarily be directly opposed to nonclinical data. This level of variability in the interpretation of the data calls for more nuanced approaches in determining the correlates of relational disturbance at the level of representation, both in terms of content and form i.e., meta-cognitive process. Some recent developments in this research domain include the Assessment of Representational Risk coding of the PDI which measures ambivalent, hostile, helplessness, and narcissistic maternal representations (ARR; Sled, 2014). Thus, future studies could simultaneously employ the MIRS and the ARR for example, to further evaluate similarities and divergences in assessment tools designed to capture representational risk factors.

Similarly, future studies are required to elucidate the indices of trauma on the EAS for use in high-risk populations. One of the research questions stemming from the current findings is whether inconsistent and paradoxical maternal EA signifies defensive processes (e.g., withdrawal) in populations with chronic trauma. This follows also from the theoretical and empirical links between attachment disorganisation in infancy and adulthood, including contradictory infant behaviours and adult mental states in relation to attachment (Lyons-Ruth et al., 2004; 2007). More EA research with high-risk dyads is required to determine the correlates of inconstant EA scale range with other traumatogenic factors, including maternal mental state and infant outcomes. Importantly, videos of longer mother-infant interaction including a stress condition that activates attachment systems for both mother and infant, such as separation, could further elucidate scores and traumatogenic EA zones for mothers with BPD. Future research should also consider using larger and diverse clinical samples, including homogenous clinical control groups, in order to help determine if the findings presented in this research are specific to BPD features, another psychopathology, or to broader aspects of relational and personality development.

Conclusions

The results highlight that mothers with BPD features are likely to have a history of trauma which has a subsequent effect on their relational thinking about the infant, parenting capacity, and style of engagement with the infant. They are likely to engage in hostile, inconsistent, withdrawn, and anxious styles of interaction. The findings contribute to the

empirical considerations of measuring distorted maternal representations via self-report, i.e., MIRS, and point to the ongoing need to further refine and expand measures that tap into relational constructs and their underlying unconscious processes and meanings. The findings support the intergenerational model of early relational trauma and the severity of BPD features on deficits in mentalisation (i.e., hypermentalisation), DMRs, and the mother-infant interaction. However, to support the understanding of vulnerable families and for providing evidence-based interventions more research is required to help determine causal mechanisms implicated in early parent-infant relational disturbances, including the key protective factors.

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Table 1

Demographic Characteristics within the Study Samples

Demographics	Sample 1 N=27	Sample 2 N=34			Total Sample N=61
	Mean (SD)	Mean (SD)	<i>t</i>	<i>p</i>	Mean (SD)
Mother age	31.3 (5.8)	28.5 (6.4)	2.1	.037	29.6 (6.8)
Infant age	5.1 (2.9)	5.4 (3.1)	-.6	.547	5.3 (3.2)
	N %	N %	χ^2 (df)	<i>p</i>	N %
Born in Australia	95%	100%	1.8 (1)	.297	97%
Marital Status			22.7 (3)	<.001	
Married	46%	0%			26 %
Cohabiting	25%	52%			32%
Single	29%	47%			33%
Government benefits	74%	65%	.91 (.34)	.342	70%
Education level			4.5 (5)	.497	
Low	50%	71%			40%
Medium	41%	26%			33%
High	7%	3%			5%
Family Income (per annum)			42.7 (12)	<.001	
< minimum wage	9%	67%			34%
\$40,000 – 80,000	37%	0%			12%
>80,000	2%	0%			1%
‘don’t know’	26%	32%			29%

MOTHERS WITH BPD FEATURES AND THEIR INFANTS

Indicated financial stability	41%	42%	3.9 (3)	.267	42%
Currently on psychotropic medication(s)	63%	67%	.16 (1)	.818	65%

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Table 2

Clinical Symptoms, Maternal Representations, Mentalisation and EA within the Study Samples

	Sample 1 N=27	Sample 2 N=34			Total sample N=61
Clinical symptoms	Mean (SD)	Mean (SD)	<i>t</i>	<i>p</i>	Mean (SD)
BAI	28.2 (10.3)	24.9 (96.2)	1.3	.191	26.4 (8.4)
BSL-23	44.3 (20.7)	37.5 (17.7)	1.4	.169	40.6 (19.2)
CTQ Total score	64.2 (14.2)	60.3 (16.7)	1.1	.490	62.9 (16.3)
EAS Total score	3.7 (1.1)	4.0 (.6)	-1.6	.120	3.8 (.9)
EA Sensitivity	4.1 (1.7)	5.0 (.9)	-2.9	.004	4.5 (1.5)
EA Structuring	3.3 (1.1)	4.9 (.9)	-7.2	<.001	4.0 (1.3)
EA Non-intrusive	3.5 (1.2)	4.8 (1.1)	-7.5	<.001	4.1 (1.4)
EA Non-hostility	3.9 (1.2)	6.1 (1.1)	-1.5	<.001	4.9 (1.6)
EA Child-responsiv	4.1 (1.4)	4.6 (1.1)	-1.9	.048	4.3 (1.2)
EA Child-involve	3.8 (1.2)	4.4 (1.1)	-2.7	.019	4.2 (1.3)
EPDS	11.3 (4.8)	10.2 (3.8)	1.1	.262	11 (4.5)
MIRS	36.2 (10.5)	32.6 (7.3)	1.7	.093	34.2 (9.2)
PDI	4.7 (1.2)	3.6 (1.1)	4.2	<.001	4.2 (1.3)
PSI	128 (22.7)	142 (12.6)	-3.22	.041	135 (20.3)

MOTHERS WITH BPD FEATURES AND THEIR INFANTS

Note. BAI = Beck Anxiety Inventory, BSL-23 = Borderline symptom checklist, CTQ = Childhood Trauma Questionnaire, MIRS = Mother Infant Relationship Scale (measure of distorted maternal representations), EAS = Emotional Availability Scales, PDI = Parent Development Interview (measure of maternal mentalisation), EPDS= Edinburgh Postnatal Depression Scale, PSI = Parenting Stress Index

Table 3

Pearson's Correlations Between Clinical Symptoms, Maternal Representations, Mentalisation and EA within the Total Sample (N=61)

Variable	1	2	3	4	4.1	4.2	4.3	4.4	4.5	4.6	5	6	7
1 BAI	-												
2 BSL-23	.79**	-											
3 CTQ	.38**	.43**	-										
4 EAS Total	-.27	.40**	-.1	-									
4.1 Sensitivity	-.30*	.52**	-.1	.84**	-								
4.2 Structuring	-.36*	.46**	-.13	.91**	.65**	-							
4.3 Non-intrusiveness	-.18	-.19	-.19	.78**	.54**	.73**	-						
4.4 Non-hostility	-.34*	.46**	-.11	.86**	.60**	.81**	.70**	-					
4.5 Childhood-responsiveness	-.13	-.27	-.03	.86**	.76**	.70**	.50**	.60**	-				
4.6 Childhood-involvement	-.1	-.21	.05	.86**	.72**	.72**	.48**	.64**	.88**	-			

MOTHERS WITH BPD FEATURES AND THEIR INFANTS

5	EPDS	.54 **	.45 **	.24 *	-.09	0	-.16	-.08	-.15	-.03	-	-		
6	MIRS	.65 **	.83 **	.30 **	.43 **	-.23	-	-	-	-.24	.32 **	.42 **	-	
7	PDI	.41 **	.47 **	-.04	-.22	-.12	-.23	-.22	-	-.04	.14 **	.25 *	.53 **	-
8	PSI	.53 **	.68 **	-.19	.28 *	.14	.41 **	.17	.31 *	.22	.21 *	-.36 *	.68 **	.41 **

Note. N = 61, BAI = Beck Anxiety Inventory, BSL-23 = Borderline symptom checklist, CTQ = Childhood Trauma Questionnaire, MIRS = Mother Infant Relationship Scale (measure of distorted maternal representations), EAS = Emotional Availability Scales (total and individual subscale scores), PDI = Parent Development Interview (measure of maternal mentalisation), EPDS = Edinburgh Postnatal Depression Scale, PSI = Parenting Stress Index; * $p < 0.05$, ** $p < 0.01$.

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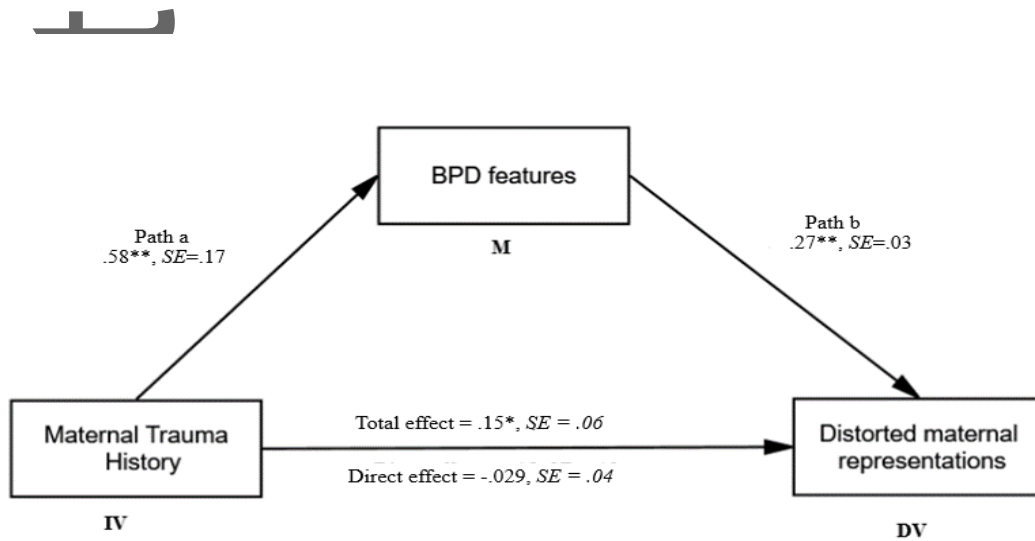


Figure 1a. Schematic illustration of the mediation model examining the effect of maternal trauma history on distorted maternal representations, through the mediator BPD features. Values represent path coefficients; SE = Standard Error, IV = Independent variable, M = Mediator, DV = Dependent variable; Maternal trauma history = measured on the CTQ, Distorted maternal representations = measured on the MIRS, BPD features = measured on the BSL-23; * $p < 0.05$, ** $p < 0.01$

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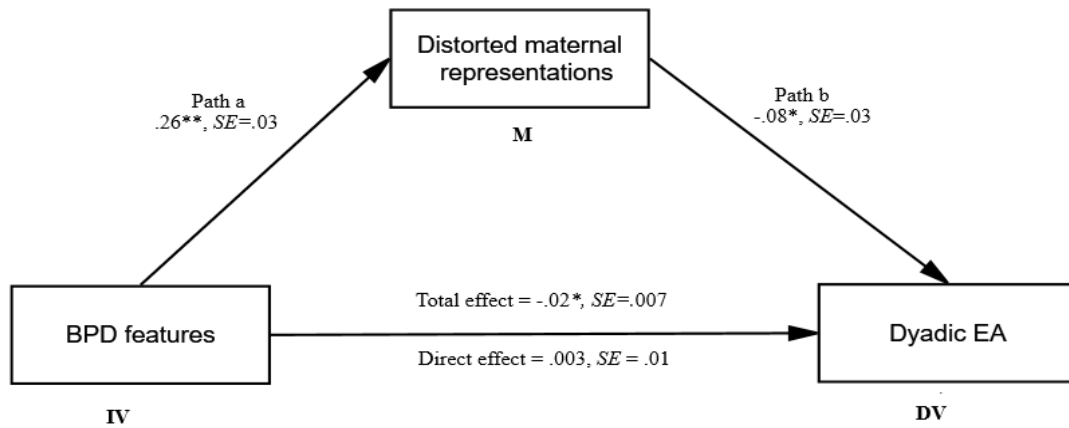


Figure 1b. Schematic illustration of the mediation model examining the effect of BPD features on dyadic EA, through the mediator DMRs. Values represent path coefficients; SE = Standard Error, IV = Independent variable, M = Mediator, DV= Dependent variable; BPD features = BSL-23, Distorted maternal representations = MIRS, dyadic EA= EAS; * $p < 0.05$, ** $p < 0.01$.

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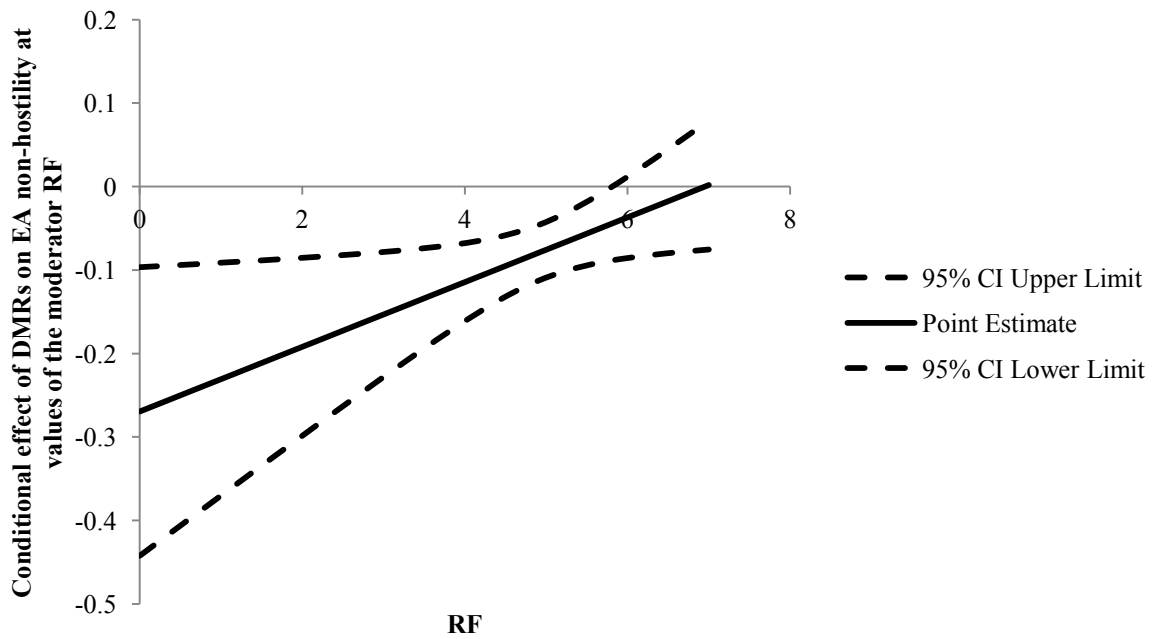


Figure 2. Schematic illustration of the interaction effects of distorted maternal representations and maternal mentalisation on maternal non-hostility in interaction.

Values represent standardised coefficients. Independent variable = distorted maternal representations (DMRs measured on the MIRS); Moderator = maternal mentalisation (RF measured on the PDI); Dependent variable = EA non-hostility. The y axis represents maternal non-hostility (i.e., higher values indicate lower hostility).

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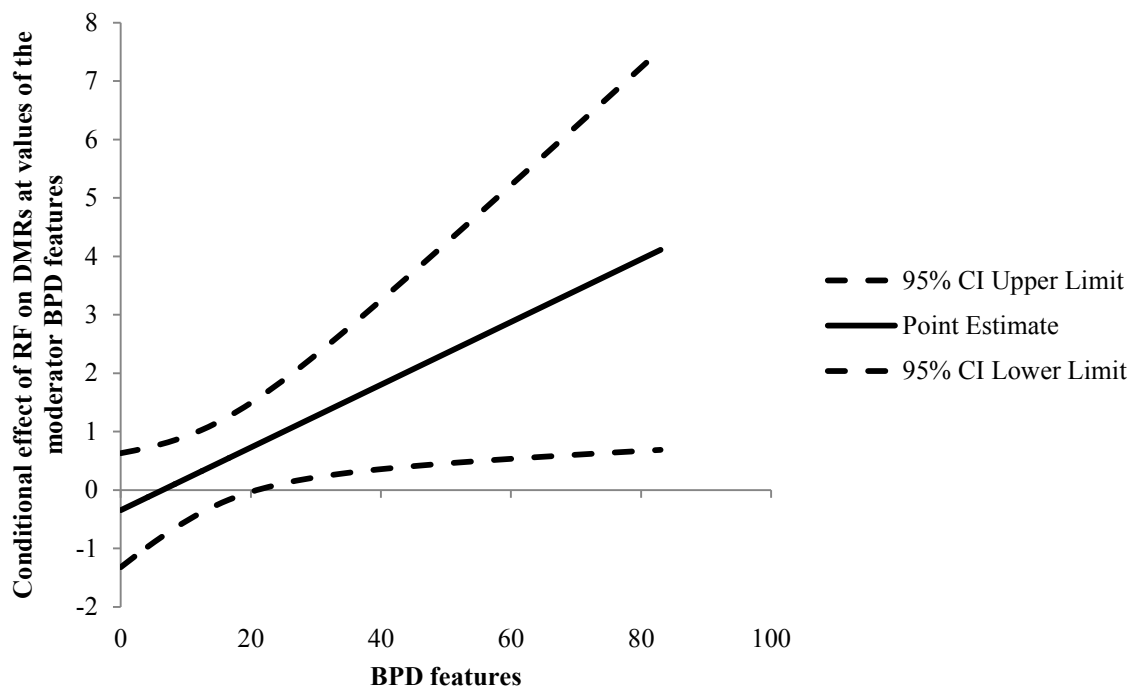


Figure 3. Schematic illustration of the interaction effects of maternal mentalisation and the severity of BPD features on distorted maternal representations. Values represent standardised coefficients. Independent variable = maternal mentalisation (RF measured on the PDI); Moderator = BPD features (measured on the BSL-23); Dependent variable = DMRs (measured on the MIRS).

Author

Key Findings and their Implications for Practice/Policy

1. This study provides empirical evidence for the intergenerational model of attachment trauma and BPD features. The results show BPD features mediate the relationship between maternal trauma history and distorted maternal representations, in turn predicting disturbance in the mother-infant interaction.
2. Maternal mentalisation was found to be a significant moderator, i.e., a buffer between distorted maternal representations and maternal non-hostility. While previous research has highlighted the protective role of maternal mentalisation in the intergenerational transmission of attachment, this is the first study to elucidate this finding in a high-risk sample.
3. The severity of BPD features was found to moderate the relationship between maternal mentalisation and distorted maternal representations. Hence, the findings suggest that maternal mentalisation may only play a buffering role relative to the severity of BPD features. The impact of BPD symptom severity on maternal mentalisation may have an antagonistic, paradoxical effect suggesting hypermentalisation (i.e., erroneous, excessive maternal pseudomentalisation).

Statement of Relevance to the field of Infant and Early Childhood Mental Health

This study contributes to the existing literature by providing evidence for the developmental and intergenerational model of attachment trauma in a high-risk sample of women with features of BPD and their infants. Specifically, the findings elucidate the impact of BPD symptom severity on maternal mentalisation. Simultaneous use of observational, interview and self-report measures raises conceptual and operationalisation issues as avenues for further research.