Dissertation: Volume 2

Title: Assessing caregiving representations: A systematic review and empirical study of the psychometric properties of measures

Literature Review

Empirical Research Project

Reflective Commentary

HDSS3

University College London

Submitted in partial requirement for the Doctorate in Psychotherapy (Child and Adolescent)

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DECLARATION

I declare that the material submitted for examination is my own work. The ideas and findings of others have been referenced in accordance with the guidelines provided and any work by others has been acknowledged.

I understand that anti-plagiarism software may be used to check for appropriate use of referencing.

Date: 6th March 2024

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Acknowledgements

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Thank you also to my co-trainees in both year groups I had the delight of being in.

Impact Statement

This study contributes to the literature around parental relational risk within the parent-child relationship. The literature review systematically evaluated the measures of relational risk, providing a clear and comprehensive review of the existing literature on the psychometric properties of each one. This review could be helpful to research methodology within the parental relational risk research area. It provides researchers with a helpful evaluation of the measures they may wish to use in their research as well as providing the strengths and limitations of each one. Furthermore, the review provides those in the field with clear areas in which further research is needed in order to in order to improve the psychometric properties of each measure. This may be of particular interest to both the creators and users of the measure. Likewise, this review may be helpful to those in social care who may be interested in using a measure of relational risk in order to contribute to their assessment of a parent's strengths and support needed relative to their ability to safely care for their child.

The findings of the empirical study provide an exploration of several psychometric properties of one specific measure of parental relational risk, the Assessment of Representational Risk (ARR). The properties evaluated were internal consistency, factor structure, criterion validity, concurrent validity, and discrimination validity.

This is a relatively new measure and this study was first to test the psychometric properties of the ARR in a sample with parents with social care support. This study generally found the ARR to have good psychometric properties, particularly in relation to the total risk score. This study therefore supports use of the ARR for both research and clinical purposes. Use of the ARR could help support parenting assessments for court purposes for clinicians asked to evaluate risk within the parent-child relationship. Furthermore, this study supports the ARR being used as an outcome measure for interventions focused on improving parenting sensitivity and reducing risk of harm to the child within the parent-child relationship.

This study has also identified a number of areas in which further psychometric testing of the ARR would be beneficial. In particular, it would be helpful for the ARR to be tested using longitudinal data, specifically in order to look at responsiveness testing as well as predictive validity. Future research looking at the factor structure of the ARR would also be important. This study therefore provides academics with clear areas of further research.

In broader terms, it is hoped that this research contributes to the broader field of child protection work. How to identify which children are at risk of harm within their families is an extremely important responsibility that local authorities and professionals in child wellbeing have. Measures like the ARR provide researchers and clinicians in child protection with a scientifically robust tool in which to help them identify and provide timely intervention to the families that need it most.

Part 1: Literature Review

Title: Exploring the Psychometric Properties of Measures of Parental Representation

Candidate Number: HDSS3

Word count 7,995

Abstract

Context: To identify and evaluate the psychometric properties of semi-structured interviews measuring parental representations

Data source: A systematic review of English articles and theses using PsycINFO, Pubmed, Proquest. Additional studies were identified by hand searching and contacting experts. Search items included Parental representations, internal working model, measures, interviews.

Study selection: Only articles and theses which used a measure of parental representation and reported quantitative finding on the measure were included.

Data synthesis: Psychometric properties in terms of methodology and quality were assessed for each paper identified in this review. An overall rating of *Psychometric Quality* and *Quality of Evidence* was given for each psychometric property of each measure of parental representation.

Conclusions: Findings were mixed with some measures of parental representation showing promising results. However generally, psychometric testing needed to be carried out to a better methodological standard, using larger sample sizes.

Introduction

The objective of this review is to identify measures of parental representation and report and evaluate the existing psychometric properties of each.

The relationship between parent and child is integral to the wellbeing and development of the child. The long-term impact on the child's mental and physical wellbeing is well documented (Lyons-Ruth & Jacobvitz, 1999; Weinfield et al., 2008). When the parent-child relationship goes wrong, it can have dire consequences.

It was Bowlby who first introduced the idea that people build up representations in their mind based on their real experience of early relationships, particularly with their caregivers (Bowlby, 1969). Bowlby felt that these internal representations were ever changing and so named them internal working models (IWMs). This was elaborated by Mary Main who conceptualised internal representations of attachment to be "a set of conscious and/or unconscious rules for the organization of information relevant to attachment and for obtaining or limiting access to that information" (Main et al., 1985, p. 67). In other words, they are a caregiver's current state of mind with respect to their child, parenting, and the relationships with their children (Mayseless, 2006).

Predictors of parental representations

A parent's own attachment has been found to have a moderate to strong association with their parental representations of their child (Mayseless & Scharf, 2006; Psouni, 2019; Slade et al., 1999) as well as specifically their ability to reflect on their child's mental states (Slade et al., 2005).

Socioeconomic and interpersonal risk factors have also been found to predict parental representations, including domestic violence, lack of support, difficult life events such as divorce, bereavement and work related-stress, social care involvement, mothers having psychiatric treatment and alcohol and drug use (Bailes et al., 2024; Huth-Bocks et al., 2004; Vreeswijk et al., 2015). A mother's experience of mental health difficulties manifesting as as depressive symptoms and posttraumatic stress symptoms more often have non balanced (distorted or disengaged) representations of their children, as measured using the Working Model of the Child Interview (WMCI; Sokolowski et al., 2007). Non-balanced representations are considered to be the more worrying type characterized by disengagement or incoherency (Vreeswijk et al., 2012).

Parental representations are not only thought to be influenced by the caregiver's own attachment state of mind, but also by the characteristics of the specific child and the parent-child relationship (Mayseless, 2006). For example, mothers of premature infants were more likely to have 'non-balanced' representations of their infants than mothers of healthy full-term infants (Korja et al., 2009). (This is in line with a more relational way of thinking, in that it allows for the possibility that the child may also influence the parent-child relationship and the parent's subjective experience of it (Mitchell, 2000).

Transmission Gap

How internal representations of attachment are passed down through generations is an important area of research. A key idea around transmission of attachment centres around the caregiver's attachment to their parents. This research was possible due to the development of the Adult Attachment Interview (AAI) which sought to capture an adult's attachment by looking at their internal representations with their own caregiver (George et al., 1984). Studies have long identified strong links between parent's own attachment states of mind and the subsequent security of their

own children (Fonagy, Steele, & Steele, 1991; George & Solomon, 1996; Main et al., 1985, 1988). In trying to understand how attachment filters down the generations, it was proposed that one's attachment state of mind would be passed to the child through the parent's capacity to be sensitive and responsive to their child. Some studies support this, finding mothers who classified as autonomous, to be warmer, more attuned and responsive parents (Adam et al., 2004; Hsiao et al., 2015). However, this link has never been completely clear, suggesting there is a transmission gap, where adult attachment patterns do not fully predict the way the adults will go on to parent their children (Goldberg et al., 2003; Van IJzendoorn, 1995). Indeed a meta-analysis looking in to the link between parents who experienced child maltreatment found only a weak, significant association with parenting behaviour (Savage et al., 2019). Notably, parents do not parent their own children in the same way and this can result in siblings and twins having different attachment patterns. Studies looking into siblings and twins' attachment styles have found only a 60% concordance rate (Teti & Ablard, 1989; van IJzendoorn et al., 2000; Ward et al., 1988).

Researchers have considered a number of additional mediating factors to explain the transmission of attachment, including maternal responsiveness (Raval et al., 2002), maternal mind-mindedness (Bernier & Dozier, 2003) and reflective functioning (Fonagy, Steele, Steele, et al., 1991; Grienenberger et al., 2005). Some of these factors could broadly be termed parental representations or 'internal working models'. Parental representations (PR) are thought to begin as early as during pregnancy (Stern, 1995; Zeanah et al., 1987). These representations are important as they link to how the parent interacts and behaves with their child which in turn takes on meaning for the child (Stern, 1995). This is supported empirically, with findings showing that differing parental representations relate to different parent-infant interactions (Vreeswijk et al., 2012). This is exemplified by Pajulo et al., (2001) who consider a mother who may have a representation of being rejected by her own mother. This can lead to the mother rejecting her child first in order to protect herself. We might see this manifest through a mother breaking mutual eye contact with her child. Indeed, distorted representations have been found to strongly relate to more concerning mother-infant interactions than from other representation classifications as measured by the WMCI (Korja et al., 2010).

Parenting representations and parent-child interaction, child attachment and child behaviour

Parental representations are associated with the quality of the parent-child relationship (Grey & Farnfield, 2017; Korja et al., 2010), parent-child interaction (Lindstedt et al., 2024; Theran et al., 2005)parenting sensitivity (Raval et al., 2001), a parent's reflective capacity (León et al., 2018) and boundary setting (Scharf et al., 2015).

Many studies have found associations between parental representations and parent-child attachment, extending from toddlerhood to adolescence (Biringen & Bretherton, 2000; Britner et al., 2005; Fonagy, Steele, & Steele, 1991; Hsiao et al., 2015; Madigan et al., 2015; Scharf et al., 2015; Van IJzendoorn, 1995). Furthermore, prenatal parental representations (during pregnancy) have been found to predict child attachment at 14-18 months after birth (Tambelli et al., 2020) with prenatal maternal representations completely accounting for the association between the parent's attachment and the child's pattern of attachment (Madigan et al., 2015). Furthermore, a recent meta-analysis found small to moderate associations between prenatal parental representations and the child's subsequent attachment (Trombetta et al., 2021).

The direct link between parental representations and child wellbeing is also evident. Parents with balanced representations were associated with higher social-emotional competence in their toddlers

(Lindstedt et al., 2024). Parental representations were found to account for variations in a child's emotional regulation, with mothers who have balanced representations of their child having children better able to return to positive affect after a temporary disruption between the mother and infant (Rosenblum et al., 2002). Parental representations are associated with adolescent's wellbeing, romantic intimacy and individuation (Scharf et al., 2015). Parents having disrupted parental representations (as measured by the WMCI), predicted poorer social-emotional functioning in the children at 24 months old (Guyon-Harris et al., 2022).

Increasingly, interventions based on changing parental representations are being used to reduce the risk of child maltreatment, improve parent behaviour and child outcomes (Barlow et al., 2016; Gregory et al., 2020; Katznelson, 2014; K. L. Rosenblum et al., 2018; Suchman et al., 2018; Vreeswijk et al., 2012). Increasing the proportion of 'balanced' parental representations with mothers from a low-income community as measured by the Working Model of the Child Interview was found to improve a child's social and emotional development (WMCI; Rosenblum et al., 2018). Caregiving sensitivity increased with an intervention for mothers to improve their reflective functioning (Suchman et al., 2018).

Rationale

Parental representations have long been linked to child maltreatment and psychopathology in children (George & Solomon, 2000) with a systematic review calling for parental representations to be an important aspect of assessing for maltreatment (Camilo et al., 2016; George & Solomon, 2000). It has therefore become increasingly important to identify parental representations which may put their child at risk in order to provide timely interventions and to contribute to information used to help identify children that are at risk or suffering significant harm (Main et al., 2011).

The ability to measure parental representations is therefore key. A number of measures have sought to capture parental representations. These have generally been semi-structured interviews with a coding system developed to analyse them. These measures are increasingly important as their association with maltreatment is becoming clearer (Kim & Cicchetti, 2003; Rosso, 2022; Stronach et al., 2011).

Semi-structured interviews are appropriate for measuring internal representations as they capture unprocessed thoughts and defences not identified with self-report questionnaires. However this also sets itself up for being more tricky from a psychometric perspective as the interview and coding is more subjective. To date, little research has been done to summarise the measures of parental representations and look at the methodological quality or psychometric properties. One systematic review has focused on measures of a related but distinct concept to parental representations, maternal mentalization of their up to three year old children (Peters & Barlow, 2003). Another systematic review looked specifically in to one measure, The Working Model of Child Interview (Vreeswijk et al., 2012). To this author's knowledge, this is the first literature review to summarise multiple measures of parental representations and look in to the psychometric properties of each.

Study aims

Aim 1: To identify all current measures of post-natal parental representations of children from 0-18 years old.

Aim 2: To give an overview and assess the methodological quality of all the studies which report on a psychometric property of the identified measures.

Aim 3: To evaluate the overall quality of psychometric properties of each identified measure of parental representation

Method

To address the research questions, this literature review was guided by and adhered to PRISMA standards (Moher et al., 2009). The PRISMA guidance aims to ensure systematic reviews are transparent and reported appropriately. This literature review aimed to meet the checklist provided (see **Appendix 1)**.

Eligibility criteria

Reports on measures or studies using the measures were identified against the following inclusion and exclusion criteria:

Inclusion:

- Quantitative or qualitative studies published in peer reviewed academic journals or dissertations
- Description and/or use of measures of parental representations (see search terms for a full list below)
- English-language papers

Exclusion:

- theoretical papers
- papers where parental representations were only measured prenatally
- did not include data on the participants
- excluded “court representations”
- Systemic reviews and meta-analyses
- Articles where measures have been modified or only a few subscales used

Searches were conducted in September 2021

Search method

Searches were carried out through the Databases: Proquest (Psychology Database), PsychINFO, PubMed and Science Direct.

Keywords were used to identify all articles that would fall within the scope to this review. As per the PRISMA guidelines, search terms were identified using the PICOS tool (Population, Intervention, Comparison and Outcomes, Study design):

PICOS tool	
P	PARENTS OR MOTHERS OR FATHERS OR MATERNAL OR PATERNAL OR CAREGIVER
I	N/A
C	N/A
O	REPRESENTATION OR "INTERNAL WORKING" **AND** INSTRUMENT OR MEASURE OR TOOL OR INTERVIEW AND PARENTAL REPRESENTATION
S	QUANTITATIVE or QUALITATIVE

The search strategy was peer reviewed as part of the process. For an example of a search, please refer to **Appendix 2.** As well as using databases, hand searching and consulting with experts in the field also took place.

Study selection

An eligibility assessment was carried out. Duplicates were firstly removed. The remaining articles were then screened against the inclusion and exclusion criteria firstly by the title, secondly using the abstract and lastly by reviewing the full text.

The reference lists and 'cited by' list of the eligible studies were also screened for any additional studies that met the criteria. The initial screening process was carried out by the author and the screened list was checked by a second reviewer with expertise in the field. Any selections the reviewer was uncertain about were discussed in consultation with another reviewer until a resolution was reached.

Data collection process and data items

The following information was captured from each study:

1) Characteristics of the participants

2) Study details including design, sample size, and country

3) Parental representation measure including the measure and the coding used

4) Psychometric testing (including inter-rater reliability, internal consistency, test re-test reliability, structural validity, Construct validity, concurrent validity, predictive validity and measurement invariance.

Methods of analysis

Aim 1: Identifying measures of parental representations

This review identified semi-structured interviews and their associated coding systems of parental representation. Some coding systems such as 'Reflective Functioning', was used to code several

different interviews. For the purposes of this review, the term “measure” is hereon in used to refer to a specific coding system as applied to a specific interview schedule. Each of the identified measures were summarised.

Aim 2: Assessing the methodological quality of the measures of parental representations

A number of psychometric tests were selected to be evaluated on for methodological and quality of their psychometric properties. The chosen psychometric properties and a definition of each are provided in **Table 1**. All key psychometric properties in relation to semi-structured interviews in psychology were considered for the review. Although relevant, both criterion validity and structural validity were excluded. Criterion validity is a challenge for the researcher because it demands a ‘gold standard’ measure to be compared to the chosen instrument and this review did not identify one for parental representations. Structural validity was also a challenge as a number of the measures analysed in this review have a factor structure that is not standardised and is anticipated to vary across different populations. This makes it very complex to assess the factor structure as valid and therefore this testing is beyond the scope of this review and has been excluded.

To evaluate the measurement properties, this review followed the COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) guidelines, which developed a standardised checklist for evaluating the quality of studies evaluating measurement tools. These guidelines are specifically for Patient Reported Outcome Measures (PROMs) which are defined as measures that directly assesses an aspect of a patient’s health status by the patient, without any interpretation (Prinsen et al., 2018). Semi Structured interviews which measure parental representations do not quite fit this definition as they require the interviewer to interpret the interview (Mokkink et al., 2017). However due to the lack of alternative guidance, the COSMIN checklist was adapted for the purposes of this review.

The methodological quality was evaluated for each study identified in the review. Methodological quality refers to whether the measures have been tested using appropriate psychometric methods. The appropriate tests and analysis are helpfully outlined for each psychometric property in the Risk of Bias checklist (Mokkink et al., 2017; Prinsen et al., 2018; Terwee et al., 2018) (**see appendix 3**). A rating of ‘very good’, ‘adequate’, ‘doubtful’ or ‘inadequate’ was given for each test this review looked at.

Aim 3: Assessing the psychometric quality of the measures of parental representations

The measures were assessed according to psychometric quality of the psychometric testing carried out in the identified studies. This was carried out according to COSMIN guidelines.

The quality of the psychometric properties of each single study was assessed against criteria for good measurement properties. The quality of the psychometric properties was determined by comparing the reported findings in the study against quality rating criteria as per COSMIN guidelines (Mokkink et al., 2017; Prinsen et al., 2018; Terwee et al., 2018). **See Appendix 4**. A rating of ‘sufficient’, ‘inconsistent’, insufficient’ or ‘indeterminate’ was given for each test this review looked at.

Aim 4: Create an overall rating of psychometric quality and methodology for each measure of parental representations

For each measure of parental representations, an overall rating of methodological quality and an overall rating of psychometric quality was given to each psychometric property by pooling the

findings of each individual study assessed. For more detail on how the ratings were pooled, refer to **Appendix 5**.

Table 1

Psychometric properties and definitions

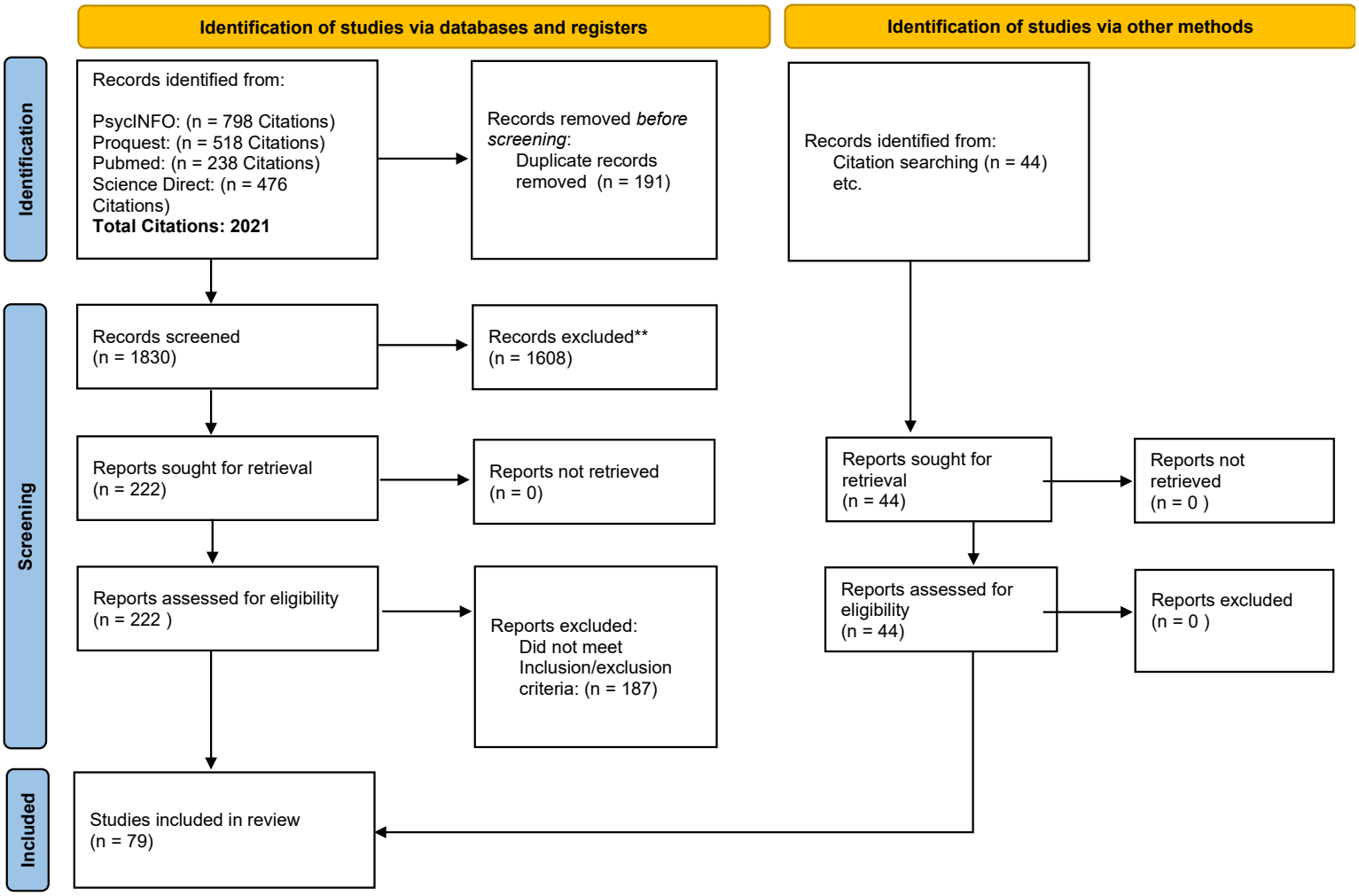
Psychometric property	Domain and Definition
Reliability	**The degree to which the measurement is free from measurement error**
Inter-rater reliability	The degree to which different raters make consistent estimates of the same phenomenon
Internal consistency	The degree of interrelatedness around the items
Test-retest reliability	The degree to which instrument scores obtained from the same participants remain consistent over brief periods during which the subject's competencies or problems are not likely to change
Validity	**The degree to which an instrument measures the construct(s) it purports to measure**
Construct validity	How closely the instrument is related to other variables and other measures of the same construct.
Discriminant validity	Measures of constructs that theoretically should not be highly related to each other are, in fact, not found to be highly correlated to each other.

Results

Study Selection

A total of 79 studies were identified for inclusion in the review. See flow diagram in **Figure 1**.

Figure 1: *Flow diagram of study selection*



Measures of parental representations

This review identified seventeen measures of parental representation. **Table 2** describes the measures. As per COSMIN criteria, modified versions of the measures were reviewed separately, even if they only differed slightly. Of the 79 articles reviewed, 18 papers aimed to evaluate the psychometric properties of a measure of parental representation and 61 papers used a measure of parental representation as an outcome or a predictor in their study. There were 10 articles that reported on two of the measures listed. The full list of articles included in the review is listed in **Appendix 6.**

Table 2 Characteristics of the measures of parental representation

Interview	Coding System	Reference	Scales/ Categories	Dimensions	No. Articles	Age range of child in the samples	Population
Interview of Maternal Representations After the Birth	*Original (IRMAN)*	Ammaniti et al. 1999, 2006	***Categories:*** *Integrated; Restricted, Ambivalent*	*Richness of perceptions; Openness to change; Affective engagement; Coherence; Differentiation; Social dependence; Fantasy emergence*	*1*	3-4 months	Community sample
Mind Mindedness Interview	*Offline (MM-Offline)*	Meins et al. 1998		*Mental; Behavioural; Physical; General*	5	1.5-6.5 years	Community samples Preterm births (Yatziv, 2020)
The Insightfulness Assessment	*Original (IA)*	Oppenheim & Koren-Kari, 2002	**Categories**: *positively insightful one-sided; disengaged; mixed*	*Insight into child's motives; Openness; Complexity in description of the child; Maintenance of focus on the child; Richness of description of child; Coherence of thought; Acceptance; Anger; Worry; Separateness from child;*	*7*	0.5 - 7 years	Community sample Mothers with depression (Ramseur et al, 2014) Children with behavioural issues (Oppenheim & Koren-Karie, 2004) Children with ASD (Oppenheim et al, 2009)
The Parent Attachment Interview	*Sensitivity /Insight scale (PAI-S/I)*	Biringen & Bretherton, 1988	Sensitivity/Insight rating scale	Unidimensional - measured via a 9-point Sensitivity/Insight rating scale	1	2 years	Community sample
The Parent Development Interview (PDI)	*Original (PDI-Original)*	Aber et al., 1985; Slade, Aber, Bresgi, Berger, & Kaplan, 2004	*Joy-pleasure/coherence; anger; guilt/separation*		7	0.5-12 years	Community sample Clinical sample - mother psychiatric (Dolberg, 2010) Cleft pallet (Habersaat, 2018)
The Parent Development Interview (PDI)	*The Caregiving Interview (PDI-CI)*	George & Solomon, 1996	Flexible integration; Dysregulation-helplessness.	*Secure base; rejection; uncertainty; helplessness*	2	1.5 - 6 years	Community sample
The Parent Development Interview (PDI)	*Assessment of representational risk (PDI-ARR)*	Sleed, Isosävi & Fonagy, 2021	*ARR hostile; ARR helpless; ARR idealizing; ARR overall risk score*	*Hostile behaviour; Hostile experiences; fearful affect; helplessness; emotional distress; enmeshment/role reversal; incoherence; idealization; mutual*	*3*	0-1.5 years	Community samples Mothers with mental health problems (Fonagy, 2016; Sleed, 2021)

				enjoyment; supportive presence.			Prison population (Sleed, 2021)
The Parent Development Interview (PDI)	*Meaning of the child (PDI-MotC)*	Grey & Farnfield 2017	***Sensitivity/Risk Category*** *and* ***ratio categories:*** *Controlling; Unresponsive; Controlling and Unresponsive*	*High Risk; (Borderline; Risk/Intervention; Intervention; Intervention/Adequate (low adequate); Adequate; Adequate/Sensitivity (high adequate); Sensitive*	2	0-3 years	At risk families, disadvantaged, community population (Grey and Farnfield, 2017)
The Parent Development Interview (PDI)	*Pianta version (PDI-Pianta)*	Pianta et al 1995	***Content codes****: Mentions Compliance, Ineffectiveness with Control/Compliance, Mentions Business of Caregiving, Mentions Child's Achievement, Mentions Comfort/Safe Haven;* ***Process codes****: Perspective taking, Enmeshment, Neutralizing/defensive, Confusion of response;* ***Affect codes:*** *Anger. Pleasure, Guilt, Worry/Anxiety about the Future, Sadness/Pain*		2	3-4.5 years	Community samples Children with behavioural issues (Shamir-Essakow, 2004)
The Parent Development Interview (PDI)	*Reflective functioning (PDI-RF)*	Slade, Bernbach, Grienenberger, Levy, & Locker, 2004		*Self focussed reflective functioning, child focussed reflective functioning*	18	0-17 years	Community samples Mothers with substance misuse (Levy, 2001; Schuman, 2001; Håkansson, 2017) Prison population (Sleed, 2013, Sleed, 2021) Community sample oversampled for mothers with a history of maltreatment (Stacks, 2014) Maternal Psychiatric issues (Fonagy, 2016; Sleed, 2021) Preterm births (Yatziv, 2020) Samples with socioeconomic and interpersonal difficulties (Sleed, 2021; Alvarez-Monjaras, 2019).
The Parent Development Interview	*Reflective functioning revised for school aged Children*	Borelli, , St.John, , Cho, , Suchman, , 2016	*Self focussed reflective functioning, child focussed*		1	8-12 years	Community sample

	(PDI-RF-SC)		*reflective functioning*				
The Parenting Representations Interview-Adolescence	*Original (PRI)*	Scharf & Mayseless, 1997/2000	*Adequate/balanced; flooded; restricted; confused/incoherent*		3	11-18 years	Community samples (Scharf et al, 2015) Teenagers with behavioural problems (Moretti, 2012) Teenagers with Type 1 diabetes (Scharf, 2017)
The Working Model of the Child Interview	*Original (WMCI-Zeanah)*	Zeanah, Benoit, Hirshberg, Barton, & Regan, 1994	***Categories:*** *Balanced; Disengaged; Distorted, 9 point scale*	*Richness of perceptions; Openness to change; Affective engagement; Coherence; Differentiation; Social dependence; Fantasy emergence*	*26*	0-9 years	Community samples Failure to thrive (Benoit, 1997) Children with behavioural problem (1999) Substance abuse (Mcneilly, 2000, Coolbear, 2000) Domestic violence (Theran, 2005; Schechter, 2005,2008) Premature (Ayala, 2006; Korja, 2010; Tooten, 2014) Disadvantaged groups (Klaus Minde, 2006; Sokolowski, 2007) Children in foster carer/adoptive placements (Schofield, 2010)
The Working Model of the Child Interview	*Reflective functioning (WMCI-RF)*	Slade, Bernbach, Grienenberger, Levy, & Locker, 2004; Schechter et al, 2005	Unidimensional, coded on a scale of -1-9		2	0.6-4 years	No community sample Mothers experiencing domestic violence, socioeconomic and interpersonal difficulties (Schechter, 2005, 2008)
The Working Model of the Child Interview	*The Parenting Reflectivity Scale (WMCI-PRS)*	Rosenblum et al, 2008	5 point scale with one global parenting reflectivity score		5	1-7 years	Community samples High risk population (Muzik, 2015; Rosenblum, 2018) Military families (Julian et al, 2018a, 2018b)
The Working Model of the Child Interview	*Disrupted (WMCI-D)*	Crawford and Benoit, 2009	***Classification:*** *Disrupted communication: Not Disrupted*	*Affective Communication Errors; Role/Boundary Confusion; Fear-fulness/Dissociation/Disorientation; Intrusiveness/Negativity, and Withdrawal;*	*3*	0.5-1.5 years	Community samples Preterm infants (Tooten, 2014)

			Affective Communication Errors				
The Working Model of the Child Interview	*Abbreviated (WMCI-A)*	Rosenblum, Dayton, & McDonough, 2006	***Categories:*** *Balanced; Disengaged; Distorted, 5 point scale*		1	4-8 years	Community samples
Total					**89**		

Seven measures sought to capture multiple domains of parental representations (WMCI, WMCI-abbreviated, PDI, PDI-Pianta, IMRAN, PDI – CI, PRI). Seven measures (MM offline, IA, PDI-RF, PDI-RF-SC, WMCI-RF, WMCI-PR, PAI-S/I) focussed on an aspect of parental representations such as insightfulness, mind mindedness or reflective functioning. The remaining three measures (PDI-ARR, PDI-MotC, and WMCI-D) captured risk within the parent's representations by identifying associated dimensions of risk such as hostile behaviour, helplessness, insensitivity.

1. Interview of maternal representation after the birth: IRMAN

The IRMAN takes around an hour to administer and explores the representations of the mother and of her infant in relation to the first months of life, particularly focussing on the mother-child interactions; thoughts feelings and fantasies towards the infant; and future expectations and life modifications. Mothers are categorised in to *Integrated, Restricted* or *Ambivalent.*

This review only identified one study where this measure was used (Ammaniti et al., 2006). In this case, it was carried out with mothers of 3 month olds who, who were at risk of maternal depression.

2. Maternal Mind-Mindedness - Offline: MM-Offline

Mind-mindedness is defined as "the caregivers tendency to treat the young child as an individual with a mind" (Meins et al., 2013, p. 544) Unlike most other representational interviews, MM-Offline is much shorter and asks only one question, "Can you describe [name] for me?" Interviews are then coded by categorising the description given by the parents in to mental processes, behavioural/personality, physical attributes, miscellaneous and unclassifiable characteristics. A score is then given by calculating the total number of descriptions related mental attributes as a proportion of the total number to descriptions provided.

3. The Insightfulness Assessment: IA

The Insightfulness Assessment (IA) focuses on the insightfulness of the parent, meaning "the degree to which the parent provides an emotionally complex, accepting picture of the child that includes a wide spectrum of contextually appropriate motives while updating their views of the child in line with new information" (Oppenheim & Koren-Karie, 2002, p597). The IA consists of three videotaped interactions between parent and child. The parent is asked to watch the first 2 minutes of each video segment and then is interviewed on their thoughts about it. Questions focus on the parent's impressions around the children's feelings and thoughts might be in the viewed interactions.

The video is then coded and the parent is categorised as positively insightful, non-insightful one-sided, non-insightful-disengaged or non-insightful-mixed.

Research has focussed on the association between the child's attachment and maternal insightfulness, finding positively insightful mothers more likely to have securely attached children and non-insightful mothers to have insecurely attached children (Koren-Karie & Oppenheim, 2018). However these studies have tended to be cross-sectional and therefore cause and effect has not yet be determined.

4. The Parent Attachment Interview - Sensitivity/Insight scale: PAI-S/I

The PAI-S/I was one of the first interviews to capture parental representations. It is an interview lasting around 1 hour with a number of questions focussing on the parent's thoughts and feelings about the child, the birth, separations and intergenerational similarities and differences. The interview is the coded on a 9 point scale for sensitivity and insight (Biringen & Bretherton, 1988). High scores reflect the parent's ability to both respond sensitively to their child whilst giving specific evidence/examples of doing so.

The interview has not been used widely in research.

5. The Parent Development Interview: PDI-Original

The Parent Development Interview (PDI) is an interview that is about an hour long where parents are asked to think about themselves as parents, of their child and of their relationship. The parent is asked to consider the child's feelings and think about their own feelings of joy, pain, guilt, and anger as a parent as well as their experiences with their own caregivers. The PDI is one of the most common interviews of parental representation and was used as in seven of the measures identified in this review.

The PDI-Original codes the interview dimensionally for parental representations of the affective experience of parenting, of the child's affective experience and parental state of mind in relation to the child.

6. The Parent Development Interview – Reflective functioning: PDI-RF

The PDI-RF applies a specially adapted RF coding scheme to the PDI (Slade et al., 2004). It is designed to measure a person's capacity to reflect on his/her own as well as others' mental states from the narrative depictions of behaviour and reflections of self and others in relational or mutual contexts.

Two types of scores are assigned individual passage scores and an overall score. First, a subset of "demand" questions are coded for level of parental RF. These questions were chosen because they require the parent to mentalize in order to respond, i.e. to describe what they, their child, or both of them may have thought or felt. A reading of the entire interview is also completed in order to provide further insight in the parent's representations and reflective capacity. Taking in to consideration both the coding of the individual demand question scores and a reading of the entire interview, the coder then assigns an overall RF score. The RF scale has a potential range of −1 (negative or bizarre RF) to 9 (marked RF).

The RF coding is the most commonly applied to the PDI in research. In this study, twenty of the identified articles used the PDI-RF.

7. ***The Parent Development Interview - Reflective functioning revised for school aged Children: PDI-RF-SC***

The PDI-RF-SC uses a modified version of PDI-RF, adapting it for parents of school-aged children. The interview was shortened from 30 to 23 questions. The language of the measure was also changed so that it was more developmentally appropriate for school-aged children.

Only one study was identified which uses the PDI-RF-S, looking at a community sample of parent-child dyads (Borelli et al., 2016).

8. ***The Parent Development Interview - Caregiving Interview: PDI-CI***

The PDI-CI uses a slightly adapted PDI and applies a different coding system which assesses defensive processes that underlie attachment categories of secure, avoidant, ambivalent and disorganized/controlling children. The coding system identifies 4 different categories of caregiving: secure base, rejection/deactivation, uncertain/cognitive disconnection, and helplessness/segregated systems.

9. ***The Parent Development Interview - Assessment of representational risk: PDI-ARR***

The PDI-ARR used the PDI, applying a coding system designed to measure risk within the specific parent-child relationship. The PDI-ARR identifies 10 dimensions which are associated with disorganized attachment and dysregulated caregiving behaviour (Sleed et al., 2013). The dimensions are, hostile behaviour; hostile experiences; fearful affect; helplessness; emotional distress; enmeshment/role reversal; incoherence; idealization; mutual enjoyment; supportive presence. An overall risk score is then calculated from the subscales.

10. ***The Parent Development Interview - Meaning of the child: PDI-MotC***

The PDI-Motc uses the PDI and applies a coding which, firstly seeks to identify the level of risk using the categories: Sensitive, Adequate, Intervention and High Risk (Grey & Farnfield, 2017). Secondly, the type of pattern of caregiving is categorised: Sensitive, Controlling, Unresponsive or Mixed Controlling and Unresponsive. The coding was developed from the parent-child interaction measures, the CARE-Index, using the same categories of caregiving pattern (Grey & Farnfield, 2017).

11. ***The Parent Development Interview - Pianta version: PDI-Pianta***

The PDI-Pianta applies a coding system to the PDI. The measure aims to capture the parental representations of the parent-child relationship by capturing three distinct areas: content/themes represented; how the parent represents themself and the content, and affective tone of representations. The coding system scores each question of the PDI individually (Pianta et al., 1995). A global score for confusion/dysfunction is then given based on the degree of disorganisation within the interview. The PDI-Pianta has not been widely used, with only two papers identified in this review.

12. ***The Parenting Representations Interview-Adolescence: PRI***

The PRI is a measure aiming to capture the parental representations specifically of a parent of an adolescent child (Scharf & Mayseless, 2000)**.** It is developed from the AAI and measures of parental representations with younger children. The measure identifies three dimensions, positive representations of adolescents, negative emotionality and inadequate boundaries.

13. The Working Model of the Child Interview - WMCI-Zeanah

The WMCI-Zeanah looks at the parent's internal working model of their child (Zeanah et al., 1986). The coding categorises parent's working models in to a Balanced category and two Non-balanced categories; Disengaged and Distorted. Attachment insecurity is predicted by the non-balanced category. This measure is widely used and was identified in this review with the most articles. The WMCI has been found to be correlated with child attachment patterns (Benoit et al., 1997).

14. The Working Model of the Child Interview - Reflective functioning: WMCI-RF

WMCI-RF applies the reflective functioning coding to the WMCI. The WMCI was modified slightly by adding additional mental state related probes such as ''What do you think was going on in [your child's mind?'' (Schechter et al., 2005)

15. The Working Model of the Child Interview - The Parenting Reflectivity Scale: WMCI-PRS

The WMCI-PRS is based on the Reflective Functioning scale coding (Fonagy et al., 1998). The measure is designed to assess the parent's ability to consider the child's mental states and motivations (Rosenblum et al., 2008). The scale was adapted to use with the WMCI, specifically focussing on mentalization of parenting experiences, how the parent interprets their child's behaviour and attributions regarding children's mental states . The WMCI-PRS is also reduced from a 9-point to a 5-point scale.

16. The Working Model of the Child Interview – Disrupted: WMCI-D

The WMCI-D is a 7-point scale which assesses five dimensions of parental representations that they consider to be disrupted: Affective communication errors, Role/boundary confusion, Disorientation (including fearful behaviour and dissociative/confused narratives), Intrusiveness/negativity and lastly, Withdrawal. These are based on the five interactional behaviours considered atypical from the AMBIANCE (Lyons-Ruth et al., 1999). An overall score from 1 (no disruption) to 7 (high levels of disruption) is then given based on both the frequency of disrupted statements in the WMCI as well on the severity level of disruption on each of the five dimensions. A classification of Disrupted communication is considered for scores from 5 to 7 or Not Disrupted for scores between 1 to 4.

17. The Working Model of the Child Interview – Abbreviated: WMCI-A

The WMCI-A is an adaptation of the WMCI-Zeanah (Leung et al., 2015) A number of questions were abbreviated, asking for three, rather than five descriptive words/phrases when asking parents to describe their child's personality and the parents relationship with the child. Furthermore, questions around their pregnancy and the child's early development were omitted.

Methodological quality

The methodological quality of each psychometric test was firstly assessed per study (see **Appendix 7**). The results were then pooled together as per COSMIN guidelines to reach an overall rating for each psychometric test per measure. See **Appendix 8.** The majority of the measures and codings identified had at least one paper which specifically looked at its psychometric properties though this was not the case for the IRMAN (Ammaniti et al., 1999, 2006) and the Sensitivity/Insight coding on the PDI, (Bretherton et al., 1989a) which only had psychometric properties reported through outcome studies. The psychometric properties of the PDI-RF and the WMCI-Zeanah were the most reported. Only WMCI-Zeanah and PDI-RF had studies which tested every psychometric property reported in this review. IMRAN and WMCI-A had the least number of psychometric properties assessed in the identified studies, both only having been tested for interrater reliability.

Psychometric quality for each measure

A psychometric rating is given for each psychometric test by study (see **Appendix 7**). The results were then pooled together as per COSMIN guidelines to reach an overall rating for each psychometric test of each measure/coding. See **Appendix 9** for the psychometric quality rating for each psychometric property of each measure.

Evaluating the overall psychometric properties of each measure

An overall quality of evidence rating was given to each psychometric property by measure, using the GRADE analysis (Prinsen et al., 2018). Table 3 provides a summary of both the quality of evidence rating as well as the psychometric rating per measure.

Table 3

				Interrater reliability			Internal Consistency			Test-Retest Reliability			Convergent Validity			Discriminant Validity		
Interview	**Measure**	**No. Papers**	**Pooled sample size**	**n**	**Quality of Evidence**	**Overall Rating**	**n**	**Quality of Evidence**	**Overall Rating**	**n**	**Quality of Evidence**	**Overall Rating**	**n**	**Quality of Evidence**	**Overall Rating**	**n**	**Quality of Evidence**	**Overall Rating**
Interview of Maternal Representations After the Birth	*IRMAN*	1	85	85	Moderate	Sufficient												
Maternal Mind Mindedness	*MM-Offline*	5	315	142	High	Sufficient				32	Very Low	Indeterminate	315	High	Sufficient	209	High	Indeterminate
The Insightfulness Assessment	*IA*	7	514	175	High	Indeterminate							247	Low	Sufficient	411	Very Low	Indeterminate
The Parent Attachment Interview	*PAI-S/I*	1	37	10	Very Low	Indeterminate							37	Low	Sufficient	37	Very Low	Indeterminate
The Parent Development Interview	*PDI-Original*	6	678	15*	Low	Sufficient	204	High	Inconsistent				297	High	Sufficient	348	Inad X 2 v. good X 1	Indeterminate
The Parent Development Interview	*PDI-CI*	2	101	38	Low	Sufficient							101	High	Sufficient			
The Parent Development Interview	*PDI-ARR*	3	310	60	Moderate	Sufficient	184	High	Indeterminate	25	Very Low	Indeterminate	234	High	Sufficient			
The Parent Development Interview	*PDI-MotC*	2	85	11	Very Low	Indeterminate							85	Moderate	Sufficient	85	Very Low	Indeterminate
The Parent Development Interview (abbreviated)	*PDI-Pianta*	2	177	44	High	Sufficient										74	Very Low	Indeterminate
The Parent Development Interview	*PDI-RF*	18	2093	531	High	Sufficient	577	High	Inconsistent	194	Very Low	Indeterminate	756	High	Sufficient	938	High	Indeterminate
The Parent Development Interview	*PDI-RF-SC*	1	117	25	High	Sufficient	117	High	Insufficient				117	High	Sufficient	117	High	Indeterminate
The Parenting Representations Interview	*PRI*	3	265	50	Moderate	Sufficient												
The Working Model of the Child Interview	*WMCI-Zeanal*	26	1987	484	High	Indeterminate	555	High	Sufficient (1)** Inconsistent (1)***	459	Low	Indeterminate	1506	NA	Indeterminate	1360	Low	Indeterminate
The Working Model of the Child Interview	*WMCI-RF*	2	84										43	Very Low	Indeterminate			
The Working Model of the Child Interview	*WMCI-PRS*	5	299	299	High	Sufficient				112	Very Low	Indeterminate	95	Moderate	Sufficient	95	Moderate	Indeterminate
The Working Model of the Child Interview	*WMCI-D*	3	461	85	Moderate	Sufficient				62	Very Low	Sufficient	272	NA	Sufficient	399	Very low	Indeterminate
The Working Model of the Child Interview	*WMCI-A*	1	295	40	Low	Sufficient												

A rating for quality of evidence was given of High, Adequate, Low or Very low according to the GRADE rating. NA was given if the Risk of Bias was inconsistent and therefore couldn't be determined.
*Sample size not given for one study **Different factor solutions identified and thus results reported seperately: Two-factor solution: WCMI Quality = Sufficient; WMCI Content = Insufficient ***Three-factor solution: Balanced, Resentful, Apprehensive = Sufficient

Additional Analysis

Construct Validity

In order to look at Construct validity for each of the measures, some additional analysis was carried out (see **appendix 10**). Firstly, the analysis looked at which measures were used to test Construct validity against the measure of parental representations. Secondly, if the correlation coefficient was reported, then this was compared to what the expected correlation was (as per **appendix 4**).

Discriminant validity

Further analysis was done to report on Discriminant validity (see **appendix 10**). Firstly, the table sets out each of the characteristics tested for each measure. Secondly, it was noted whether the t-test was significant or not and lastly, it was checked whether the magnitude of the correlation was reported on and whether this was in line with this review's hypothesis (as per **appendix 4)**.

Discussion

Overall themes of measures

Most of the measures were tested on samples with a broad range of characteristics including community and clinical samples exposed to a variety of socioeconomic and interpersonal risk. However, the IRMAN, WMCI-D and WMCI-A have only been tested with community samples (Ammaniti et al., 2006; Hall et al., 2015; Niccols et al., 2015; Tooten et al., 2014; Yatziv et al., 2020). The PDI-ARR, WMCI-PRS and PDI—Motc were tested in community samples including with Samples with socioeconomic and interpersonal difficulties (Grey & Farnfield, 2017; Julian et al., 2018; Muzik et al., 2015)(Grey & Farnfield, 2017; Julian et al., 2018; Muzik et al., 2015). The WMCI-RF has only been tested on a sample of mothers who experienced domestic violence (Schechter et al., 2005, 2008).

All the measures were tested on parents of both boys and girls. Most of the measures are suitable to administer to the parents of children from birth through preschool , with the exception of the PRI which was designed for parents of adolescent children and PDI-RF-SC which was adapted for school aged children.

Parents varied in race/ethnicity, socio-economic status, risk, age, education level, marriage status and number of children. Most studies focussed on mothers, with fewer studies including fathers. Only the PDI-RF, PDI-RF-SC, IA, MM, WMCI, WMCI-D and WMCI-PRS had samples which included fathers (Anis et al., 2020; Benbassat & Priel, 2012; Borelli et al., 2016; Julian et al., 2018; Lundy, 2013; Marcu et al., 2016; Tooten et al., 2014).

The majority of studies took place within developed, western cultures with very few exceptions. The WMCI was tested in Turkey and South Africa. The PDI-Original, PDI-RF and PDI-ARR were used in the middle east but didn't specifically examine the validity of the interviews from a cultural perspective.

Inter-rater reliability

Interrater reliability was generally done well and was the only psychometric test to be carried out on every identified measure of parental representations. Having a high level of interrater reliability is

particularly important for semi-structured interviews where the coding is more subjective and can be quite nuanced.

Studies tended to have a second rater, double-coding a random selection of 10% - 30% of the collected sample of interviews. On the whole, the appropriate statistical analysis of ICC or Cohen's K was used to determine reliability and there was a very good level of agreement between the raters. However some studies only reported % rater agreement which is widely considered to not be good enough evidence of reliability because it is inflated by a level of agreement between the raters that takes place by chance (O'Connor & Joffe, 2020). This was the case for PAI-S/I and WMCI-RF. Without the recommended testing, inter-rater reliability has not yet been adequately explored for these measures.

In relation to psychometric quality, nearly all the measures were deemed to have sufficient inter-rater reliability with the exception of the IA, PAI-S/I, PDI-MotC and WMCI-Zeanah. Poor interrater reliability can indicate that there are issues with the coding procedure such as inadequate coding schemes or inadequate coder training (Keyton et al., 2004; Neuendorf, 2017).

It is noted that this review used a cut off for inter-rater reliability of 0.75 which has the highest consensus in the literature of good agreement (Hallgren, 2012). However it was difficult to find any literature on cut offs which related to semi-structured interviews. One meta-analysis of inter-rater reliability in psychological studies considered acceptable scores to be 0.67 for highly structured interviews and 0.34 for unstructured interviews (Conway et al., 1995). It is therefore possible that there would have been an even higher consensus between the studies of this review if a lower cut off was used.

Internal consistency

Internal consistency was only reported in nine papers in relation to five of the measures (PDI, PDI-RF, PDI-RF-SC, PDI-ARR and WMCI), making it the least reported psychometric test explored in this review. Internal consistency indicates whether consistent scores are produced from individual items within a subscale/scale which are supposed to measure the same construct (Tang et al., 2014). It is therefore a key psychometric test in the evaluation of interviews (Tavakol & Dennick, 2011). For the five measures that were tested for internal consistency, all used the appropriate test and were rated high in terms for methodological quality of evidence.

In relation to psychometric quality, the PDI-Original and PDI-RF were inconsistent across the studies. There were better results for the PDI-RF as a unidimensional construct as opposed to PDI-RF as a two-factor structure, suggesting the PDI-RF may be more robust as a unidimensional scale (Alvarez-Monjarás et al., 2019; Benbassat & Priel, 2012; Sleed et al., 2020).

For WMCI, the two studies that examined internal consistency did so using different factor structures and therefore the psychometric quality rating was not pooled. One study used a two-factor structure finding mixed results. The second study used a three-factor structure (Balanced, Resentful, Apprehensive) and found good internal consistency for each.

In relation to PDI-ARR, good internal consistency was found on the Hostile subscale and the overall ARR score but insufficient validity was found on the two remaining subscales, Helpless and Idealizing (alpha = 0.587 and 0.420 respectively) (Sleed, Isosävi, et al., 2021). PDI-ARR would therefore benefit from future studies looking in to the internal consistency of each scale.

Test-retest Reliability

The methodology for assessing test-retest reliability was carried out poorly overall and very few studies carried out this test, therefore very little is known about this area of reliability for measures of parental representation. This is problematic, as these measures are often used to assess treatment efficacy and are used as pre and post measures which necessitates stability in the absence of an intervention. If there measures are unstable, they are unlikely to be able to capture the effects of the intervention. Usually these treatments are taking place in the postnatal period which can be a period in which thoughts and feelings towards their infant as well as ones sense of identity is rapidly changing. Rather than being attributable to the intervention, it might be that parental representations in this stage organically change. Furthermore, measures of parental representations are increasingly used as part of social work assessments in determining parenting capacity. It is therefore especially important that the interviews are able to capture parental representations with the confidence that these are unlikely to significantly change within a short period of time.

Only six measures had test-retest reliability testing (MM-Offline, PDI-ARR, PDI-RF, WMCI, WMCI-PRS, WMCI-D). The overall quality of evidence ranged from low to poor. This was generally because the sample size was not adequate (<100) and the length of time between testing was often not in the recommended range. There is a general consensus in psychology literature that retesting should be carried out within 1-2 weeks (Mokkink et al., 2017; Prinsen et al., 2018; Terwee et al., 2018). For the studies identified in this review, re-testing took place across several months with no studies at all re-testing within 2 weeks. On a practical note, the semi structured interviews used to measure parental representations can be lengthy and arduous for the interviewer and interviewee to carry out. This may therefore be contribute to the reluctance in the literature for this testing to be carried out thus far. However when test-retest reliability was carried out in this review, generally, only p-values denoting whether there was a significant difference between the scores at T1 and T2 were reported. Psychometric literature is clear that this is unhelpful, and recommends the statistical analysis, Internal correlation coefficient (ICC) as the best method for testing, although it is also acknowledged that correlations are widely used (Polit, 2014).

As a result of the poor methodology, test-retest reliability ratings for MM-Offline, PDI-ARR, PDI-RF, WMCI, WMCI-PRS were all indeterminate. Only WMCI-D had a 'sufficient' rating. For WMCI-D, test-retest was carried out within an interval of 8 months. There was a high level of concordance between the categories (disrupted and non-disrupted (90% agreement)) between the two time points (Niccols et al., 2015).

Construct validity

Numerous papers evaluated construct validity. Papers compared parental representational measures to a broad range of relevant measures (**Appendix 11**) including adult attachment, child's attachment, parent-child interaction, child's behaviour and parental characteristics. Studies provided adequate justification for why they would be associated and what their hypotheses were around these associations; although it was rare that the magnitude of the association was ever hypothesised. Furthermore, the tests used to carry out the psychometric testing was often inadequate, using t-tests which simply identified that the hypothesis differed from zero, rather than showing the direction and magnitude of the correlation between the two measures (Mokkink et al., 2017).

Construct validity was assessed between seven sets of measures of parental representations (WMCI & PDI-RF; MM-Offline & PDI-RF; ARR & PDI-RF; PDI & PI; PDI-MotC & PDI-RF; WMCI & WMCI-RF and WMCI-Zeanah & WMCI-RF) where significant correlations were found for each. Five of the seven reported the correlation coefficient with two (MM-Offline & PDI-RF; ARR & PDI-RF and PDI-RF & WMCI) not falling within the predicted range (r=0.30, r=-0.23 and r=0.22, respectively; predicted range: r>0.5) and the second (PDI-MotC & PDI-RF) did find significant correlations in the predicted range (r=0.86; predicted range: r>0.5). This review made the assumption that constructs of parental representation were all similar and therefore a correlation coefficient of >0.5 should be expected. However these mixed findings might indicate that dimensions of parental representation are broad and distinct and therefore would not necessarily be highly correlated.

A number of studies looked in to the correlation between parental representations (MM-Offline, PDI, PDI-RF, PDI-CI, PRI, WMCI, WMCI-D) and adult attachment, with the AAI being used the most. All parental representational measures that were tested in relation to adult attachment had at least one significant correlation. The five measures (MM-Offline, PDI-CI, PDI, PRI and WMCI) that tested against the AAI all found significant correlations, although unfortunately no papers reported on the correlation coefficient. It is in keeping with established theoretical understanding that there would be a significant association between adult attachment and their parental representations (Stern, 1995; Zeanah et al., 1987). Though we would also expect AAI to not be too highly correlated with the measures, due to our understanding around parental representations seeking to partly explain the transmission gap between adult attachment and child attachment. As the paper's have not reported on the correlation coefficient, the degree to which we might understand the parent and child's attachment to be related to the parental representation is limited. (George & Solomon, 2008, 2016)

Seven different measures of mother-child interactions were found to be significantly associated with measures of parental representations (PDI-CI, PDI, PDI-ARR, PDI-RFS, MM-Offline, WMCI and WMCI-D). These relationships were in the expected direction such that higher reflective functioning, mind-mindedness, flexible integration were associated with more positive parenting; higher disrupted and ARR scores were associated with less positive parenting; and positive parenting scores being higher among balanced compared to non-balanced representations. This suggests a clear association between how parents think about their children and their interactions. This is a strong theoretical basis, reinforcing the understanding that a parent's representation of their child is very specific to that child and can dynamically inform how the parent interacts with the child.

There were several parenting representation measures that were tested against child attachment measures including six (PAI-S/I, PDI-CI, PDI-RF, IA, WMCI) with the Strange Situation Procedure , finding the correlations to be significant between the two but no correlation coefficients reported. Only one study reported on coefficients, finding PDI-CI and child attachment (ADPA) to be correlated in the expected range. This further supports the idea that there is a strong link between parental representations and the child's attachment. Indeed one study with the parental representations measure, Insightfulness Assessment, conducted a regression analysis, finding that IA significantly increased the prediction of attachment classifications beyond maternal sensitivity and maternal vocabulary (Koren-Karie et al., 2002). The PAI-S/I found mixed results, with one study finding sensitivity/insight to be associated with the child's attachment but a recent study found it didn't predict mother-child attachment interactions (Biringen et al., 2000; Bretherton et al., 1989b).

Measures of parental representation which aimed to capture risk, (PDI-ARR, PDI-MotC and WMCI-D) were found to be significantly correlated with other measures related to risk such as maternal psychopathology and parental stress. In particular, PDI-ARR and maternal psychopathology were found to have correlations within the expected range. This provides some evidence that these

measures do indeed capture risk. However as only a small number of studies looked in to this more research will need to be carried out in order to draw firmer conclusions.

Discriminant validity

Discriminant validity was generally carried out poorly in the review papers. In particular the methodological quality of the tests were inadequate. Most only used t-tests to explore if the association between the parental representation measure and the characteristic/measures/subscale was significant rather than reporting on the correlation itself. This limited this review's ability to determine the psychometric quality ratings of discriminant validity. On a positive note, many papers did provide clear hypotheses around what they expected to see in the testing though it would have also been beneficial for anticipated correlations to be quantified in advance.

The measures were most commonly tested for discriminant validity against maternal age, education, child age, child gender, parent gender. MM-Offline, PDI-RF, WMCI all had at least one study that adequately tested discriminant validity for a number of characteristics, all finding expected correlations ($r<0.3$) for maternal age and child age. PDI-RF and WMCI-PRS both had studies reporting correlations outside the expected hypothesis ($r>0.3$) for parental education. PDI-RF reported IQ to be more highly correlated than expected ($r>0.5$).

For those studies which did not report correlation coefficients, t-tests used and although limited in their usefulness, still give an indicator of where future studies should focus their investigations. T-tests found significant differences for a number of the parental representation measures and child gender, maternal age, parental education, maternal higher income, parent ethnicity, parental gender and parental socioeconomic status. There is a risk of bias if these characteristics are strongly associated with parental representations and therefore it is important for further research to better understand the significance of these correlations with these characteristics. For example, if child age and gender are significantly and strongly correlated (>0.3), it might be recommended that there are slightly adapted coding systems split by age and gender of the child.

Overall quality of psychometric properties

Findings were mixed with some measures of parental representation showing promising results. Generally, psychometric testing needed to be carried out to a better methodological standard, using larger sample sizes.

It is also noted that measures with a higher number of studies carrying out psychometric testing were at a disadvantage as this increased the likelihood of findings being contradictory and therefore receiving an inconsistent rating. Indeed for WMCI-Zeanah and PDI-RF, there were a number of individual studies which reported sufficient psychometric properties of the measures and good methodological quality.

Limitations

This review aimed to cover a number of key areas of psychometric testing for semi-structured interviews which measure parental representations, however not all psychometric properties were assessed. Responsiveness, interpretability, hypothesis testing and face validity were not covered in this review and therefore the findings of this review are limited to only to the psychometric

properties identified and assessed and cannot claim to provide a full picture of the psychometric properties of each measure.

This review was unable to find literature on how semi-structured interviews should be evaluated psychometrically and how the criteria may differ compared to questionnaires or other tools. This is critical gap, given the wide use of semi-structed interviews in psychology. This has meant that this review has had to rely on recommended testing and cut offs which were generally developed for health reported outcome measures. This may mean that the quality and methodological criteria used to compare to the studies reviewed in this paper were not always the most appropriate. This severely compromises the findings of this review.

Due to the limitations of this review, a second rater was not available to check the assigned methodological and quality ratings. This results in a greater risk of bias in this review.

This review chose to include outcome studies within the review which is specifically not recommended according to COSMIN guidelines (Prinsen et al., 2018). This decision was made in order to maximise the likelihood of identifying all psychometric properties that have been carried out on the measures. However in doing this, it was difficult to carry this out in a standardized way due to the sheer amount of papers to review. Furthermore, testing carried out within the outcome studies was sometimes chosen by this review to include as psychometric testing even when that was not the main intention of the study for carrying out this test. This increased the subjectivity during the study selection phase and thereby further increasing the risk of bias in this review.

Most studies identified in this review used populations from western countries. The meaning derived from the assessment of psychometric testing of these measures is therefore limited to these populations and doesn't necessarily mean that the measures are robust in other contexts (Cook & Beckman, 2006). More testing of these measures therefore needs to be done in other, particularly non-western countries.

Recommendations

Generally, psychometric literature has highlighted a significant gap between research in psychology and psychometric theory, suggesting that this has compromised the progress within the field of psychology (Borsboom, 2006). Indeed this review has found a substantial number of papers using inappropriate statistical tests to validate the measures. It is therefore strongly recommended that further research is carried out on measures of parental representation to bring the psychometric analysis up to date with established psychometric methods.

Contributing to this issue, is the dearth of literature specifically on how to carry out psychometric testing on measures such as semi-structured interviews in psychology. It was very difficult to find any guidance for this review which specifically fit the type of measures being looked at here. This review has highlighted a clear gap in the field of psychometrics which may have contributed to poor methodological testing of parental representation interviews and similar measures. It is recommended that clear guidance is established in order to assist future studies carrying out psychometric testing in this area.

Inter-rater reliability was generally good but some papers still used inadequate testing methods. It would therefore be beneficial for all studies to use the recommended statistical tests of ICC or Cohen's K when measuring interrater reliability rather than just the % rater agreement.

Internal consistency was not reported for many of the studies. This would be a helpful additional analysis to carry out. It is noted that although COSMIN guidelines recommends either Macdonald's Omega or Cronbach's alpha for psychometric testing of internal consistency however there is increasing recognition that Cronbach's alpha can systematically underestimate reliability and therefore Macdonald's omega is preferable (Flora, 2020). It is therefore recommended for future studies to therefore report Macdonald's omega for internal consistency.

It is recommended that test-retest reliability is carried out using the advised methodology in psychometric literature, namely, that testing is carried out within 1-2 weeks and that ICC or correlations are used in the testing, rather than T-tests only.

Construct validity testing would profit from papers coming up with more specific hypotheses where the level of correlation they might expect to see between the two measures is quantified and a reasonable justification is provided. To test the hypothesis, Pearson's correlation should then be use rather than just t-tests. This would help provide better insight in to how the constructs between the two measures/subscales might related. Likewise, discriminant validity was generally tested with t-tests only, rather than carrying out Pearson's correlations. It would be helpful for correlations to be used in order to establish the relationship (or lack of) between the measure and the variables.

Conclusion

This systematic review has identified seven measures and twelve coding systems of parental representations and reported on a range of key psychometric properties. This review has found that overall, there are a number of promising measures but that generally more testing needs to be carried out to a higher methodological standard. No measure of parental representation was found to have good methodological and psychometric ratings across every psychometric property. In particular, test-retest reliability and discriminant validity require considerable improvement before a number of the measures could be considered robust. Generally, studies would also benefit from using larger sample sizes. Lastly, more psychometric testing needs to be carried out in general on every measure of parental representation in order to ensure these measures are robust and therefore good enough to be used clinically and for future research.

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Part 2: Empirical Work

Title: Exploring Psychometric Properties of the Assessment of Representational Risk (ARR) in a sample with social care involvement

Candidate Number: HDSS3

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Abstract

Background: The assessment of representational risk (ARR) is a new coding system which is applied to the parent development interview (Slade et al., 2004; Sleed, Isosävi, et al., 2021). It is designed to assess for potential risk in the caregiver and child relationship. Thus far, there are few studies that have explored the psychometric properties of the ARR.

Objective: The paper aims to firstly, examine a number of psychometric properties of the ARR in a population of parents with social care involvement including, discriminant validity, internal consistency, concurrent validity compared with the Child Abuse Potential Inventory (CAPI; Milner, 1986); and criterion validity.

Participants and Setting: The data was gathered from a larger project called the Supporting Parents Project (Sleed, Fearon, et al., 2021). A total of 110 caregiver-child dyads participated, across five local authorities in England. All children were subject to a child in need, child protection plan or planning law outline (PLO).

Methods: The data was analysed using SPSS. For factor structure of the ARR, Confirmatory Factor Analysis (CFA) and Principal Components Analysis (PCA) was used. For internal consistency, Cronbach's alpha was calculated. Correlations were used for concurrent validity. Criterion validity was tested using independent t-tests. Discrimination validity was tested with t-tests for nominal variables and correlations for continuous variables.

Results: CFA revealed a poor fit against previous models (CMIN/DF=3.4)**.** The Cronbach's alpha coefficients for the hostile, idealizing and the total score were good (α=.699 and α=.772 respectively). The reliability for the helplessness and idealising subscale were acceptable (α=.650 and α=.643). Concurrent validity and criterion validity were good. Discriminant validity was good, except in relation to parent's education.

Conclusions: Findings indicate that the ARR has good psychometric properties to measure risk in the parent-child relationship, with the total ARR score being the most robust use of the ARR for both clinical and research purposes.

Introduction

1.1 Defining parental representations

Parental representations are defined as a parent's 'internal working models' of the child or the current state of mind with respect to their child, parenting, and the relationship with their child (Mayseless, 2006). These representations begin during pregnancy and evolve with the parent-child relationship, tending to stabilise by the child's first year (Stern, 1995; Vreeswijk et al., 2015; Zeanah et al., 1987).

1.2 The impact of parental representations

Parental representations are closely linked with the nature of the parent-child relationship and is crucial for a child's wellbeing and the shaping of their development. The quality of the parent-child relationship is thought to be closely linked with attachment security (Diener & Ryan, 2009). Research has found strong associations between prenatal parental representations and their child's attachment security (Madigan et al., 2015; Steele et al., 2014). Indeed Tambelli (2020) found maternal representations to predict child attachment at 14-18 months.

Parental representations is associated with parental behaviour (Bretherton & Munholland, 2008; Crawford & Benoit, 2009; Dayton et al., 2010; De Falco et al., 2014; George & Solomon, 2016b; Isosävi et al., 2016, 2020; Korja et al., 2010; León et al., 2018; Lundy, 2013; Marcu et al., 2016; Salomonsson et al., 2015; Suchman et al., 2010; Theran et al., 2005). When parents have non-distorted parental representations of their child, the parent displays more positive affect and parental support (Button et al., 2001) as well as parenting sensitivity (Sayre et al., 2001), emotional availability (Tambelli et al., 2020) and has a greater ability to provide a secure base for their child (Meins et al., 2013).

Parental representations have a clear link with children's wellbeing including emotional regulation (Rosenblum et al., 2002, 2018), social-emotional processing (Dykas et al., 2011) and brain development (Fitter et al., 2022). Two longitudinal study identified parental representations as a predictor in adolescent's psychosocial functioning upon leaving home (Carlson et al., 2004; Scharf et al., 2015). Mothers with non-balanced parental representations have been associated with more atypical parenting behaviour such as hostile, intrusive, negative or frightening behaviour (Schechter et al., 2005).

The parent-child relationship is evidently hugely important for the happiness and wellbeing of children. When the relationship goes wrong and the child is maltreated, the child suffers in numerous ways. A child who is maltreated is more likely to experience psychopathology, including suicide, depression, psychosis, anxiety disorders, behaviour disorders, personality disorder and dissociation (Cicchetti et al., 2015; Cicchetti & Doyle, 2016; Finzi et al., 2001; Morgan & Gayer-Anderson, 2016; Norman et al., 2012; Vachon et al., 2015).

1.3 Predictors of child maltreatment

Identifying children who are being maltreated by their parents is pertinent in order to offer timely help. Equally, there is concern around families being unnecessarily investigated in social care, which is difficult for the families and a poor use of resources. Being able to identify the families that truly need support is therefore key.

A parent's adult attachment is a strong predictor of their children's likelihood to experience maltreatment (Lo et al., 2017). When a parent has insecure attachment, they more likely to display dysfunctional parenting by being less sensitive to their children's needs and having difficulties with emotional regulation such as poor anger management and intrusiveness (Adam et al., 2004; Jones et al., 2015). This is thought to be the underlying mechanism behind adult attachment leading to child maltreatment. Furthermore, parents who are insecurely attached are more likely to experience partner violence (Rankin et al., 2000) and higher parenting stress (Rholes et al., 2006), which thereby increases the likelihood of child maltreatment.

Parents with insecure attachment are also more likely to have children who have insecure attachment (Van IJzendoorn, 1995). Children with insecure attachment have poorer self-regulation and lower levels of compliance to parents (Bendel-Stenzel et al., 2022) which can be difficult for parents to manage and thus heighten the risk of child maltreatment.

1.4 Parental representations and child abuse

There is a growing body of research finding parental representations to be a strong mediating factor in the perpetration of child abuse (Crawford & Benoit, 2009; Huth-Bocks et al., 2004; Malone et al., 2010; Schechter et al., 2008). Parents who have experienced interpersonal trauma have a higher likelihood of having disrupted prenatal parental representations, finding that the more severe the trauma, the more severe the disruption (Ahlfs-Dunn et al., 2022)**.** Distorted parental representations are associated with disorganized attachment in the children (Crawford & Benoit, 2009) which has long been established as a predictor of mental health difficulties in later life (Zeanah et al., 1986). Disrupted parental representations are linked with maladaptive social-emotional outcomes in children such as more negative child affect and poorer quality of play (Korja et al., 2010; Rosenblum et al., 2002). Furthermore, prenatal disrupted parental representations were found to predict poorer social-emotional functioning at 24 months (Guyon-Harris et al., 2022).

From this evidence, there is a clear need to be able to screen parents for disrupted parental representations in order to offer timely intervention to support the family.

1.5 Parental representations and interventions

Attachment based interventions are widely used in order to support parents to improve the relationship with their children and therefore decrease the risk of child maltreatment (Barlow et al., 2016; Gregory et al., 2020). Barlow (2016)'s review found that parent-infant psychotherapy, video-feedback and mentalisation-based programs have all had good results in improving attachment related outcomes. Attachment-based interventions have found positive results when focussing on trying to increase the proportion of 'balanced' parental representations with mothers from a low-income community as measured by the Working Model of the Child Interview (WMCI; Rosenblum et

al., 2018). A study with mothers with addictive difficulties found improvements in reflective functioning and parental representations led to improvement in caregiving sensitivity 3 months on (Suchman et al., 2018). Another intervention for parents and children where difficulties were identified in the parent-child relationship or in the child's behaviour found improvement in maternal representations, child behaviour and reduction in disorganized attachment classifcations for the children (Huber et al., 2015). With the increased use of attachment based interventions, appropriate measures of parental representations are needed, particulary those sensitive to identifying risk within the parent-infant relationship.

The ARR is a new measure which offers researchers and clinicians a way to identify multiple dimensions of parental representation that arise from traumatic experiences in attachment relationships and predict harsh parenting that does not support childrens developmental needs. (Sleed, Isosävi, et al., 2021).

1.6 The Assessment of Representational Risk (ARR)

The ARR is a coding system designed to be used on the Parent Development Interview (PDI) in order to measure relational risk within the parent-child relationship. The PDI is a semi-structured interview that asks the parent to think about their relationship with a specific child (Pianta et al., 1995; Sleed et al., 2020). It was developed in response to a need for a multidimensional measure which can assess relational risk (Sleed et al., 2021). Findings suggest that this is a robust measure for both clinical and research purposes. The measure was found to have good reliability and validity, particularly for the overall risk score. It was also found to be sensitive to treatment change when used in an intervention (Fonagy et al., 2016). However there is a need to study this measure further for several reasons. This is a relatively new measure that has not been tested widely. The ARR is intended to identified severe disruptions in the parent-child relationship yet it has not been tested on parents who would be expected to have some of the highest risk scores on the ARR, such as those with social care involvement.

1.7 Psychometrics of the ARR

In order for the ARR to be use appropriately for clinical and research purposes, it is first important to have a better understanding of it's psychometric properties. There is only one dedicated study looking at the psychometric properties of the ARR (Sleed et al., 2021) as such it needs to be further evaluated. The sample in the original validation study comprised of a total of 184 mother-infant dyads across three groups: a community group, a clinical group of mothers with mental health issues and their babies and a group of mothers and babies who spent time at Mother-Baby units in prison (Sleed, Isosävi, et al., 2021). Interrater reliability was good for all three subscales, as well as the overall risk score.

The total ARR score had a strong internal consistency score (α=.736). In relation to the subscales, only the hostile subscale had an adequate internal consistency (α=.807), with helpless and idealization only achieving moderate levels of internal consistency (α=.587 and α=.420 respectively), possibly due to the low number of items in each of these factors.

With regards to criterion validity, the total ARR score was able to discriminate between the two samples exposed to socioeconomic and interpersonal risks, (prison group and group with social care involvement) and the community sample. The prison group was not found to differ significantly from the community group with regards to the hostile and helpless subscales. Whilst there was no difference found on the idealizing subscale between the clinical and community group.

Concurrent validity against parent-child interaction, maternal psychopathology and reflective functioning were also tested in the original validation study. The total risk score was negatively correlated with parental reflective functioning (PRF) as well as maternal psychopathology. Further to this, the total risk score and hostile and idealizing ARR subscales correlated with poorer observed parent-child interactions but a significant correlation wasn't found for the helpless subscale (Sleed, Isosävi, et al., 2021).

Two outcome studies offer further insight in to the psychometric properties of the ARR. The first, looked at the ARR on a sample of 76 mother-baby dyads, where the mother had mental health difficulties (Fonagy et al., 2016b). The sample was from a low socioeconomic background. Interrater reliability was carried out on all three subscales and found to be acceptable (ICC=.865, .700, and .705 for the Hostile, Helpless, and Narcissistic (renamed Idealising in the original validation paper) subscales).

The second outcome study looked at the ARR on a sample of 50 Palestinian mother-baby dyads, exposed to war conditions (Isosävi et al., 2020). Inter-rater reliabilities were good with regards to the total risk score (intra-class correlation (ICC) = .87). A two factor model was identified in this study with an ICC of .94 for the first factor (flood-constricted) and .89 for the second factor (hostile-helpless and fearful). The paper considered the representational features, flooded-constricted, hostile-helpless and fearful to be clear indicators of risk within the parent-infant relationship, just as was found in western samples (Sleed et al., 2021) . However the dimensions, incoherence and idealizing dimensions appeared the most impacted by cultural and context specific issues and therefore raised important questions around cultural validity for these items. This study had a relatively small sample and therefore further research is needed to provide further reliability over the results found. In addition, during the study, the measures were translated and then back translated without being recalibrated. This leaves the findings exposed to translation bias thereby casting doubt over the reliability of the results.

Although there are some good psychometric results so far, only three papers have explored the psychometric properties of the ARR and therefore further research is still needed, especially in samples where children have been reported for maltreatment. The ARR was designed to pick up on acute distortions in the parent-child relationship. Yet, so far, no studies have explored the concurrent validity of the ARR against the CAPI, a well established measure of maltreatment in a sample of parents who have been referred to social care for allegations of maltreatement. Studies

instead, have used maternal sensitivity or parental stress which is not regarded as an equivalent measure. Furthermore, findings around moderate internal consistency for some of the subscales warrants further investigation. As Sleed (2021) calls for, a further look in to discriminant validity is needed in order to see if there are any confounding sociodemographic variables. Lastly, as a measure designed to identify high risk representational profiles, it is particularly important to test whether the ARR would be able to do so in populations exposed to many socioeconomic and interpersonal risks. One of the potential uses of the ARR is to identify "red flags" in the parent's representations of the child (Sleed, Isosävi, et al., 2021). It is notable that no research so far has been conducted with a sample of parents with social care involvement .

This study seeks to address some of these gaps in the research by carrying out further psychometric testing of the ARR.

1.8 The current study

1. To examine the factor structure of the ARR in a sample of caregivers with social care support. The validation study indicated a three factor model of helpless, hostile and idealising subscales and it's hypothesized that this study will find the same structure for this sample.
2. To test discriminant validity for potentially confounding sociodemographic variables. It is predicted that the total ARR score would not be associated with parent's education, parent and child, age and gender, nor whether a parent has an illness or not.
3. To examine the internal consistency of the individual subscales and the overall risk score. It is hypothesized that the total risk score will have good internal consistency as found in previous studies.
4. To look at the concurrent validity of the ARR compared with the Child Abuse Potential Inventory (CAPI; Milner, 1986). It is hypothesized that the ARR will be at least moderately (r>0.4) correlated with the CAPI.

5. To examine criterion validity of the ARR by comparing the sample group in the current study with others in a different study that all have different risk profiles. It is expected that the total risk score will be significantly higher (p<0.05) in this sample of families open to social care, compared with two other groups whereby the relational risk is predicted to be lower..

Method

2.1 Participants and procedure

2.1.1 Procedure

The data was gathered from a larger project called the Supporting Parents Project (Sleed, Fearon, et al., 2021). For this current study, only baseline data from the sample was used. Participants were recruited from five local authorities in England: Bath & North East Somerset, Bristol, Stockton-on-Tees, Wiltshire, Oxfordshire.

Following referral from social care, the researchers contacted participants and collected informed consent. Data were collected pre randomisation. Interview and questionnaire baseline data were collected. All data were collected online on video conferencing calls. After baseline data was collected, the program randomized the participants in to one group, which provides additional support from the Supporting Parents Project intervention alongside their usual care or the second group which received Treatment as Usual (TaU).

2.1.2 Participants in the current study

A total of 180 parent-child dyads with social care involvement were referred to the study. Of those, 70 did not participate as they were not able to be contacted, refused to participate or were not deemed eligible. A total of 110 parent-child dyads participated. Only the baseline data is used for the purposes of this study.

The baseline demographics are detailed in **Table 1**. The data were collected across five local authorities in England. The sample includes mainly biological parents (91%). Most were female (79%) and were a single parent household (66%). Three quarters having no paid income and most families

living in a council house (90%). The majority of participants were born in the United Kingdom (97%) and described themselves as of white ethnicity (94%).

Table 1 Participant Baseline Demographics (N=103)

Parent/Caregiver	
Parent Gender: n(%)	
Female	81 (79%)
Male	21 (20%)
Non-binary	1 (1%)
Parent Age: mean (range) in years	32.90 (20-63) years
Parent Ethnicity: n (%)	
White	96 (93%)
Other than White	7 (7%)
Single Parent household: n (%)	67 (65%)
Parent Work status: n (%)	
Employed	35 (34%)
Not Employed and not looking for work	62 (60%)
Not employed and looking for work	6 (6%)
Household yearly income category: n (%)	
Prefer not to say	4 (4%)
Under £10,000	27 (26%)
£10,000-£20,000	54 (52%)
£20,000 - £30,000	10 (10%)
Over £30,000	8 (8%)
Source of household income: n (%)	
State benefits only	68 (66%)
State benefits and earnings	23 (22%)
Earnings only	12 (12%)
Target Child	
Child Gender: n (%)	
Male	55 (54%)
Female	47 (46%)
Child Age: mean (sd) in years	8 (unborn – 16)

At referral, the target child was on a Child in Need, Child Protection Plan or in Planning Law Outline (PLO) proceedings. By beginning of the project, however, some of the children's social care status had changed with 8% stepped down and 5% stepped up to care proceedings or Looked After Child.

The children ranged from unborn to 16 years old and tended to either be on a Child in Need (CIN) plan (42%) or Child Protection (CP) plan (39%). Most families had at least two children (76%).

The family social care records show that for the 6 months prior to randomisation:

• 54% families had a record of police involvement

• 24% families had a record of Emergency Duty Team involvement

• 22% families had a Section 47 investigation

• 17% families had a recorded incidence of domestic violence

2.1.2 Samples used from another study

Criterion validity was tested in order to see whether the total ARR score could discriminate between groups where caregivers were expected to have differing levels of risk within the parent-child relationship. This would contribute to the evidence around the application of the ARR for both clinical and research purposes, where the sensitivity of the risk score is needed to identify change of relational risk or to differentiate between higher or lower relational risk levels between different caregivers. To test criterion validity, two sample groups were used from the original validation study (Sleed, Isosävi, et al., 2021). The first is a group of clinically referred dyads ("clinical group"; n=118) and the second is a group of mothers who are staying on a Mother Baby Units (MBUs) in prison ("Prison group"; n=149). These groups are therefore briefly described with more information on the criteria and recruitment process detailed elsewhere (Fonagy et al., 2016a; Sleed et al., 2013).

The clinical group were recruited for an RCT looking at the outcomes of a Parent-child Psychotherapy intervention (Fonagy et al., 2016a). Mothers were referred by a professional for needing additional emotional support. Mothers included in the study all met criteria for clinical mental health problems.

Mothers were excluded if they were non- English-speaking, had a diagnosis of psychosis, substance misuse or an IQ below 70.

The prison group consisted of mothers and babies who were part of a cluster RCT evaluating an intervention in MBUs in UK prisons (Sleed et al., 2013). The sample used in this study consisted of an intervention group made up of dyads in 3 MBUs running the intervention and a control group made up of dyads in 4 MBUs that were not running the intervention.

2.2 Ethics

The data collection was carried out by facilitators who were trained and supervised as part of the project. The overall project has been granted ethical approval by the UCL ethics committee (No.9593/002). Approval for this study was granted as an amendment to the main study. Fully anonymised data was used. Informed consent was acquired from the participants. The data was handled in line with General Data Protection Regulation 2016.

2.3 Measures

2.3.1 Parent Development Interview (PDI)

The PDI is a semi-structured interview that looks at the parent's current representations, thoughts and feelings towards their child (Slade et al., 2004). The parent is asked to describe their child and their relationship with their child and to give examples. Questions also centre around feelings related to fearfulness, guilt, joy as well as the difficulties of being a parent. Other questions delve in to the parent's own childhood and how they would like to be similar or dissimilar to their own parents. The interview was audio-recorded and transcribed verbatim. The transcripts were coded using 2 coding systems:

2.3.1.1 The Assessment of Representational Risk (ARR)

The ARR coding system was applied to the PDI transcripts, coded according to the manual. The ARR consists of 10 dimensions of parental representation: hostile hehaviour; hostile experiences; fearful affect; helplessness; emotional distress; enmeshment/role reversal; incoherence; idealization; mutual enjoyment and supportive presence (Sleed, Isosävi, et al., 2021). The first 8 dimensions relate to features associated with relational risk in the parent-child relationship. The remaining two

dimensions, mutual enjoyment and supportive presence are related to secure attachment and when absent, indicate concern within the parent-child relationship.

Each item is rated out of 5; 1 being low and 5 being high. In the original valdation study, the dimensions were found to coalesce on to three subscales: ARR hostile (sum of hostile experience, hostile behaviour, mutual enjoyment—reversed score and supportive presence—reversed score), ARR helpless (sum of fearful affect, helplessness, and emotional distress) and ARR idealising (sum of enmeshment and idealization), except for incoherence which was not strongly associated with any of the subscales (Sleed et al., 2021). An overall risk score is also given in which the dimension, incoherence, is added as validity was improved with its inclusion (Sleed, Isosävi, et al., 2021).

The coders were the author of this study and two psychology doctoral students who were trained to reliable standards on the measure. A randomly selected subset of 20 interviews were recoded. The interrater reliability for all sub-scales was good, with intraclass correlations of the total risk score being 0.835.

2.3.1.2 The Reflective Functioning Scale (PDI-RF)

The RF coding was initially developed to measure reflective functioning in adults and adapted for the PDI (Slade et al., 2004). This coding system was applied to the transcripts. Research has demonstrated adequate psychometric properties of the coding system when applied to the PDI (Luyten et al., 2017; Slade, 2005; Sleed et al., 2018, 2020).

There is a subset of “demand” questions which are coded for reflective functioning. “Demand” questions are those which require the parent to mentalize, describing how they or their child might have felt or thought. The coding applies an 11-point RF rating scale. The RF score ranges from -1 to 9. A very low score of -1 to 1 is the lowest reflective functioning level indicating negative or bizarre mental states or no mental state language. Scores of 3 or less are considered low; Moderate scores are around 4 and 6; Scores of 6 and above are considered high, showing a sophisticated level of

mentalizing (Fonagy et al., 1998). The interviews were coded by three researchers who were trained and accredited as reliable coders.

2.3.2 The Child Abuse Potential Inventory (CAPI)

The CAPI is a self-reported, screening tool designed to be used to assess a parent's beliefs and practices around abuse, particularly physical abuse (Milner, 1986). It consists of 160 questions of which 77 feed in to an overall abuse score which can be split in to six subscales: distress, rigidity, unhappiness, problems with the child and self, problems with family, and problems from others. The remaining items feed in to three validity scales (lie, random response and inconsistency) as well as a response distortion index which picks up on purposefully faking good, faking bad, and random responses.

A review of the CAPI has found good internal consistency and good cultural validity (Walker & Davies, 2010). The review also found that the CAPI was able to classify and discriminate between abusive and non-abusive parents with over 70% accuracy (Walker & Davies, 2010). The CAPI has good concurrent validity against measures such as a history of child abuse (Haskett et al., 1995), low self-esteem and personal stress (Miragoli et al., 2015).

The CAPI is a well-researched tool and can be considered as a well established measure for potential child abuse (Lopez et al., 2012; Walker & Davies, 2010).

2.4 Data Analysis

The data was analysed using SPSS and AMOS SPSS. To explore the factor structure of the ARR, Confirmatory Factor Analysis (CFA) was used to test whether this study found the same underlying structure of the ARR as in the original study (the hypothesized model). Three different goodness-of-fit measures were used: Chi-Square, root mean square error of approximation (RMSEA), comparative fit index (CFI) and Tucker–Lewis index (TLI). Principal Components Analysis (PCA) with varimax rotation was used to identify the underlying structure of the ARR which fits this sample group best. For internal consistency, Cronbach's alpha was calculated for each subscale and the total ARR score. To explore concurrent validity of the ARR against the CAPI, correlations were carried out between

the total score and subscales of the ARR, against the total abuse score of the CAPI. To explore criterion validity, the sample group in this current study was compared with three other sample groups from a different study that all have different levels of parental representational risk using independent t-tests. To test discrimination validity, t-tests were used for nominal data including gender of the parent and child, parent education level and whether or not the parent lives with a partner. Correlations were used for continuous variables including parent and child age.

Results

Different sample numbers are reported for different tests due to missing data on some measures.

3.1 Descriptive statistics

Descriptive statistics are reported in **Table 1**. The distribution of the data was examined using skewness and kurtosis. Skewness for the total score and the subscales were all between -0.5 and 0.5. This indicates the data is nearly symmetrical, which is in keeping with assumptions around normal distribution. Looking at the kurtosis, a value closest to 0 indicates a normal distribution of the weight of the tails in relation to the rest of the distribution. The hostility and helplessness subscale, as well as the total risk score all have kurtosis close to zero, indicating normal distribution of the tail-heaviness. The Idealisation subscale has a platykurtic distribution. However, considering the idealisation subscale is symmetrical, we can still assume that the data falls in the range of normal distribution.

Table 1: Descriptive Statistics

N = 100	Scale range	Mean	Min	Max	Standard Deviation	Skewness	Kurtosis
ARR Hostility	4-20	11.58	4	19	3.32	0.162	-1.181
ARR Helplessness	3-15	8.06	3	15	2.84	0.159	-0.526
ARR Idealisation	2-10	4.99	2	9	2.06	0.32	-0.244

Total Risk Score	10-50	26.76	13	43	6.74	0.233	-0.594

3.2 Factor Structure

3.2.1 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis was used to test the three-factor model, hostility, idealizing and helplessness identified in the previous psychometric study of the ARR (Sleed, Isosävi, et al., 2021). CFA results were measured against accepted levels of good model fit: For Chi-Square/Degrees of Freedom (CMIN/DF), good fit ≤ 3; Comparative Fit Index (CFI), good fit ≥ 0.95; For Tucker-Lewis Index (TLI), good fit ≥ 0.95; For Root mean square error of approximation (RMSEA) good fit ≤ 0.06 (Hu & Bentler, 1999; Kline, 2015; MacCallum et al., 1999). Findings showed a poor fit across all measures which means that the three-factor model identified in the validation study does not fit the sample in this current study and therefore it is likely that a different model would fit better (**Table 2**).

Table 2: Goodness of Fit Statistics from AMOS SPSS

Subscale	CMIN/DF	RMSEA	CFI	TLI
Assessment of Representational Risk (ARR)	3.432	0.157	0.777	0.665

3.2.2. Principal Components Analysis (PCA)

As CFA found a poor fit for the data against the validation model, factor structure analysis using a PCA was carried out to identify the best factor structure for this population. The results of the PCA with varimax rotation are presented in **Table 3.** Both eigenvalues and the scree plot found a three-factor structure, which accounted for 66% of the variance. **Table 3** shows the three-factor structure and which items loaded together to make up a component. Items with a factor loading of over 0.4 are considered to be stable.

Table 3: PCA from SPSS (showing item loadings > 0.5)

	Subscales

ARR Dimension	Hostile/Helpless	Distorted-fearful	Lack of protective factors
Hostile Experiences	0.764[c]		
Hostile Behaviour	0.731[c]		
Fearful Affect		0.531[a]	
Helplessness	0.791[a]		
Emotional distress	0.736[a]		
Idealisation		0.793[b]	
Enmeshment		0.713[b]	
Incoherence		0.804[d]	
Enjoyment (reversed)			0.910[c]
Support (reversed)			0.831[c]

[a] Item originally loaded on helpless subscale; [b] item originally loaded on idealizing subscale; [c] item originally loaded on hostility subscale; [d] item didn't load on any subscale

The subscales and items included in each are:

Hostile/Helpless (Factor 1): Hostile Behaviour, Hostile Experience, Helplessness and Emotional Distress

Distorted-fearful (Factor 2): Idealization, Enmeshment, Incoherence and Fearfulness

Lack of protective factors (Factor 3): Enjoyment (reversed) & Support (reversed)

3.3 Internal Consistency

Internal Consistency was carried out using the three subscales identified in this paper, Hostile/Helpless, Distorted-Fearful and Lack of protective factors. Commonly accepted thresholds for Cronbach's α consider > 0.5 as poor; > 0.6 as acceptable; > 0.7 as good; > 0.8 as very good and > 0.9 as excellent (D. George & Mallery, 2003; Zinbarg et al., 2005). The Cronbach's alpha coefficients for the total ARR score, as well as the subscales, Hostile/Helplessness, Distorted/Fearful, Lack of protective factors were considered as good (α=.772 respectively, α=.798, α=.702 and α=.771). The reliability for the total score was tested to see if Cronbach's Alpha improved if any item was deleted (**Table 4**). This indicates the reliability of the total risk score is strongest with all 10 items included.

Table 4: Cronbach's Alpha for Total Risk Score if items are deleted

ARR Dimension excluded	Cronbach's Alpha if Item Deleted
Hostility	0.723
Hostile Behaviour	0.753
Fearfulness	0.767
Helplessness	0.721
Emotional distress	0.732
Idealisation	0.771
Enmeshment	0.747
Incoherence	0.745
Enjoyment (reversed)	0.767
Support (reversed)	0.766

The correlations (**Table 5**) between the subscales are all significant, meaning none are mutually exclusive.

Table 5: Pearson Correlations between subscales

Subscales	ARR Hostile/Helplessness	ARR Distorted/Fearful	ARR Lack of protective factors
ARR Hostile/Helplessness			
ARR Distorted/Fearful	0.418*		
ARR Lack of protective factors	0.245*	-0.049*	

***** Significant to 95% Confidence Level

3.4 Convergent validity

Convergent validity was carried out between the total ARR score and the CAPI abuse score. The strength of the correlations were reported using widely agreed upon interpretations: r=0.1-0.3: Weak; r=0.4-0.6: Moderate; and r=0.7-0.9: Strong (Tavakol & Dennick, 2011). A moderate positive association was found between the CAPI and the total ARR score (r=0.413, p=<0.001).

An additional test was carried out in which the correlation between ARR lack of protective factors and Reflective Functioning Scale (RFS), A moderate negative correlation was found between the two r(97)=-0.41, p<0.001.

3.5 Criterion validity

Criterion validity was carried out by comparing the mean total ARR score from this sample against the mean total ARR scores from three other groups in a previous study which have different levels of risk (**Table 6**). In line with the hypothesis, significantly different mean risk scores were found when comparing the social care involvement group against other groups with lower risk: clinical, prison and the community groups.

Table 6: t-tests between different sample groups

		Social care involvement Group (n=103)	**Prison (n=53)**	**Clinical (n=77)**
	Mean (SD)	**26.76 (6.74)**	**21.28 (3.69)**	**23.51 (6.55)**
t-test against Social care involvement	**Mean difference with Social care involvement group**		**5.48**	**3.25**
	95% Confidence interval for Mean difference		**3.53-7.43**	**1.28-5.28**
	P value		**p<0.001**	**p<0.001**

		High-Risk Group (n=103)	**Prison (n=53)**	**Clinical (n=77)**	**Community (n=54)**
	***Mean* (*SD*)**	26.76 (6.74)	21.28 (3.69)	23.51 (6.55)	17.91 (4.88)

t-test against High-Risk Group	***Mean difference with High risk group***	5.48	3.25	8.85
	95% Confidence interval for Mean difference	3.53-7.43	1.28-5.28	6.93-10.94
	P value	p<0.001	p<0.001	p<0.001

3.6 Discriminant validity

T-tests for equality of means of the total ARR score were carried out on whether the parent reported having any illnesses (**Table 7**), the education level of the parent (split between parents with A-Levels (>=2) or higher vs parents with GCSE or equivalent to no qualifications (<2)**;** whether the parent lived with a partner or not; whether the parent is male or female and whether the child is male or female. All characteristics were found to have equal variances and so t-test could be carried out with equal variances assumed. The t-tests found no significant difference between the two groups for whether the parent has illnesses or not, education level, lives with a partner or not or whether the parent was female or male (p=0.518, p=0.952 and p=0.332 respectively), indicating that these characteristics have no bearing on the representational risk to the child.

Pearson correlations were used when looking at the relationship between the total ARR score and both the age of the child and the age of the parent. As hypothesized, no significant correlations were found (p=0.082 and =0.188 respectively)

Table 7: t-test for equality of means of the total ARR score comparing parents that have illnesses vs no illnesses

				t-test for Equality of Means	
		Number	**Mean**	**Two Sided t-test**	**Mean difference**
Illnesses	No illnesses	75	27.01	0.518	1.01

	Illnesses	25	26.00		
Parent's Education Level	A-Levels and above GCSEs and below	14 89	28.86 26.47	0.220	2.39
Living with a Partner Status	Living with Partner Not living with Partner	33 67	26.82 26.73	0.952	0.09
Parent Gender	Female Male	79 20	27.05 25.40	0.332	1.65
Child Gender	Male Female	44 53	26.205 27.189	0.481	-0.984

Discussion

The aims of this study were to address some of the gaps identified in the research around the psychometric properties of the ARR. Results have implications for the utility of this measure in determining clinical decision making for samples of children who have been reported for maltreatment, including which interventions may be appropriate, progress in interventions, whether the child can remain safely in the home, and ultimately whether the child returns to the parent's custody. With regard to the psychometric properties, the results suggest that the total ARR score is the most robust use of the ARR for both clinical and research purposes. As the validaton study also found, a three factor structure was the best fit for the sample in this study, although the subscales each contained different dimensions. As expected, internal consistency was adequate to good for the subscales and total score. Concurrent validity, Discriminant validity and criterion validity were all good.

4.1 Factor Structure and Internal reliability

This study found that the factor structure reported in previous studies was a poor fit for the population in this study (Isosävi et al., 2020; Sleed, Isosävi, et al., 2021). This suggests that there are likely different clusters of risk factors for different populations.

Internal consistency of the subscales were all adequate. This is something that has not been found in previous studies study (Isosävi et al., 2020; Sleed, Isosävi, et al., 2021).

Although the subscales are not universal, the overall risk score has been shown to have good internal consistency in every sample group including in this study (Isosävi et al., 2020; Sleed, Isosävi, et al., 2021). This indicates that the ten factors comprising the total risk score in the ARR reflect various elements of parental representations which are associated with risk within the parent-child relationship. This suggests that the total ARR score is the most robust use of the ARR for both clinical and research purposes.

It should be noted that for measures with subscales (rather than unidimensional scales), there is increasing caution around the appropriateness of using Cronbach's alpha in isolation, to demonstrate internal consistency of total scores, because as long as the subscales themselves have high internal consistencies, a high Cronbach's alpha will always be found when all the items are pooled together for the total score (Taber, 2018). This is because Cronbach's alpha reports high values as long as *some* items relate to each other, rather than looking at the consistency of all the items as a whole. With this in mind, this paper reports good internal consistency of the total ARR score with caution and emphasises the importance of looking at internal consistency in the context of the broader picture of the other psychometric tests administered, particularly factor analysis. Further testing with longitudinal data would be also be recommended such as test re-test reliability in order to provide further evidence around the robustness of the measure.

4.2 Factor Structure in a Sample with social care support

It is interesting to look at the factor structure that best fits the sample of parents with social care support in this study. The factor structure identified three subscales which this study has labelled: Hostile/Helplessness, Idealisation and Protective factors. The two subscales Hostile/Helpless and Idealisation seem to reflect George and Solomon's two caregiving system, dysregulated and constricted (George & Solomon, 2008).

The hostile/helpless subscale characterises parents who describe their child with hostility and/or attribute hostile intention behind their child's behaviour At other times, the parent might describe a helplessness in which the parent is helpless in the face of their child's behaviour. These parents were often highly emotionally distressed and were exposing their children to this. This reflects what George and Solomon termed, dysregulated caregiving (George & Solomon, 2008). These are mothers whose mental state is flooded and those who are "overwhelmed by their worst fears about themselves and their children" (George & Solomon, 2008, p. 30). A parent's protective function is paralysed during these times and they feel at a loss as to how to cope, feeling completely out of control.

The distorted-fearful factor is the subscale most closely associated with George and Solomon's 'constricted caregiving'. These parents have a "brittle defensive guard" in order to prevent a dysregulated mental state from emerging (George & Solomon, 2008, p. 31). This results in parents who "can think of the child only in relation to themselves – the child is invisible" (George & Solomon, 2008, p. 31). Parents with a constricting state of mind will describe giving up their parenting responsibilities, even when their child might really need them, in order to prevent themselves from breakdown or losing control. The parent may describes situations where the parent and child are in a role reversal, where the child is taking care of the parent. Parents might describe their children as 'angels'. Equally, psychological merging between parent and child is also described in which the parent and child feel and think in exactly the same way and operate as one.

It is of note that this study found that the dimension, incoherence, was part of the distorted-fearful state of mind, unlike in the validation study which found incoherence to not coalesce on to any subscale (Sleed, Isosävi, et al., 2021). Incoherence on the ARR relates to long, confusing, contradictory or bizarre parenting narratives and are a key indicator of disorganized attachment, linked to unprocessed trauma (Main & Hesse, 1990). It is likely, as research has found, that there are disproportionately high levels of trauma exposure in parents with children open to social care

(Suomi et al., 2023). Fearfulness was also clustered in this factor. In thinking about why we might see this particular cluster in parents with social care involvement, it is possible that parents are using highly idealized or distorted states of mind in order to defend against feelings of fear associated with trauma. When the defences fail, parents might feel flooded by frightening thoughts and images which distorts their relationship with their child.

The hostile/helpless subscale and the distorted-fearful subscale were found to be moderately correlated, suggesting that that there were at least some parents who had elements of both these profiles. This is unsurprising, considering these caregiving systems are connected. Dysregulated caregiving occurs when the defences of the constricted caregiving breakdown, leaving the (George & Solomon, 2008)med (George & Solomon, 2008).

Being able to identify the dysregulated and constricted caregiving systems in parents with high socioeconomic and interpersonal difficulties could be particularly helpful for treatment planning. The two caregiving systems, dysregulated and constricted provide a helpful picture of what might be happening in the parent's mind which prevents them from using their caregiving. In their work, George and Solomon are critical of the many interventions which try to support better parenting by changing the parent's 'bad' behaviour. They instead, suggest that their concept of caregiving systems is well placed to frame an intervention with a parent in more positive terms, by focussing on their wish to protect their child and keep them safe (George & Solomon, 2008). There are therefore potentially important clinical implications for the ARR, in aiding the clinician to identify whether the parent is more aligned with the Hostile/Helpless or Idealising representation. In doing so, the clinician could then tailor their intervention to help the parent better manage these states of mind so they can retain their protective function for their child.

The third subscale, ARR lack of protective factors, includes dimensions which related to a parent's sensitivity and availability to their child's needs as well as a parent's enjoyment and ability to derive pleasure from interactions with their child. Sensitivity of this nature is related to mentalisation.

Indeed the ARR lack of protective mentalisation subscale was found to have a moderate, negative correlation with the reflective functioning scale which is often used as a proxy for mentalisation. Research has found a strong link between a parent's mentalisation deficit and maltreatment of their children (Rosso, 2022).

The ARR lack of protective factors subscale was found to be weakly correlated with the ARR hostile/helpless subscale. A recent study has found poor mentalisation predisposes parents to attaching hostile attributions to their children's intentions, thereby increasing the likelihood that the parent reacts in a hostile way themselves (Byrne et al., 2019).

4.3 Concurrent Validity

The total risk score of the ARR was associated with the low CAPI abuse scores. The association was moderate which is expected as they do not measure exactly the same thing. The ARR intends to pick up on the underlying parental representation which may result in abuse. The CAPI is best at identifying risk of physical abuse and is not as good at picking up on sexual abuse or neglect (McNary & Black, 2003).

Although the CAPI is a well established measure for child maltreatment, previous results suggest that CAPI scores only account for about 17% of the variance in actual Crown Prosecution Service reports (Chaffin & Valle, 2003). This may partly be explained by the fact that the CAPI predominantly measures the risk of physical abuse as opposed to neglect and emotional abuse. Studies have also called for further research in order to establish whether the CAPI can be used as a predictor of future abuse (McNary & Black, 2003). Despite this, a positive correlation between the CAPI and the ARR is certainly a positive step in validating the ARR.

It is also important to be aware that due to their large sampling errors, the test for concurrent validity may not be reliable in small sample sizes (Boateng et al., 2018). This means that it would be particularly beneficial for this test to be replicated in another study.

4.4 Criterion Validity

As hypothesized, the total risk score in the very social care involvement group was significantly higher compared with both other groups. The social care involvement group comprises of families who have be identified by their local authorities who at the very least, need support to improve the wellbeing of the chid and in the most worrying cases, have children who are at risk of or are currently suffering significant harm. This is therefore one of the highest risk populations of disturbances within the parent-child relationship. Indeed this group had a wide range of ARR total risk scores from 13 to 43 (max score: 50). The first group comprised of mothers in prison. Mothers in mother-baby units are very vulnerable with a high frequency of mental health problems, childhood abuse and histories of violence (Sleed et al., 2013). Despite these risk factors, all the mothers in the sample went through rigorous risk assessments and were deemed safe to stay in a mother-baby unit with their children. The clinical group is made up of a population of mothers who were identified by professionals as meeting clinical levels of depression or anxiety as well as at least one indicator of social exclusion. Maternal mental health has been associated with problems in the parent-child relationship (O'Donnell et al., 2015), however, the mothers in this group have not specifically been identified as having disturbances in their relationship with their child. It is therefore of no surprise that both the clinical and prison group had a lower risk score than the group with social care involvement. This shows good criterion validity for the ARR and indicates the ARR is highly sensitive in differentiating levels of relational risk across a range of samples.

4.5 Discriminant Validity

The total risk score was found to be unrelated to a number of characteristics: whether the parent has any illnesses or not, whether the parent lives with a partner or not, the parent's education, the parent's gender, the child's gender, the parent's age and the child's age. These are all factors which this study predicted to have no bearing on the total risk score. The ARR possesses good discriminant validity in these areas. It is interesting to note that father's parental representations take on similar profiles as mothers, as fathers have not been included in previous studies related to the ARR. This provides tentative support that the ARR could be used for both parents. It is positive that the ARR

does not related to child's gender, considering that alternative measure of parental representations, such as the Working Model of the Child Interview (WMCI), have had an association (Sandnes et al., 2021; Slade et al., 1999). Furthermore it is of note that the ARR was not found to be confounded by Parent's education, when the PDI-RF was also found to be biased (Sadler et al., 2013).

4.6 Strengths and Limitations

This study has tested a number of psychometric properties of the ARR on a sample with social care involvement with a relatively large sample size. The ARR appears to have robust psychometric properties, particularly for the total risk score. It is uncommon for studies examining parental risk to include fathers in their sample (Jones et al., 2011) and so it is a strength of this study for fathers to be included, contributing to this under-researched area. This study has carried out a number of psychometric tests, providing tentative support for the use of the ARR, however there are also a number of limitations. Firstly, test re-test reliability was not able to be carried out. This would tell us about the stability of the ARR scale and therefore whether the ARR score is representative of the parent's risk to their child over time.

there are some psychometric properties that were unable to be conducted as this was a cross-sectional rather than longitudinal study. No responsiveness testing has been carried out. Responsiveness is the ability for a measure to capture change, over time. The responsiveness of the measure is important when it is used to evaluate interventions at different time points. One study has used the ARR to evaluate a psychoanalytic parent-child psychotherapy intervention (n=76) and found it to be sensitive enough to detect changes in the mother's representations (Fonagy et al., 2016a). As only one study has tested this so far with a relatively small sample size, further responsiveness testing would be helpful to provide assurance of its use for intervention evaluation.

Likewise, predictive validity was unable to be carried out. It would have been particularly useful to look at whether the was a link between the ARR and child outcomes over time.

Another limitation is that although the three-factor structure has been identified in this study for a population of parents with social care involvement, no dimensionality testing has been carried out. This is an often missed out stage in which the hypothesized factor structure is tested (e.g. via CFA) on the same sample at a different time point, or on a new sample (Boateng et al., 2018). It would be helpful for future research to test this study's three-factor structure on another population with social care involvement. If the same factor structure is found, this may give a sense of the different risk profiles that might be found in different groups of parents with sociodemographic difficulties.

Lastly, there is debate around the minimum sample size number for psychometric testing. The general rule of thumb has been to have at least 10 participants per scale item (Nunnally, 1978). With 10 ARR items, a sample size of 100 is therefore the minimum accepted sample and this study meets this requirement. However, increasingly, research has suggested that sample sizes should be at larger than that with recommendations of between 200 and 1000 being cited (Boateng et al., 2018; Frost et al., 2007). It would therefore be helpful in the future, for this study to be repeated with a larger sample size.

4.7 Conclusion

This study has looked at a number of psychometric properties of the ARR, including, internal consistency, factor structure, criterion validity, concurrent validity and discrimination validity. It is the first study of the ARR on a sample of parents with social care involvement. Findings indicate that the ARR is a robust measure of risk in the parent-child relationship. The total risk score was found to be the most reliable and valid score and therefore should be used in future research and clinical work.

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Appendices

Appendix 1

PRISMA checklist

SECTION/TOPIC	#	CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4-8
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	8
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	9
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	10
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	11
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	12
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	12
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	12-18
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	14
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	12-14
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	14
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	N/A
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N/A

Appendix 2

Search Criteria for PsychInfo

Searches	Results	Type
1	"Internal Working Model".mp.	261
2	Mind-mindedness.mp.	175
3	psychometrics/	65547
4	exp Questionnaires/	22120
5	father.mp.	29166
6	parent*.mp.	316955
7	Mother*.mp.	142410
8	interview.mp.	213328
9	maternal.mp.	63794
10	paternal.mp.	11301
11	representation*.mp.	114719
12	"working model".mp.	1278
13	insightfulness.mp.	145
14	5 or 6 or 7 or 9 or 10	421195
15	3 or 4 or 8	287709
16	1 or 2 or 11 or 12 or 13	116064
17	14 and 16	6994
18	15 and 17	1093
19	Parent*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	316955
20	Mother*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	142410
21	Father*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	52381
22	Maternal.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	63794
23	Paternal.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	11301
24	Caregiver.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	29723
25	Representation.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	69056
26	Internal-working-model.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	261
27	working-model.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	1278
28	Instrument.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	79510
29	Measure.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	279141
30	interview.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	213328
31	Tool.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	104144
32	19 or 20 or 21 or 22 or 23 or 24	445523
33	28 or 29 or 30 or 31	608376
34	Parental representation*.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	209
35	25 or 26 or 27 or 34	70382
36	32 and 33 and 35	798

Appendix 3

Methodology Quality and Cosmin guidelines standards for each psychometric property

An overall methodological quality score for each measurement property per study was then determined by taking the lowest rating of any standard (Prinsen et al., 2018). COSMIN guidelines do not provide standards for inter-rater reliability. This is an important property to be assessed when using semi-structured interviews. Therefore for the purposes of this review, guidance was adapted from established design requirements for inter-rater reliability (Hallgren, 2012).

Box 4. Internal consistency

Does the scale consist of effect indicators, i.e. is it based on a reflective model? [1] yes / no

Design requirements	very good	adequate	doubtful	inadequate	NA
1 Was an internal consistency statistic calculated for each unidimensional scale or subscale separately?	Internal consistency statistic calculated for each unidimensional scale or subscale		Unclear whether scale or sub scale is unidimensional	Internal consistency statistic NOT calculated for each unidimensional scale or sub scale	
Statistical methods					
2 For continuous scores: Was Cronbach's alpha or omega calculated?	Cronbach's alpha, or Omega calculated		Only item-total correlations calculated	No Cronbach's alpha and no item-total correlations calculated	Not applicable
3 For dichotomous scores: Was Cronbach's alpha or KR-20 calculated?	Cronbach's alpha or KR-20 calculated		Only item-total correlations calculated	No Cronbach's alpha or KR-20 and no item-total correlations calculated	Not applicable
4 For IRT-based scores: Was standard error of the theta (SE (θ)) or reliability coefficient of estimated latent trait value (index of (subject or item) separation) calculated?	SE(θ) or reliability coefficient calculated			SE(θ) or reliability coefficient NOT calculated	Not applicable
Other					
5 Were there any other important flaws in the design or statistical methods of the study?	No other important methodological flaws		Other minor methodological flaws	Other important methodological flaws	

[1] If the scale is not based on a reflective model, internal consistency is not relevant

Box 5. Cross-cultural validity\Measurement invariance					
Design requirements	**very good**	**adequate**	**doubtful**	**inadequate**	**NA**
1 Were the samples similar for relevant characteristics except for the group variable?	Evidence provided that samples were similar for relevant characteristics except group variable	Stated (but no evidence provided) that samples were similar for relevant characteristics except group variable	Unclear whether samples were similar for relevant characteristics except group variable	Samples were NOT similar for relevant characteristics except group variable	
Statistical methods					
2 Was an appropriate approach used to analyse the data?	A widely recognized or well justified approach was used	Assumable that the approach was appropriate, but not clearly described	Not clear what approach was used or doubtful whether the approach was appropriate	Approach not appropriate	Not applicable
3 Was the sample size included in the analysis adequate?	Regression analyses or IRT/Rasch based analyses: 200 subjects per group	150 subjects per group	100 subjects per group	< 100 subjects per group	
	MGCFA*: 7 times the number of items and ≥100	5 times the number of items and ≥100; OR 5-7 times the number of items but <100	5 times the number of items but <100	<5 times the number of items	
Other					
4 Were there any other important flaws in the design or statistical methods of the study?	No other important methodological flaws		Other minor methodological flaws	Other important methodological flaws	

**MGCFA: multi-group confirmatory factor analyses*

Box 6. Reliability					
Design requirements	**very good**	**adequate**	**doubtful**	**inadequate**	**NA**
1 Were patients stable in the interim period on the construct to be measured?	Evidence provided that patients were stable	Assumable that patients were stable	Unclear if patients were stable	Patients were NOT stable	
2 Was the time interval appropriate?	Time interval appropriate		Doubtful whether time interval was appropriate or time interval was not stated	Time interval NOT appropriate	
3 Were the test conditions similar for the measurements? e.g. type of administration, environment, instructions	Test conditions were similar (evidence provided)	Assumable that test conditions were similar	Unclear if test conditions were similar	Test conditions were NOT similar	
Statistical methods					
4 For continuous scores: Was an intraclass correlation coefficient (ICC) calculated?	ICC calculated and model or formula of the ICC is described	ICC calculated but model or formula of the ICC not described or not optimal. Pearson or Spearman correlation coefficient calculated with evidence provided that no systematic change has occurred	Pearson or Spearman correlation coefficient calculated WITHOUT evidence provided that no systematic change has occurred or WITH evidence that systematic change has occurred	No ICC or Pearson or Spearman correlations calculated	Not applicable
5 For dichotomous/nominal/ordinal scores: Was kappa calculated?	Kappa calculated			No kappa calculated	Not applicable
6 For ordinal scores: Was a weighted kappa calculated?	Weighted Kappa calculated		Unweighted Kappa calculated or not described		Not applicable
7 For ordinal scores: Was the weighting scheme described? e.g. linear, quadratic	Weighting scheme described	Weighting scheme NOT described			Not applicable
Other					
8 Were there any other important flaws in the design or statistical methods of the study?	No other important methodological flaws		Other minor methodological flaws	Other important methodological flaws	

Box 8. Criterion validity					
	very good	adequate	doubtful	inadequate	NA
Statistical methods					
1 For continuous scores: Were correlations, or the area under the receiver operating curve calculated?	Correlations or AUC calculated			Correlations or AUC NOT calculated	Not applicable
2 For dichotomous scores: Were sensitivity and specificity determined?	Sensitivity and specificity calculated			Sensitivity and specificity NOT calculated	Not applicable
Other					
3 Were there any other important flaws in the design or statistical methods of the study?	No other important methodological flaws		Other minor methodological flaws	Other important methodological flaws	

Box 9. Hypotheses testing for construct validity					
9a. Comparison with other outcome measurement instruments (convergent validity)					
Design requirements	very good	adequate	doubtful	inadequate	NA
1 Is it clear what the comparator instrument(s) measure(s)?	Constructs measured by the comparator instrument(s) is clear			Constructs measured by the comparator instrument(s) is not clear	
2 Were the measurement properties of the comparator instrument(s) sufficient?	Sufficient measurement properties of the comparator instrument(s) in a population similar to the study population	Sufficient measurement properties of the comparator instrument(s) but not sure if these apply to the study population	Some information on measurement properties of the comparator instrument(s) in any study population	No information on the measurement properties of the comparator instrument(s), OR evidence for insufficient measurement properties of the comparator instrument(s)	
Statistical methods					
3 Was the statistical method appropriate for the hypotheses to be tested?	Statistical method was appropriate	Assumable that statistical method was appropriate	Statistical method applied NOT optimal	Statistical method applied NOT appropriate	
Other					
4 Were there any other important flaws in the design or statistical methods of the study?	No other important methodological flaws		Other minor methodological flaws (e.g. only data presented on a comparison with an instrument that measures another construct)	Other important methodological flaws	

Additional box added for this review. *Standard adapted from* (Hallgren, 2012)

Inter-rater reliability				
	very good	adequate	doubtful	inadequate
Statistical methods				
1 Were appropriate statistical methods used?	Intra-class correlation coefficients (ICC) (for Ordinal) or Cohen's Kappa (for Nominal)		Intra-class correlation coefficients (ICC) (for Ordinal) or Cohen's Kappa (for Nominal) was used and	No ICC or Cohen's Kappa used e.g. only the % rater agreement was given only for the overall score.

	was used and reported on for each subscale		reported on for each subscale

Appendix 4

Definition and quality criteria of psychometric properties

Psychometric property	Domain and Definition	Quality rating criteria	
Reliability	The degree to which the measurement is free from measurement error		
Inter-rater reliability	The degree to which different raters make consistent estimates of the same phenomenon	+	Intraclass correlation coefficient (ICC) or weighted Kappa > 0.70
		-	ICC or weighted Kappa coefficient< 0.70
		?	ICC or weighted Kappa not reported
Internal consistency	The degree of interrelatedness around the items	+	At least low evidence for sufficient structural validity AND Cronbach's alpha(s) ≥ 0.70 for each unidimensional scale or subscale
		-	At least low evidence for sufficient structural validity AND Cronbach's alpha(s) < 0.70 for each unidimensional scale or subscale
		?	Criteria for "At least low evidence sufficient structural validity" not met
Test-retest reliability	The degree to which instrument scores obtained from the same participants remain consistent over brief periods during which the subject's competencies or problems are not likely to change	+	ICC or weighted Kappa > 0.70
		-	ICC or weighted Kappa coefficient < 0.70
		?	ICC or weighted Kappa not reported
Validity	The degree to which an instrument measures the construct(s) it purports to measure		
Convergent validity	How closely the instrument is related to other variables and other measures of the same construct.	+	The result is in accordance with the hypothesis
		* or +**	*Correlations were not in accordance with hypothesised correlations ** Correlations with instruments measuring similar constructs ≥0.50; related, but dissimilar constructs 0.30-0.50
		-	The result is not in accordance with the hypothesis
		?	No hypothesis defined (by the review team)
Discriminant validity	Measures of constructs that theoretically should not be highly related to each other are, in fact, not found to be highly correlated to each other.	+	The result is in accordance with the hypothesis (r<0.3)
		-	The result is not in accordance with the hypothesis (r>0.3)
		?	No correlation coefficients are reported

Ratings: + positive rating, ? indeterminate rating, - negative rating

As adapted from (Cronbach & Meehl, 1955; Frey, 2018; Hallgren, 2012; Krabbe, 2017; Mokkink et al., 2010; Prinsen et al., 2018; Putnick & Bornstein, 2016)

To assess the quality of convergent validity, a hypothesis around the correlations between the measure and another instrument was determined by this review, apriori. Instruments which measured an aspect of parental representation were considered to be measuring similar constructs. Any other instrument was considered to measure a related but dissimilar construct. This determined the expected level of correlation for the quality criteria.

To assess the quality of discriminant validity, a hypothesis around which characteristics/other measures should not be expected to correlate with the PR measure was determined by this review. For this purpose, it was hypothesised that parental age, gender, education level, socioeconomic background, income level and IQ; child age, gender and sibling order would be expected to have low correlations ($r<0.3$). All other correlations reported between the measures and other characteristics will be ignored for the purposes of discriminant validity such as maternal depression symptoms because this review is not clear what the hypothesis around correlation would be.

Appendix 5

Evaluating the overall psychometric properties of each measure

Overall methodological quality: For each measure, a methodological quality rating was assigned for each psychometric measure by pooling all the individual quality scores for each study (Prinsen et al., 2018). When >75% of the studies had the same rating, this same rating was given to the measure quality score. The rating *inconsistent* was assigned if there was <75% agreement between the study ratings.

Overall psychometric quality: For each measure, an overall psychometric quality score for each psychometric property was determined as per COSMIN guidelines (Prinsen et al., 2018). When >75% of the studies had the same rating (sufficient, insufficient or indeterminate), then the same rating was given to the overall quality score for the measure. The rating *inconsistent* was assigned if there was <75% agreement between the study ratings.

A slightly different approach was taken for discriminant validity to determine an overall psychometric quality rating. This is because discriminate validity is testing a number of different characteristics and therefore it doesn't make sense to pool the ratings. Therefore, of the characteristics tested, like for the other psychometric properties, if >75% had the same rating (sufficient, insufficient or indeterminate), then the same rating was given to the overall quality score for the measure. However if >50% were rated indeterminate then a rating of 'indeterminate' (rather than 'inconsistent' was given). A rating of 'inconsistent' was only given if there were different ratings for the same characteristics (e.g. if child gender was correlated in line with the hypothesis for discriminant validity ($r<0.3$) with the PR measure in one study but in another, the correlation was >0.3).

Quality of evidence: The quality of the evidence for each measure of parental representation was then graded (high, moderate, low, very low evidence), using a modified GRADE approach (Prinsen et al., 2018)tal., 2018). This incorporates the overall methodological quality scored with a number of other factors.

Quality of Evidence grading system

Quality of evidence	Lower if
High	Risk of bias -1 Serious -2 Very serious -3 Extremely serious Inconsistency -1 Serious -2 Very serious Imprecision -1 total n=50-100 -2 total n<50 Indirectness -1 Serious -2 Very serious
Moderate	
Low	
Very low	

n=sample size

Adapted from (Prinsen et al., 2018)

This approach takes in to account the following areas:

(1) risk of bias - i.e. the methodological quality of the studies

The following table was used to downgrade the overall quality of evidence in relation to risk of bias:

Quality of evidence grading method for Risk of Bias (Prinsen et al., 2018).

Risk of bias	Downgrading for Risk of Bias
No	There are multiple studies of at least adequate quality, or there is one study of very good quality available
Serious	There are multiple studies of doubtful quality available, or there is only one study of adequate quality
Very serious	There are multiple studies of inadequate quality, or there is only one study of doubtful quality available
Extremely serious	There is only one study of inadequate quality available

(2) inconsistency - unexplained inconsistency of results across studies

(3) imprecision - i.e. total sample size of the available studies

(4) indirectness - evidence from different populations than the population of interest in the review (Prinsen et al., 2018).

Appendix 6

List of studies identified in the review

No.	Interview	Measure	Name of article	Authors	Year	Type	Psychometric Paper/Outcome Study?
1	Interview of Maternal Representations After the Birth (IRMAN)	IRMAN	Prevention And Promotion Intervention program In The Field Of Mother–Infant relationship	Massimo Ammaniti, Anna Maria Speranza, Renata Tambelli, Sergio Muscetta, Loredana Lucarelli, Laura Vismara, Flaminia Odorisio, And Silvia Cimino	2006	Journal article	Outcome
2	Maternal Mind Mindedness	MM-Offline	Paternal And Maternal Mind-Mindedness And Pre-schoolers' Theory Of Mind: The Mediating Role Of Interactional Attunement	Brenda L. Lundy	2013	Journal article	Outcome
3	Maternal Mind Mindedness	MM-Offline	Maternal And Child Characteristics As Antecedents Of Maternal Mind-Mindedness	Demers, I., Bernier, A., Tarabulsy, G. M., & Provost, M. A.	2010	Journal article	Outcome
4	Maternal Mind Mindedness	MM-Offline	Pathways To Understanding Mind: Construct Validity And Predictive Validity Of Maternal Mind-Mindedness	Elizabeth Meins, Charles Fernyhough, Rachel Wainwright, David Clark-Carter, Mani Das Gupta, Emma Fradley, Michelle Tuckey	2003	Journal article	Psychometric Paper
5	Maternal Mind Mindedness	MM-Offline	Maternal Mind-Mindedness: Stability Over Time And Consistency Across Relationships	Illingworth Gaby; Maclean Morag; Wiggs Luci	2016	Journal article	Psychometric Paper
6	Maternal Mind Mindedness (Offline) & The Parent Development Interview (RF)	MM-Offline & PDI-RF	When Do Mothers' Executive Functions Contribute To Their Representations Of Their Child's Mind? A Contextual View On Parental Reflective Functioning And Mind-Mindedness	Tal Yatziv, Yoav Kessler, And Naama Atzaba-Poria	2020	Journal article	Outcome
7	The Insightfulness Assessment	IA	Mothers' Empathic Understanding Of Their Preschoolers' Internal Experience: Relations With Early Attachment	Oppenheim, D., & Koren-Sagi, A	2001	Journal article	Outcome
8	The Insightfulness Assessment	IA	Mothers'insightfulness Regarding Their Infants'internal Experience: Relations With Maternal Sensitivity And Infant Attachment	Koren-Karie N., Oppenheim D., Dolev S., Sher E. &Etzion-Carasso A.	2002	Journal article	Outcome
9	The Insightfulness Assessment	IA	Maternal Insightfulness And Preschoolers' Emotion And Behavior	Oppenheim, D., Goldsmith, D., & Koren-Karie, N.	2004	Journal article	Outcome
10	The Insightfulness Assessment	IA	Maternal Insightfulness And Resolution Of The Diagnosis Are Associated With Secure Attachment In Preschoolers With Autism Spectrum Disorders.	Oppenheim, D., Koren-Karie, N., Dolev, S., & Yirmiya, N	2009	Journal article	Outcome
11	The Insightfulness Assessment	IA	Insightfulness And Later Infant Attachment In Clinically Depressed And Nonclinical Mothers	Ramsauer, B., Lotzin, A., Quitman, J., Becker-Stoll, F., Tharner, A., & Romer, G	2014	Journal article	Outcome

12	The Insightfulness Assessment	IA	Caregiver Insightfulness And Young Children's Violence Exposure: Testing A Relational Model Of Risk And Resilience.	Gray, S. A. O., Forbes, D., Briggs-Gowan, M. J., & Carter, A. S.	2015	Journal article	Outcome
13	The Insightfulness Assessment	IA	Parental Insightfulness Is Associated With Cooperative Interactions In Families With Toddlers	Marcu, I., Oppenheim, D., & Koren-Karie, N.	2016	Journal article	Outcome
14	The Parent Attachment Interview	PAI-S/I	Attachment: The Parental Perspective	Bretherton, Biringen, Ridgeway, Maslin, & Sherman,	1989	Journal article	Outcome
15	The Parent Development Interview	PDI-ARR & PDI-RF	Randomized Controlled Trial Of Parent-Infant Psychotherapy For Parents With Mental Health Problems And Young Infants	Fonagy Peter; Sleed Michelle; Baradon Tessa	2016	Journal article	Outcome
16	The Parent Development Interview	PDI-ARR & PDI-RF	The Assessment Of Representational Risk (ARR): Development And Psychometric Properties Of A New Coding System For Assessing Risk In The Parent-Infant Relationship	Sleed, Michelle	2021	Journal article	Psychometric Paper
17	The Parent Development Interview	PDI-ARR	Caregiving Representations In War Conditions: Associations With Maternal Trauma, Mental Health, And Mother–Infant Interaction	Sanna Isosävi, Safwat Y. Diab,Samir Qouta,Samuli Kangaslampi,Michelle Sleed,Saija Kankaanpää,Kaija Puura,Raija-Leena Punamäki	2021	Journal article	Outcome
18	The Parent Development Interview	PDI-MotC	'The Meaning Of The Child To The Parent' The Development And Validation Of A New Method Of Classifying Parenting Interviews For The Nature Of The Parent-Child Relationship	Grey & Farnfield	2014	Thesis	Psychometric Paper
19	The Parent Development Interview	PDI-MotC	The Meaning Of The Child Interview (Motc) – The Initial Validation Of A New Procedure For Assessing And Understanding The Parent-Child Relationships Of 'At Risk' Families	Grey & Farnfield	2017	Journal article	Psychometric Paper
20	The Parent Development Interview	PDI-Pianta	Caregiving Representations Of Mothers Of Behaviorally Inhibited And Uninhibited Preschool Children.	Shamir-Essakow, Galia1; Ungerer, Judy A.1,3; Rapee, Ronald M.1; Safier, Ruth2	2004	Journal article	Outcome
21	The Parent Development Interview	PDI-Pianta	Mothers' Representations Of Their Relationships With Their Children Related To Maternal Behavior Demographic Information And Psychological Characteristics	Steinberg Donna Rachel	2000	Thesis	Outcome
22	The Parent Development Interview	PDI-RF	Maternal Reflective Functioning, Attachment, And The Transmission Gap: A Preliminary Study	Arietta Slade , John Grienenberger , Elizabeth Bernbach , Dahlia Levy & Alison Locker	2005	Journal article	Outcome
23	The Parent Development Interview	PDI-RF	Maternal Reflective Functioning Among Mothers With Childhoodmaltreatment Histories: Links To Sensitive Parenting And Infant Attachment Security	Ann M. Stacks, Maria Muzikb,C*, Kristyn Wonga,D, Marjorie Beeghlyd,E,Alissa Huth-Bocksf, Jessica L. Irwindand Katherine L. Rosenblum	2014	Journal article	Outcome

24	The Parent Development Interview	PDI-RF-SC	Reflective Functioning In Parents Of School-Aged Children	Borelli, Jessica L; St. John, H. Kate; Cho, Evelyn; Suchman, Nancy E	2016	Journal article	Outcome
25	The Parent Development Interview	PDI-RF	Associations Between Maternal Reflective Functioning, Parenting Beliefs, Nurturing, And Preschoolers' Emotion Understanding	Jessee, Alison	2020	Thesis	Outcome
26	The Parent Development Interview	PDI-RF	The Impact Of Prenatal Cocaine Use On Maternal Reflective Functioning.	Levy, D. W., Truman, S & Mayes	2001	Journal article	Outcome
27	The Parent Development Interview	PDI-RF	Minding The Baby: Enhancing Reflectiveness To Improve Early Health And Relationship Outcomes In An Interdisciplinary Home Visiting Program	Lois S. Sadler,A,B Arietta Slade,B,C Nancy Close,B Denise L. Webb,B Tanika Simpson,B Kristopher Fennie,A And Linda C. Mayesb	2014	Journal article	Outcome
28	The Parent Development Interview	PDI-RF	Convergent Validity Of Three Measures Of Reflective Function: Parent Development Interview, Parental Reflective Function Questionnaire, And Reflective Function Questionnaire	Lubna Anis1*, Grace Perez2, Karen M. Benzies2, Carol Ewashen2, Martha Hart3 And Nicole Letourneau3	2020	Journal article	Psychometric Paper
29	The Parent Development Interview	PDI-RF	Reflective Functioning On The Parent Development Interview: Validity And Reliability In Relation To Socio-Demographic Factors	Sleed, Michelle; Slade, Arietta; Fonagy, Pete	2018/20?	Journal article	Psychometric Paper
30	The Parent Development Interview	PDI-RF	New Beginnings For Mothers And Babies In Prison: A Cluster Randomized Controlled Trial	Michelle Sleed, Tessa Baradon And Peter Fonagy	2013	Journal article	Outcome
31	The Parent Development Interview	PDI-RF	Reflective Functioning In Mothers With Drug Use Disorders: Implications For Dyadic Interactions With Infants And Toddlers	Nancy E. Suchman , Cindy Decoste , Denise Leigh & Jessica Borelli	2010	Journal article	Outcome
32	The Parent Development Interview	PDI-RF	Parenting And Adolescent Adjustment: The Role Of Parental Reflective Function	Naom Benbassat & Beatriz Priel	2012	Journal article	Outcome
33	The Parent Development Interview	PDI-RF	The Significance Of Parental Reflective Function In The Adjustment Of Young Adults.	Naomi Benbassat & Shmuel Shulman	2016	Journal article	Outcome
34	The Parent Development Interview	PDI-RF	Stability And Change In Maternal Reflective Functioning In Early Childhood	Poznansky, Olga	2010	Thesis	Psychometric Paper
35	The Parent Development Interview	PDI-RF	Parental Reflective Functioning And Executive Functioning In Mothers With Substance Use Disorder	Ulrika Håkansson , Kerstin Söderström Reidulf Watten , Finn Skårderud , Merete Glenne Øie	2017	Journal article	Outcome
36	The Parent Development Interview	PDI-Original & PDI-RF	Assessing Reflective Parenting In Interaction With School-Aged Children	Karin Ensink, Annie Leroux,. A., Lina Normandin, Marko Biberdzic., Peter Fonagy.	2017	Journal article	Outcome
37	The Parent Development Interview	PDI-CI	Representational Models Of Relationships: Links Between Caregiving And Attachment	George & Solomon	1996	Journal article	Outcome

38	The Parent Development Interview	PDI-CI	The Attachment Doll Play Assessment: Predictive Validity With Concurrent Mother-Child Interaction And Maternal Caregiving Representations	George & Solomon	2016	Journal article	Psychometric Paper
39	The Parent Development Interview	PDI-Original	Maternal Representations Infant Psychiatric Status And Mother-Child Relationship In Clinic-Referred And Non-Referred Infants	Dollberg Daphna;Feldman Ruth;Keren Miri	2010	Journal article	Outcome
40	The Parent Development Interview	PDI-Original	Imagining The Child: Maternal Representations Of The Child As A Function Of The Quality Of The Mother's Object Relations	Gerber Jennifer Dale	2000	Thesis	Outcome
41	The Parent Development Interview	PDI-Original	Affect In Maternal Representations And Infant-Mother Attachment	Graf Francoise Geisendorf	1999	Thesis	Outcome
42	The Parent Development Interview	PDI-Original	Mothers' Mental Representations Of Their Relationships With Their Toddlers: A Link To Working Models Of Their Parents	Markham Laura Jean	1999	Thesis	Outcome
43	The Parent Development Interview	PDI-Original	Mothers' Representations Of Their Relationships With Their Toddlers: Links To Adult Attachment And Observed Mothering	Slade, A., Belsky, J., Aber, J. L., & Phelps, J. L.	1999	Journal article	Outcome
44	The Parent Development Interview & Working Model of the Child Interview	PDI-Original & WMCI-Zeanah	Maternal Representations And Parenting Style In Children Born With And Without An Orofacial Cleft	Habersaat Stephanie;Turpin Helene;Möller Cecile;Borghini Ayala;Ansermet François;Müller-Nix Carole;Urben Sébastien;Hohlfeld Judith	2018	Journal article	Outcome
45	The Parent Development Interview & Working Model of the Child Interview	PDI-RF & WMCI-Zeanah	Does Maternal Reflective Functioning Mediate Associations Between Representations Of Caregiving With Maternal Sensitivity In A High-Risk Sample?	Alvarez-Monjaras Mauricio; Mcmahon Thomas J; Suchman Nancy E	2019	Journal article	Outcome
46	The Parenting Representations Interview	PRI	Sense Of Coherence And Parenting Representation Among Parents Of Adolescents With Type 1 Diabetes	Goldberg A Scharf M Wiseman H.	2017	Journal article	Outcome
47	The Parenting Representations Interview	PRI	The Viability Of The Parenting Representations Interview For Assessing And Measuring Change In Parents Of Adolescents	Miri Scharf, Ofra Mayseless & Inbal Kivenson-Baron	2015	Journal article	Psychometric Paper
48	The Parenting Representations Interview	PRI	Shifting Internal Parent-Child Representations Among Caregivers Of Teens With Serious Behavior Problems: An Attachment-Based Approach	Moretti Marlene M.;Obsuth Ingrid;Mayseless Ofra;Scharf Miri	2012	Journal article	Outcome
49	The Working Model of the Child Interview	WMCI-A	Maternal Representations Of Their Children In Relation To Feeding Beliefs And Practices Among Low-Income Mothers Of Young Children	Leung CY Miller AL Lumeng JC Kaciroti NA Rosenblum KL.	2015	Journal article	Outcome
50	The Working Model of the Child Interview	WMCI-RF & WMCI-Zeanah	Maternal Mental Representations Of The Child In An Inner-City Clinical Sample: Violence-Related Posttraumatic Stress And Reflective Functioning	Schechter DS Coots T Zeanah CH Davies M Coates SW Trabka KA Marshall RD Liebowitz MR Myers MM.	2005	Journal article	Outcome

51	The Working Model of the Child Interview	WMCI-RF & WMCI-Zeanah	Distorted Maternal Mental Representations And Atypical Behavior In A Clinical Sample Of Violence-Exposed Mothers And Their Toddlers.	Schechter, Daniel S; Coates, Susan W; Kaminer, Tammy; Coots, Tammy; Zeanah, Charles H Jr.; Davies, Mark; Schonfeld, Irvin S; Marshall, Randall D; Liebowitz, Michael R; Trabka, Kimberly A; Mccaw, Jaime E; Myers, Michael M.	2008	Journal article	Outcome
52	The Working Model of the Child Interview	WMCI-PRS	Intervention Effects On Reflectivity Explain Change In Positive Parenting In Military Families With Young Children	Julian Megan M;Muzik Maria;Kees Michelle;Valenstein Marcia;Dexter Casey;Rosenblum Katherine L	2018	Journal article	Outcome
53	The Working Model of the Child Interview	WMCI-PRS	Reflection In Thought And Action: Maternal Parenting Reflectivity Predicts Mind-Minded Comments And Interactive Behavior	KATHERINE L. ROSENBLUM, SUSAN C. MCDONOUGH, ARNOLD J. SAMEROFF, AND MARIA MUZIK	2008	Journal article	Outcome
54	The Working Model of the Child Interview	WMCI-PRS	Strong Military Families Intervention Enhances Parenting Reflectivity And Representations In Families With Young Children	M.M. Julian, M. Muzik, M. Kees, M. Valenstein, Rosenblum	2018	Journal article	Outcome
55	The Working Model of the Child Interview	WMCI-PRS	Mom Power: Preliminary Outcomes Of A Group Interventionto Improve Mental Health And Parenting Among High-Risk Mothers	Maria Muzik & Katherine L. Rosenblum & Emily A. Alfafara & Melisa M. Schuster & Nicole M. Miller & Rachel M. Waddel L& Emily Stanton Kohle	2015	Journal article	Outcome
56	The Working Model of the Child Interview	WMCI-Zeanah & WMCI-PRS	Improving Maternal Representations In High-Risk Mothers: A Randomized Controlled Trial Of The Mom Power Parenting Intervention	Rosenblum Katherine;Lawler Jamie;Alfafara Emily;Miller Nicole;Schuster Melisa;Muzik Maria	2018	Journal article	Outcome
57	The Working Model of the Child Interview	WMCI-D	Longitudinal Associations Between Maternal Disrupted Representations Maternal Interactive Behavior And Infant Attachment: A Comparison Between Full-Term And Preterm Dyads	Hall R A; S;Hoffenkamp H N;Tooten A;Braeken J;Vingerhoets A J; J; M;Van Bakel H J; A	2015	Journal article	Outcome
58	The Working Model of the Child Interview	WMCI-D	The Working Model Of The Child Interview: Stability Of The Disrupted Classification In A Community Intervention Sample	Niccols A Smith A Benoit D.	2015	Journal article	Psychometric Paper
59	The Working Model of the Child Interview	WMCI-Zeanah & WMCI-D	Maternal And Paternal Infant Representations: A Comparison Between Parents Of Term And Preterm Infants	Tooten, Anneke; Hall, Ruby A. S; Hoffenkamp, Hannah N; Braeken, Johan; Vingerhoets, Ad J.J.M; Van Bakel, Hedwig J.A.	2014	Journal article	Outcome
60	The Working Model of the Child Interview	WMCI-Zeanah	Maternal Attachment Representations Of The Infant In The First Year Of Life: The Influence Of Prenatal Factors	Alismail Fatimah Hussain	2017	Thesis	Outcome
61	The Working Model of the Child Interview	WMCI-Zeanah	Mothers' Representations Of Their Infants Assessed Prenatally: Stability And Association With Infants' Attachment Classifications	Benoit, Parker, & Zeanah	1997	Journal article	Psychometric Paper

62	The Working Model of the Child Interview	WMCI-Zeanah	"Working Model Of The Child Interview": Infant Clinical Status Related To Maternal Perceptions	Benoit, Zeanah, Parker, Nicholson, & Coolbear	1997	Journal article	Outcome
63	The Working Model of the Child Interview	WMCI-Zeanah	Mothers Attachment Representations Of Their Premature Infant At 6 And 18 Months After Birth	Borghini Ayala; Pierrehumbert Blaise Miljkovitch Raphaele; Muller-Nix Carole Forcada-Guex Margarita; Ansermet Francois	2006	Journal article	Outcome
64	The Working Model of the Child Interview	WMCI-Zeanah	Mothers' Representations Of Their Infants Are Concordant With Infant Attachment Classifications	Charles H. Zeanah. M.D. Diane Benoit, M.D. **, Laurence Hirshberg, Ph.D. ***. Marianne L. Barton, Ph.D. ***, Cara Regan, Sc.B.	1994	Journal article	Psychometric Paper
65	The Working Model of the Child Interview	WMCI-Zeanah	Caregiver-Infant Interactions And Caregivers' Representations Of Relationships In Failure To Thrive	Coolbear Jennifer L	2000	Thesis	Outcome
66	The Working Model of the Child Interview	WMCI-Zeanah	An Examination Of The Psychometric Properties Of The Working Model Of The Child Interview Coding Scheme With Biological Mothers Who Have Maltreated.	Gustman, Brian Daniel	2015	Thesis	Psychometric Paper
67	The Working Model of the Child Interview	WMCI-Zeanah	Culturally Sensitive Assessment Of Attachment In Children Aged 18–40 Months In A South African Township	Klaus Minde, Regina Minde, Wendy Vogel	2006	Journal article	Outcome
68	The Working Model of the Child Interview	WMCI-Zeanah	Relations Between Maternal Attachment Representations And The Quality Of Mother-Infant Interaction In Preterm And Full-Term Infants	Korja R Ahlqvist-Björkroth S Savonlahti E Stolt S Haataja L Lapinleimu H Piha J Lehtonen L; PIPARI Study Group.	2010	Journal article	Outcome
69	The Working Model of the Child Interview	WMCI-Zeanah	Attachment Representations In Mothers Of Preterm Infants	Korja R Savonlahti E Haataja L Lapinleimu H Manninen H Piha J Lehtonen L; PIPARI Study Group.	2009	Journal article	Outcome
70	The Working Model of the Child Interview	WMCI-Zeanah	Maternal Representations And Infant Attachment: An Examination Of The Prototype Hypothesis	Madigan S Hawkins E Plamondon A Moran G Benoit D.	2015	Journal article	Outcome
71	The Working Model of the Child Interview	WMCI-Zeanah	Mothers' Representations Of Their Children And Axis II Diagnoses In Women On Methadone Maintenance	Mcneilly Catherine G	2000	Thesis	Outcome
72	The Working Model of the Child Interview	WMCI-Zeanah	Maternal Attachment Representations After Very Preterm Birth And The Effect Of Early Intervention	Meijssen D Wolf MJ Van Bakel H Koldewijn K Kok J Van Baar A.	2011	Journal article	Outcome
73	The Working Model of the Child Interview	WMCI-Zeanah	Maternal Working Model Of The Child And Emotional Availability In A Sample Of Aggressive Preschoolers	Rethazi Maya	1999	Thesis	Outcome
74	The Working Model of the Child Interview	WMCI-Zeanah	Stability And Change In Mothers' Internal Representations Of Their Infants Over Time	Sally A Theran , Alytia A Levendosky, G Anne Bogat, Alissa C Huth-Bocks	2005	Journal article	Psychometric Paper
75	The Working Model of the Child Interview	WMCI-Zeanah	A Long-Term Follow-Up Study Of A Randomized Controlled Trial Of Mother-Infant Psychoanalytic Treatment: Outcomes On Mothers And Interactions	Salomonsson Mw Sorjonen K Salomonsson B.	2015	Journal article	Outcome

76	The Working Model of the Child Interview	WMCI-Zeanah	Measuring Mothers' Representations Of Their Infants: Psychometric Properties Of The Clinical Scales Of The Working Model Of The Child Interview In A Low-To Moderate-Risk Sample	Sandnes K Lydersen S Berg Kårstad S Berg-Nielsen TS.	2021	Journal article	Psychometric Paper
77	The Working Model of the Child Interview	WMCI-Zeanah	Assessment Of Attachment In Foster And Adoptive Dyads	Schofield Diana W	2010	Thesis	Outcome
78	The Working Model of the Child Interview	WMCI-Zeanah	Mothers' Representations Of Their Infants And Parenting Behavior: Associations With Personal And Social-Contextual Variables In A High-Risk Sample	Sokolowski MS Hans SL Bernstein VJ Cox SM.	2007	Journal article	Outcome
79	The Working Model of the Child Interview	WMCI-Zeanah	Turkish Mothers' Attachment Orientations And Mental Representations Of Their Children	Sümer Nebi;Sakman Ezgi;Harma Mehmet;Savas Özge	2016	Thesis	Psychometric Paper

Appendix 7

Psychometric Quality and Methodological rating per study, split by Reliability and Valdiity

7a Reliability:

				Inter-rater reliability			Internal Consistency			Test Re-test reliability		
No.	**Measure**	**Ref**	**n**	**Result**	**Method Quality**	**Rating**	**Result**	**Method Quality**	**Rating**	**Summary**	**Method Quality**	**Rating**
1	IA	Koren-Karie et al, 2002	129	0.66-0.89	Very good	(+/-)						
2	IA	Oppenheim et al, 2004	42	0.77 and 0.93	Very good	+						
3	IA	Oppenheim et al, 2009	45	0.79	Very good	+						
4	IA	Ramsauer et al, 2014	39	0.44	Very good	-						
5	IA	Gray et al, 2015	64	0.76 to 0.95	Very good	+						
6	IA	Marcu et al, 2016	77	0.65	Very good	-						
7	IA	Oppenheim & Koren-Karie, Sagi, 2001	118	0.64 to 0.74	Very good	-						
8	IRMAN	Massimo et al, 2006	91	0.64-0.97	Very good	(+/-)						
9	MM-Offline	Yatziv et al, 2020	99	0.96	Very good	+						

10	MM-Offline	Meins et al, 2003	52	0.87	Very good	+						
11	MM-Offline	Demers et al, 2010	106	0.77-0.93	Very good	+						
12	MM-Offline	Lundy, 2013	78	0.84	Very good	+						
13	MM-Offline	Illingworth et al, 2016	32	0.80	Very good	+				Older sib, r=0.47 (p=0.009) Younger sib, r=0.36 (p=0.51)	Doubtful	*
14	PAI-S/I	Bretherton et al, 1989	37	0.81*	Inadequate	?						
15	PDI-ARR	Fonagy & Sleed, 2016	76	0.70-0.87	Very good	+				No sig difference	Inadequate	*
16	PDI-ARR	Sleed, 2021	184	0.72-0.92	Very good	+	0.42-0.81	Very good	"+/-" Hostile: + Helpless: - Idealizing: - Total score: +			
17	PDI-ARR	Isosävi et al, 2021	50	0.67-0.94	Very good	(+/-)						
18	PDI-CI	George & Solomon, 1996	32	0.77-0.90	Inadequate	+						
19	PDI-CI	George & Solomon, 2016	69	0.79-0.90	Inadequate	+						
20	PDI-MotC	Grey & Farnfield, 2014	85									
21	PDI-MotC	Grey & Farnfield, 2017	85	0.65-0.76*	Inadequate	?						
22	PDI-Pianta	Steinberg, 2000	74	>0.51-0.92	Very good	(+/-)						
23	PDI-Pianta	Shamir-Essakow, 2004	103	0.68-0.83	Very good	(+/-)						

24	PDI-RF	Alvarez-Monjaras et al, 2019	177	0.77-0.98	Very good	+	0.8	Very good	+			
25	PDI-RF	Levy & Mayes, 2001	46	0.88	Very good	+						
26	PDI-RF	Slade et al, 2005	40	0.78-0.95	Very good	+						
27	PDI-RF	Suchman et al, 2010	56	≥.50	Very good	-	0.57-0.69	Very good	-			
28	PDI-RF	Poznansky, 2010	30							Secure group - no sig Insecure - sig change	Doubtful	*
29	PDI-RF	Benbasset & Priel, 2012	105	0.87-0.89	Very good	+						
30	PDI-RF	Sleed at al, 2013	88	0.83	Very good	+				No sig difference	Inadequate	*
31	PDI-RF	Stacks et al, 2104	83	0.76	Very good	+						
32	PDI-RF	Sadler et al, 2014	105	80%	Inadequate	+						
33	PDI-RF	Fonagy & Sleed, 2016	76	0.76	Very good	+				No sig difference	Inadequate	*
34	PDI-RF	Benbasset & Shulman, 2016	105				0.94	Very good	+			
35	PDI-RF	Ensink et al, 2017	158	0.73	Very good	+						
36	PDI-RF	Håkansson et al, 2017	43	0.96	Very good	+						
37	PDI-RF	Jessee, 2020	52	0.77	Very good	+						
38	PDI-RF	Lubna et al, 2020	150	80%	Inadequate	+						
39	PDI-RF	Yatziv et al, 2020	99	0.88	Very good	+						

40	PDI-RF	Sleed, 2021	184	0.73-0.83	Very good	+						
41	PDI-RF	Sleed et al 2020	323	0.75	Very good	+	0.9	Very good	+			
42	PDI-RF-SC	Borelli et al, 2016	117	0.76-0.94	Very good	+	0.66-0.68	Very good	-			
43	PDI-Original	Geisendorf, 1999	49									
44	PDI-Original	Markham, 1999	185									
45	PDI-Original	Slade et al, 1999	125	0.80-0.95	Very good	+	0.68-0.84	Very good	Factor 1 & 2 = + Factor 3 = -			
46	PDI-Original	Gerber, 2000	38									
47	PDI-Original	Dolberg, 2010	79	0.74-0.86	Very good	+	0.68-0.75	Very good	Joy–Pleasure /Coherence = + Anger = -			
48	PDI-Original	Habersaat et al, 2018	44									
49	PRI	Moretti et al, 2012	39	0.74	Very good	+						
50	PRI	Scharf et al, 2015	120	0.75	Very good	+						
51	PRI	Goldberg et al, 2017	106	1	Very good	+						
52	WMCI-A	Leung et al, 2015	295		Very good	+						
53	WMCI-D	Tooten et al, 2014	189		Very good	+						
54	WMCI-D	Hall et al, 2015	210		Very good	+						
55	WMCI-D	Niccols et al, 2015	62		Very good	+				90% agreement, k=0.79	Doubtful	+

56	WMCI-PRS	Rosenblum et al, 2008	95		Very good	+						
57	WMCI-PRS	Muzik et al, 2015	99		Very good	+						
58	WMCI-PRS	Julian et al, 2018a	44		Very good	+						
59	WMCI-PRS	Julian et al, 2018b	44		Very good	+						
60	WMCI-PRS	Rosenblum et al, 2018	112		Very good	+				No sig difference	Inadequate	*
61	WMCI-RF	Schechter et al, 2008	43									
62	WMCI-Zeanah	Zeanah et al, 1994	45	75%-100%	Inadequate	+						
63	WMCI-Zeanah	Benoit et al, 1997a	96		Very good	+				89% stability	Inadequate	*
64	WMCI-Zeanah	Benoit et al, 1997b	99		Very good	(+/-)						
65	WMCI-Zeanah	Rethazi, 1999	40									
66	WMCI-Zeanah	Coolbear, 2000	57		Very good	+						
67	WMCI-Zeanah	Mcneilly, 2000	150		Very good	+						
68	WMCI-Zeanah	Theran et al, 2005	180	1	Very good	+				73%, k=0.402, p<0.001	Inadequate	-
69	WMCI-Zeanah	Schechter et al, 2005	41	100%	Inadequate	+						
70	WMCI-Zeanah	Borghini et al, 2006	80		Very good	(+/-)				76% stability	Inadequate	*
71	WMCI-Zeanah	Minde et al, 2006	46	85%-100%	Inadequate	+						
72	WMCI-Zeanah	Sokolowski et al, 2007	100		Very good	+						

73	WMCI-Zeanah	Schechter et al, 2008	43									
74	WMCI-Zeanah	Korja et al, 2009	38	0.83	Very good	+						
75	WMCI-Zeanah	Korja et al, 2010	38									
76	WMCI-Zeanah	Schofield, 2010	44									
77	WMCI-Zeanah	Meijssen et al, 2011	78		Very good	-						
78	WMCI-Zeanah	Tooten et al, 2014	189		Very good	+						
79	WMCI-Zeanah	Gustman, 2015	403				0.37-0.88	Very good	Mixed: WCMI Quality: Cronbach's α = .88 WMCI Content: Cronbach's α = .37			
80	WMCI-Zeanah	Madigan et al, 2015	84		Very good	-				83%, $\chi 2(1)=28.91, p<.001$, $r\phi=.66$	Inadequate	*
81	WMCI-Zeanah	Salomonsson et al, 2015	66		Very good	+						
82	WMCI-Zeanah	Sümer et al, 2016	30		Very good	+						
83	WMCI-Zeanah	Hussain, 2017	47		Very good	+						
84	WMCI-Zeanah	Habersaat et al, 2018	44							t[10] = 1.94; P = .082	Inadequate	*
85	WMCI-Zeanah	Rosenblum et al, 2018	112		Very good	+				No sig difference	Inadequate	*
86	WMCI-Zeanah	Alvarez-Monjaras et al, 2019	177		Very good	+						

87	WMCI-Zeanah	Sadnes et al, 2021	152		Very good	(+/-)	0.79-0.97	Very good	+			

7b Validity:

				Convergent validity			Discrimination validity		
No.	**Measure**	**Ref**	**n**	**Summary**	**Method Quality**	**Rating**	**Result**	**Method Quality**	**Rating**
1	IA	Koren-Karie et al, 2002	129		inadequate	+		inadequate	?
2	IA	Oppenheim et al, 2004	42					inadequate	?
3	IA	Oppenheim et al, 2009	45					inadequate	?
4	IA	Ramsauer et al, 2014	39						
5	IA	Gray et al, 2015	64						
6	IA	Marcu et al, 2016	77					Inadequate	?
7	IA	Oppenheim & Koren-Karie, Sagi, 2001	118		inadequate	+		Inadequate	?
8	IRMAN	Massimo et al, 2006	91						
9	MM-Offline	Yatziv et al, 2020	99		Very good	+*		Very good	+
10	MM-Offline	Meins et al, 2003	52		Very good	+*			
11	MM-Offline	Demers et al, 2010	106		Very good	+**(for PSI)			
12	MM-Offline	Lundy, 2013	78		Very good	+**		Very good	?
13	MM-Offline	Illingworth et al, 2016	32		Very good	?		Very good	?
14	PAI-S/I	Bretherton et al, 1989	37		Very good	+**		Inadequate	?

15	PDI-ARR	Fonagy & Sleed, 2016	76						
16	PDI-ARR	Sleed, 2021	184		Very good	+*			
17	PDI-ARR	Isosävi et al, 2021	50		Very good	?			
18	PDI-CI	George & Solomon, 1996	32		inadequate	+			
19	PDI-CI	George & Solomon, 2016	69		Very good	+**(for mother child behaviour)			
20	PDI-MotC	Grey & Farnfield, 2014	85		Very good	+**		Inadequate	?
21	PDI-MotC	Grey & Farnfield, 2017	85		Very good	+*		Inadequate	+
22	PDI-Pianta	Steinberg, 2000	74					Inadequate	?
23	PDI-Pianta	Shamir-Essakow, 2004	103						
24	PDI-RF	Alvarez-Monjaras et al, 2019	177		Very good	+*		Very good	+
25	PDI-RF	Levy & Mayes, 2001	46						
26	PDI-RF	Slade et al, 2005	40						
27	PDI-RF	Suchman et al, 2010	56		Very good	?		Very good	(+/--)
28	PDI-RF	Poznansky, 2010	30						
29	PDI-RF	Benbasset & Priel, 2012	105		Very good	+		Very good	_
30	PDI-RF	Sleed at al, 2013	88						

31	PDI-RF	Stacks et al, 2104	83		Very good	+			?
32	PDI-RF	Sadler et al, 2014	105						
33	PDI-RF	Fonagy & Sleed, 2016	76						
34	PDI-RF	Benbasset & Shulman, 2016	105						
35	PDI-RF	Ensink et al, 2017	158						
36	PDI-RF	Håkansson et al, 2017	43		Very good			Very good	-
37	PDI-RF	Jessee, 2020	52		Very good	+		Inadequate	?
38	PDI-RF	Lubna et al, 2020	150						
39	PDI-RF	Yatziv et al, 2020	99		Very good	+*		Inadequate	+
40	PDI-RF	Sleed, 2021	184			+* (RF & CIB), **(Maternal psychopathology)			
41	PDI-RF	Sleed et al 2020	323					Very good	?
42	PDI-RF-SC	Borelli et al, 2016	117		Very good	?		Very good	+
43	PDI-Original	Geisendorf, 1999	49		Very good	?			
44	PDI-Original	Markham, 1999	185					Very good	?
45	PDI-Original	Slade et al, 1999	125		Very good	+		Inadequate	?
46	PDI-Original	Gerber, 2000	38					Inadequate	?

47	PDI-Original	Dolberg, 2010	79		Very good	+**			
48	PDI-Original	Habersaat et al, 2018	44		Very good	+**			
49	PRI	Moretti et al, 2012	39						
50	PRI	Scharf et al, 2015	120		Very good	+*			
51	PRI	Goldberg et al, 2017	106						
52	WMCI-A	Leung et al, 2015	295						
53	WMCI-D	Tooten et al, 2014	189					Very good	?
54	WMCI-D	Hall et al, 2015	210		Very good	+		Inadequate	?
55	WMCI-D	Niccols et al, 2015	62		inadequate	+			
56	WMCI-PRS	Rosenblum et al, 2008	95		Very good	+**(Maternal interactive behaviour) *(Mind Mindedness)		Very good	(+/-)
57	WMCI-PRS	Muzik et al, 2015	99						
58	WMCI-PRS	Julian et al, 2018a	44						
59	WMCI-PRS	Julian et al, 2018b	44						
60	WMCI-PRS	Rosenblum et al, 2018	112						
61	WMCI-RF	Schechter et al, 2008	43		Adequate	?			
62	WMCI-Zeanah	Zeanah et al, 1994	45		Very good	+			

63	WMCI-Zeanah	Benoit et al, 1997a	96		Very good	+			
64	WMCI-Zeanah	Benoit et al, 1997b	99			+		Very good	+
65	WMCI-Zeanah	Rethazi, 1999	40		Very good	+**		Inadequate	?
66	WMCI-Zeanah	Coolbear, 2000	57		Very good	+		Inadequate	(+/-)
67	WMCI-Zeanah	Mcneilly, 2000	150		Very good				
68	WMCI-Zeanah	Theran et al, 2005	180						
69	WMCI-Zeanah	Schechter et al, 2005	41					Inadequate	?
70	WMCI-Zeanah	Borghini et al, 2006	80						
71	WMCI-Zeanah	Minde et al, 2006	46		Very good	+			
72	WMCI-Zeanah	Sokolowski et al, 2007	100		inadequate	+		Inadequate	?
73	WMCI-Zeanah	Schechter et al, 2008	43		Very good	+		Inadequate	?
74	WMCI-Zeanah	Korja et al, 2009	38		inadequate	+		Inadequate	?
75	WMCI-Zeanah	Korja et al, 2010	38		inadequate	+			
76	WMCI-Zeanah	Schofield, 2010	44		inadequate	?			
77	WMCI-Zeanah	Meijssen et al, 2011	78					Inadequate	?
78	WMCI-Zeanah	Tooten et al, 2014	189					Very good	?

79	WMCI-Zeanah	Gustman, 2015	403		Very good	+*		Very good	+
80	WMCI-Zeanah	Madigan et al, 2015	84		Very good	+		Inadequate	?
81	WMCI-Zeanah	Salomonsson et al, 2015	66		inadequate	+			
82	WMCI-Zeanah	Sümer et al, 2016	30		Very good	+**		Inadequate	?
83	WMCI-Zeanah	Hussain, 2017	47		Very good	+		Inadequate	+
84	WMCI-Zeanah	Habersaat et al, 2018	44						
85	WMCI-Zeanah	Rosenblum et al, 2018	112						
86	WMCI-Zeanah	Alvarez-Monjaras et al, 2019	177		Very good	+*		Very good	?
87	WMCI-Zeanah	Sadnes et al, 2021	152		Very good	+**		Very good	?

**For convergent validity, the study used Pearson's correlations which are not recommended*

Appendix 8

Pooled methodological quality rating per measure

			Reliability			**Validity**	
Measure	**Coding**	**No. Articles**	**Interrater reliability**	**Internal Consistency**	**Test-Retest Reliability**	**Convergent Validity**	**Discriminant Validity**
			Rating (number of studies that assessed the measure)				
Interview of Maternal Representations After the Birth	*IRMAN*	1	Very good (1)				
Maternal Mind Mindedness	*MM-Offline*	5	Very good (5)		Doubtful (1)	Very good (5)	Very good (3)
The Insightfulness Assessment	*IA*	7	Very good (7)			Inadequate (2)	Inadequate (5)
The Parent Attachment Interview	*PAI-S/I*	1	Inadequate (1)			Very good (1)	Inadequate (1)
The Parent Development Interview	*PDI-Original*	6	Very good (2)	Very good (2)		Very good (4)	Inadequate (3)
The Parent Development Interview	*PDI-CI*	2	Very good (2)			Very good (2)	

The Parent Development Interview	*PDI-ARR*	3	Very good (3)	Very good (1)	Inadequate (1)	Very good (2)	
The Parent Development Interview	*PDI-MotC*	2	Very good (1)			Very good (1)	Inadequate (1)
The Parent Development Interview (abbreviated)	*PDI-Pianta*	2	Very good (2)				Inadequate (1)
The Parent Development Interview	*PDI-RF*	18	Very good (16)	Very good (4)	Inadequate (3)	Very good (7)	Very good (7)*
The Parent Development Interview	*PDI-RF-SC*	1	Very good (1)	Very good (1)		Very good (1)	Inadequate (1)
The Parenting Representations Interview	*PRI*	3	Very good (3)				
The Working Model of the Child Interview	*WMCI-Zeanah*	26	Very good (20)*	Very good (2)	Inadequate (6)	Inconsistent (18)	Inconsistent (14)
The Working Model of the Child Interview	*WMCI-RF*	2				Adequate (1)	
The Working Model of the Child Interview	*WMCI-PRS*	5	Very good (5)		Inadequate (1)	Very good (1)	Inadequate (1)
The Working Model of the Child Interview	*WMCI-D*	3	Very good (3)		Doubtful (1)	Inconsistent (2)	Inadequate (1)
The Working Model of the Child Interview	*WMCI-A*	1	Very good (1)				
Total		**88**	**73**	**10**	**13**	**47**	**37**

*A rating of very good, adequate, doubtful and inadeaqute were given if 100% of the studies had the same rating. * If >75% had the same rating; Inconsistent if <75% had the same rating*

Appendix 9

Pooled psychometric quality rating by measure

			Reliability			Validity	
Interview	**Measure**	**No. Articles**	**Interrater reliability**	**Internal Consistency**	**Test-Retest Reliability**	**Convergent Validity**	**Discriminant Validity**
			Rating (number of studies that assessed the measure)				
Interview of Maternal Representations After the Birth	*IRMAN*	1	Sufficient (1)				
Maternal Mind Mindedness	*MM-Offline*	5	Sufficient (5)		Indeterminate (1)	Sufficient (5)	Indeterminate (3)
The Insightfulness Assessment	*IA*	7	Indeterminate (7)			Sufficient (2)	Indeterminate (5)
The Parent Attachment Interview	*PAI-S/I*	1	Indeterminate (1)			Sufficient (1)	Indeterminate (1)
The Parent Development Interview	*PDI-Original*	6	Sufficient (2)	Inconsistent (2)		Sufficient (4)	Indeterminate (1)
The Parent Development Interview	*PDI-CI*	2	Sufficient (2)			Sufficient (2)	
The Parent Development Interview	*PDI-ARR*	3	Sufficient (3)	Indeterminate (1)	Indeterminate (1)	Sufficient (2)	
The Parent Development Interview	*PDI-MotC*	2	Indeterminate (1)			Sufficient (1)	Indeterminate (1)

The Parent Development Interview	*PDI-Pianta*	2	Sufficient (2)				Indeterminate (1)
The Parent Development Interview	*PDI-RF*	18	Sufficient (16)	Inconsistent (4)	Indeterminate (3)	Sufficient (7)	Indeterminate (8)
The Parent Development Interview	*PDI-RF-SC*	1	Sufficient (1)	Insufficient (1)		Sufficient (1)	Indeterminate (1)
The Parenting Representations Interview	*PRI*	3	Sufficient (3)				
The Working Model of the Child Interview	*WMCI-Zeanah*	26	Indeterminate (20)	Sufficient (1) Inconsistent (1)*	Indeterminate (6)	Indeterminate (18)	Indeterminate (14)
The Working Model of the Child Interview	*WMCI-RF*	2				Indeterminate (1)	
The Working Model of the Child Interview	*WMCI-PRS*	5	Sufficient (5)		Indeterminate (1)	Sufficient (1)	Indeterminate (1)
The Working Model of the Child Interview	*WMCI-D*	3	Sufficient (3)		Sufficient (1)	Sufficient (2)	Indeterminate (1)
The Working Model of the Child Interview	*WMCI-A*	1	Sufficient (1)				
Total		**88**	**73**	**10**	**13**	**47**	**37**

A rating of sufficient, indeterminate or insufficient was given if >75% studies had the same rating. A rating of Inconsistent if <75% had the same rating

* Two-factor solution: WCMI Quality = Sufficient; WMCI Content = Insufficient
Three-factor solution: Balanced, Resentful, Apprehensive = Sufficient

Appendix 10

Additional testing - Discriminant validity by measure

					Psychometric testing: Convergent Validity		
Interview	**Coding**	**Measure/Characteristic**	**No studies***	**T-test significant?**	**Expected correlation**	**Expected correlation met?**	**Quality rating**
Maternal Mind Mindedness	MM-Offline	Maternal age	2	No	r<0.3	Yes**	Sufficient
	MM-Offline	Child age	2	No	r<0.3	Yes**	Sufficient
	MM-Offline	Number of siblings	1	No	r<0.3	Yes	Sufficient
	MM-Offline	Maternal education	1	No	r<0.3	Yes**	Indeterminate
	MM-Offline	Maternal socioeconomic status	1	No	r<0.3	Yes**	Indeterminate
	MM-Offline	Pre term/full term	1	No	r<0.3	NR	Indeterminate
	MM-Offline	Child gender	1	No	r<0.3	NR	Indeterminate
	MM-Offline	Parent gender	1	No	r<0.3	Yes	Sufficient

The Parent Attachment Interview	PAI-S/I	Maternal education	1	No	r<0.3	NR	Indeterminate
Parent Development Interview	PDI-MotC	Parent gender	1	No	r<0.3	NR	Indeterminate
	PDI-Pianta	Child gender	1	Yes	r<0.3	Yes	Sufficient
	PDI-Pianta	Maternal age	1	Yes	r<0.3	NR	Indeterminate
	PDI-Pianta	Maternal education	1	Yes	r<0.3	NR	Indeterminate
	PDI-Pianta	Maternal higher income	1	Yes	r<0.3	NR	Indeterminate
	PDI-RF	Maternal age	2	No	r<0.3	Yes	Sufficient
	PDI-RF	Parental education	1	Yes	r<0.3	No (>0.3)	Insufficient
	PDI-RF	Parental IQ	2	Mixed	r<0.3	No (>0.3)	Insufficient
	PDI-RF	Parent gender	1	No	r<0.3	NR	Indeterminate
	PDI-RF	Child gender	4	Mixed	r<0.3	NR	Indeterminate
	PDI-RF	Child age	4	Mixed	r<0.3	Yes	Sufficient
	PDI-RF	No. Siblings	1	No	r<0.3	Yes	Sufficient
	PDI-RF-SC	Parental education	1	No	r<0.3	NR	Indeterminate
	PDI-RF-SC	Marital status	1	Yes	r<0.3	NR	Indeterminate
	PDI-RF-SC	Parental income	1	Yes	r<0.3	NR	Indeterminate
	PDI-RF-SC	Parent ethnicity	1	Yes	r<0.3	NR	Indeterminate
	PDI-RF-SC	No. Siblings	1	No	r<0.3	NR	Indeterminate
	PDI-RF-SC	Birth Order	1	No	r<0.3	NR	Indeterminate
	PDI-RF-SC	Parent gender	1	No	r<0.3	NR	Indeterminate
	PDI-RF-SC	Child gender	1	No	r<0.3	NR	Indeterminate
	PDI-Original	Mothers and fathers	2	Yes	r<0.3	NR	Indeterminate
	PDI-Original	Child gender	2	Yes	r<0.3	NR	Indeterminate
	PDI-Original	Child age	1	No	r<0.3	NR	Indeterminate
The Working Model of the Child Interview	WMCI-PRS	Maternal education	1	Yes	r<0.3	No	Insufficient
	WMCI-PRS	Maternal age	1	No	r<0.3	NR	Indeterminate
	WMCI-PRS	Marital status	1	No	r<0.3	NR	Indeterminate
	WMCI-D	Parent gender	1	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Marital status	2	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Maternal socioeconomic status	1	Yes	r<0.3	NR	Indeterminate

	WMCI-Zeanah	Parental income	1	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Maternal education	10	Mixed	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Paternal education	1	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Maternal employment status	1	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Parent gender	1	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Paternal age	1	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Maternal age	6	No	r<0.3	Yes	Sufficient
	WMCI-Zeanah	Child age	5	Mixed	r<0.3	Yes	Sufficient
	WMCI-Zeanah	Child gender	4	No	r<0.3	NR	Indeterminate
	WMCI-Zeanah	Child birth order	1	No	r<0.3	NR	Indeterminate

* No. studies which reported at least a t-test in relation to discrimant validity

**One paper reported mothers' age, child's age, education and socio-economic status had rs<0.35 but didn't not specify the correlations for each (Illingworth et al 2016). Therefore characteristics which only had findings reported from this study were classed as 'indeterminate'.

Appendix 11

Additional Analysis: Convergent validity by measure

				Psychometric testing: Convergent Validity		
Interview	**Measure**	**Convergent Validity Measure**	**Relationship between measures/constructs**	**Expected correlation**	**Expected correlation met?**	**Quality rating**
Maternal Mind Mindedness	MM-Offline	PDI-RF	Similar	r>0.5	No (<0.5)	Sufficient
	MM-Offline	MM Online	Dissimilar but related	0.3<r<0.5	Yes/No*	Indeterminate
	MM-Offline	Maternal Sensitivity	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	MM-Offline	Parental stress index (PSI)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	MM-Offline	Adult Attachment Interview (AAI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	MM-Offline	Interactional Attunement	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	MM-Offline	Children's Theory of Mind (ToM)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient

	MM-Offline	Peabody Picture Vocabulary Test (PPVT)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
The Parent Attachment Interview	PAI-S/I	Strange Situations (SS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PAI-S/I	Attachment Story Completion Task	Dissimilar but related	0.3<r<0.5	NR	Sufficient
The Parent Development Interview	PDI-CI	Strange Situations (SS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-CI	Adult Attachment Interview (AAI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-CI	Children's attachment classifications (ADPA)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	PDI-CI	Mother child interaction (Video)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	PDI-ARR	PDI-RF		0.3<r<0.5	No (<0.5)	Sufficient
	PDI-ARR	CIB quality parent–infant interactions	Dissimilar but related	0.3<r<0.5	No (<0.3)	Sufficient
	PDI-ARR	Maternal Psychopathology	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	PDI-ARR	Edinburgh Postnatal Depression Scale(EPDS)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	PDI-ARR	Harvard Trauma Questionnaire (HTQ)	Dissimilar but related	0.3<r<0.5	No (<0.3)	Insufficient
	PDI-ARR	Exposure to war	Dissimilar but related	0.3<r<0.5	No (<0.3)	Insufficient
	PDI-MotC	PDI-RF	Similar	r>0.5	Yes	Sufficient
	PDI-MotC	Care Index	Dissimilar but related	0.3<r<0.5	No (>0.5)	Sufficient
	PDI-RF	WMCI	Similar	r>0.5	No (<0.5)	Sufficient
	PDI-RF	Nursing Child Assessment Satellite Training (NCAST)	Dissimilar but related	0.3<r<0.5	No (<0.3)	Sufficient
	PDI-RF	Adolescent's RF	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-RF	Adolescent's Social Competenence	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-RF	Strange Situations (SS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-RF	Parental Sensitivity	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-RF	Trauma Questionnaire	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-RF	Emotion understanding task for children	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-RF	Offline MM	Similar	r>0.5	No (<0.5)	Sufficient
	PDI-RF	Executive functioning tasks	Dissimilar but related	0.3<r<0.5	No (<0.3)	Sufficient
	PDI-RF	ARR	Similar	r>0.5	No (<0.5)	Sufficient
	PDI-RF	CIB	Dissimilar but related	0.3<r<0.5	No (<0.3)	Sufficient

	PDI-RF	Nursing Child Assessment Satellite Training (NCAST)	Dissimilar but related	0.3<r<0.5	NR	Indeterminate
	PDI-RF-SC	Parent's self reported attachment	Dissimilar but related	0.3<r<0.5	NR	Indeterminate
	PDI-Original	Adult Attachment Interview (AAI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-Original	Pregnancy Interview (PI)	Similar	r>0.5	NR	Sufficient
	PDI-Original	Strange Situations (SS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	PDI-Original	Child Behaviour Checklist (CBCL)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	PDI-Original	Parenting Style and Dimensions Questionnaire (PSQ)	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
The Parenting Representations Interview	PRI	Adult Attachment Interview (AAI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
The Working Model of the Child Interview	WMCI-PRS	Mind Mindedness (online)	Dissimilar but related	0.3<r<0.5	No (<0.3)	Sufficient
	WMCI-PRS	Maternal Interactive behaviour	Dissimilar but related	0.3<r<0.5	Yes	Sufficient
	WMCI-D	Attachment secuirty scale (ASS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-D	Observed maternal behaviour (Qualitative Scales of the Observational Ratings of Mother–Child Interaction)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-D	Parental stress index (PSI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-D	Socioeconomic Status	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-RF	WMCI	Similar	r>0.5	NR	Sufficient
	WMCI-Zeanah	Strange Situations (SS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	Adult Attachment Interview (AAI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	EAS (Sensitivity Scale for parents)	Dissimilar but related	0.3<r<0.5	Yes/No**	Sufficient
	WMCI-Zeanah	Attachment Q-Sort (AQS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	Parenting Behaviours (rated against Parent-Child Observation Guide)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	Ambiance	Dissimilar but related	0.3<r<0.5	NR	Sufficient

	WMCI-Zeanah	Edinburgh Postnatal Depression Scale score	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	Revised Inventory of Parent Attachment	Dissimilar but related	0.3<r<0.5	NR	Indeterminate
	WMCI-Zeanah	This is my baby foster carer interview (TIMB)	Similar	r>0.5	NR	Indeterminate
	WMCI-Zeanah	Self rated adult attachment ratings	Dissimilar but related	0.3<r<0.5	NR	Indeterminate
	WMCI-Zeanah	Parent–Child Early Relational Assessment (PCERA)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	Child Abuse Potential Inventory -Total score (CAPI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	Children's Global Assessment Scale (CGAS)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	WMCI-RF	Similar	r>0.5	NR	Sufficient
	WMCI-Zeanah	Nursing Child Assessment Satellite Training (NCAST)	Dissimilar but related	0.3<r<0.5	NR	Sufficient
	WMCI-Zeanah	Parental stress index (PSI)	Dissimilar but related	0.3<r<0.5	NR	Sufficient

* Of the 6 domains of MM (online) only two were significantly correlated with MM offline: Appropriate mind-related comments (r=0.4) and Inappropriate mind-related comments (-0.44)

* *Caregiving Sensitivity (WMCI) was significantly correlated with Maternal Sensitivity (EAS) (-59, p<0.001) ; Maternal Hostility (WMCI) was negatively correlated with caregiving sensitivity (EAS) (-.46, p<0.001)