The role of reflective functioning in mediating the relationship between attachment style and psychopathology

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Date: 04/07/2014

This thesis focuses on the association between attachment style and mentalizing ability and the extent to which the two are predictive of psychopathology. It is a joint thesis with *Dissociative symptoms and the quality of structural integration in BPD* (Sole, 2014).

Part 1, the literature review, examines the evidence for an association between attachment style and mentalizing ability. Twelve studies represent a small but compelling body of research evidencing a robust link between parents' ability to mentalize and infant attachment style. However, the evidence varies greatly due to differences in how variables, particularly those relating to mentalizing, have been operationalised, e.g. through direct observation of infant-caregiver behaviour or by recording caregivers' representations of their mentalizing abilities. Moreover, mentalizing alone does not fully account for the intergenerational transmission of attachment.

Part 2, the empirical paper, describes a study investigating the role of reflective functioning in mediating the association between attachment style and psychopathology, and examining the scale reliability and criterion validity of a new measure of structural integration, the Operationalized Psychodynamic Diagnosis Structure Questionnaire (OPD-SQ). A group of participants with a diagnosis of personality disorder ($N = 80$) were compared to a group of healthy controls ($N = 85$) on attachment style, reflective functioning, structural integration and psychopathology. Group comparisons showed unexpected findings for reflective functioning and attachment style. Reflective functioning was shown to mediate attachment-related differences in psychopathology in the total and non-clinical samples only.

Part 3, the critical appraisal, reflects on the process and impact on the researcher of conducting the research. It comprises a discussion of my motivation for conducting research in this area, my reflection on the current state of research into the relationship between attachment and mentalizing, methodological issues relating to the operationalisation of the mentalizing construct, and ethical considerations relating to the interviewing of participants.

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Part 1: Literature Review

The Significance of the Reflective Self for Security of Attachment

Abstract

Aims: The review investigates the association between mentalizing and attachment security, focusing exclusively on correlational studies employing longitudinal designs and utilising the most established conceptualisations of the mentalizing process (e.g. reflective function, mind-mindedness).

Method: A systematic literature search was conducted using the databases PsychINFO, MEDLINE, and EMBASE. 12 studies met criteria for review.

Results: Results suggest an association between RF/mind-mindedness and infant and adult attachment security. Three studies found maternal behaviour to have a mediating role in the relationship between mothers' mentalizing and subsequent infant attachment.

Conclusion: The evidence is limited by methodological and conceptual differences between studies, particularly relating to operationalisation of the mentalizing construct. Differences in how attachment status was classified is likely to have contributed to variation. Other factors not addressed in this review may have an influential role in fostering infant attachment security. More culturally representative research is needed to elucidate the roles of RF and attachment across different populations.

Introduction

Attachment theory (Bowlby, 1969/1982, 1980) posits that infants have an innate disposition to form and maintain close relationships with emotionally significant others, most importantly their primary caregivers. The theory proposes that the bond between an infant and caregiver offers a protection function, security and self-confidence for the infant at times of threat and stress. Thus, when a child feels threatened, their attachment system becomes activated, motivating them to seek proximity to and comfort from their caregivers. Conversely, when a child feels safe, their attachment systems are deactivated and they develop the confidence to explore their environment (Slade, 2000; 2004). Attachment develops in early infancy and is most clearly evident around 7-9 months in proximity-seeking and stranger anxiety.

Sensitive caregivers will be aware of their infant's attachment cues, interpret them accurately and provide an appropriate response. This exchange is the base of a secure attachment, which allows the child to seek proximity, communicate their need for comfort and yet maintain exploration of the environment. By contrast, insecure attachment typically results when caregiving has been inconsistent, unstable, unavailable or incongruous with the situation in which the child finds themselves.

The Strange Situation

The concept of distinct patterns of attachment evolved from the experimental observations of Mary Ainsworth and her colleagues (1978) during the Strange Situation, a procedure in which children are observed playing for 20 minutes while they are separated from and then reunited with their caregiver. The procedure aims to capture the balance of familiar and unfamiliar presence in most children's lives under varying conditions of stressfulness. On the basis of their behaviours when separated and reunited with their caregivers, infants were categorised as belonging to one of three groups (Ainsworth et al., 1978), with a fourth added later (Main

& Solomon, 1990), each reflecting a different kind of attachment relationship with the caregiver (see Table 1). The Strange Situation continues to be used by researchers to classify infant attachment security.

The Adult Attachment Interview

Following Ainsworth's observations of infant attachment *behaviour*, Mary Main and her colleagues (George, Kaplan, & Main, 1987; Main & Goldwyn, 1984; Main, Kaplan, & Cassidy, 1985) developed the Adult Attachment Interview (AAI; George, et al., 1987) as a way of assessing attachment *representations* (Slade, 2000) in adolescents and adults. The AAI is a semi-structured interview, comprising about 20 questions and taking between 45 and 90 minutes to administer. It is designed to capture *internal working models* or *states of mind* with respect to attachment by asking interviewees to reflect on their childhood attachment experiences and evaluate the influence of these experiences on their subsequent personality and current behaviour. As attachment security is closely related to narrative coherence, the AAI also assesses interviewees' ability to maintain cohesive and collaborative discourse with the interviewer.

Table 1. *Strange Situation attachment classifications (Ainsworth et al., 1978; Main &*

Solomon, 1990)

Attachment classification	Description
Secure attachment (B)	The child uses the mother as a 'safe base' from which to explore and feels confident that the caregiver will be available. They will show visible signs of distress when separated from the caregiver but seek contact and comfort on reunion. The child is able to be comforted, after which they will resume exploration.
Anxious-avoidant insecure attachment (A)	The child will avoid or ignore the caregiver and show little emotion on separation or reunion. The child will readily explore without reference to mother, show little or no visible distress upon separation and does not seek contact on reunion. The child will actively avoids mother by focusing on toys, looking away, stiffening or pulling away on contact.
Anxious-ambivalent/resistant insecure attachment (C)	The child is visibly anxious, avoids exploration and remains focused on mother. They show distress on separation but fail to be comforted on reunions, which alternate between contact-seeking and angry rejection of the caregiver, or the child is too passive or overwhelmed to seek contact.
Disorganized/disoriented attachment (D)	The child shows a lack of organisation in attachment responses, indicating a temporary collapse of behavioural strategy. Their behaviour may come across as fearful, contradictory, inexplicable, stereotyped and/or confused; examples include stereotypic, asymmetric, misdirected or jerky movements, freezing and apparent dissociation.

Using the AAI, Main and Goldwyn (1984) observed distinct patterns in the way parents of

children with varying levels of attachment security talked about their own attachment

histories. These patterns were identified and consolidated into the AAI coding system

(Daniel, 2006; Hesse, 2008). AAI classifications correspond directly to the Strange Situation

infant attachment styles (see Table 2).

Table 2. *AAI attachment classifications (Hesse, 2008; Solomon & George, 2008)*

AAI attachment classification	Corresponding infant attachment classification	Description of narrative responses to AAI
Autonomous (labelled F) -	Secure (B)	Consistent, coherent and collaborative, whether reported experiences are favourable or unfavourable. Sufficient but not excessive elaboration. The interviewee displays openness to questions and opportunities to reflect on experiences. The children of autonomous parents are typically classified as secure.
Dismissing (labelled D)	Anxious-avoidant insecure attachment (A)	Aimed at minimising or generalising the discussion of attachment-related experience. Internally inconsistent and lacking coherence and detail. Responses are often excessively terse (e.g. I don't remember). Descriptions of parents are often favourable to highly favourable but without consistent and supportive evidence. Discussion of negative experiences is avoided and difficult emotions are unarticulated. Dismissing interviewees have repeatedly been found to have children who are avoidant.
Preoccupied (labelled E)	Anxious-ambivalent/resistant insecure attachment (C)	While not necessarily inconsistent, the interviewee is unable to maintain focus or contain emotional responses (e.g. anger) to a given question. Answers are often lengthy, confusing and vague with digressions to remote topics and frequent oscillations regarding a view of a parent. Preoccupied interviewees tend to have children classified as ambivalent/resistant.
Unresolved (labelled U)	Disorganized/disoriented attachment (D)	Temporary cognitive disorganization and lapses in monitoring of reasoning or discourse during discussion of potentially traumatic events. Interviews are assigned a secondary organised category (F/D/E). Children of unresolved interviewees have repeatedly been found to show disorganized Strange Situation behaviour.

The intergenerational transmission of attachment

Attachment security is crucial to the infant's physical, cognitive, emotional and social development. Attachment theory (Bowlby, 1969; Ainsworth et al., 1978) purports that the quality and quantity of a person's earliest attachment to their caregivers lays the foundation for their future capacities to relate to other people (Fonagy, Steele, Steele, & Higgitt, 1991b; Steele et al. 1999; Fonagy & Target, 2001). Main et al. (1985) documented strong links between a mother's state of mind in relation to attachment and the quality of her child's attachment to her at 1 year. This finding that a mother's capacity to recognise, regulate and organise her own thoughts and feelings about her relationships with her own primary caregivers is linked to her capacity to recognise and sensitively to respond to her child's need for comfort security and safety has been repeatedly corroborated since (Carlson & Sroufe, 1995; Main, 1995, 2000; Van Ijzendoorn, 1995).

The caregiver's patterns of responding in the attachment relationship lead to the development in the child of internalised representations, or *internal working models*, which govern future attachment-related thoughts, feelings and behaviours. These internal working models remain relatively stable throughout life, assimilating new experiences into existing mental representations and causing self-perpetuating attachment-related behaviour. The primary mechanism, however, which underlies the transmission of attachment from one generation to the next remains unclear. Van Ijzendoorn (1995) documented efforts to explain this transmission as the direct consequence of maternal behaviour and concluded that these have been largely unsuccessful, showing only weak links between maternal attachment quality, maternal behaviour and infant attachment quality. He referred to this gap in knowledge about what mediates the intergenerational transmission of attachment as *the transmission gap.* Since Van Ijzendoorn's paper, a growing body of research has proposed *reflective functioning* as the elusive mechanism mediating the transmission.

Reflective functioning (RF) is a basic component of psychic structure and refers to the psychological processes underlying the capacity to mentalize, i.e. to perceive and understand oneself and others in terms of each other's mental states (Fonagy, Gergely, Jurist, & Target, 2002). Over and above introspection and empathy, RF encompasses the ability to create sense and meaning (Fonagy et al., 2002). It enables the person to become conscious of his or her own intentions, wishes, thoughts and feelings, and to perceive the other as a being with intentions and feelings. It is therefore a pivotal function in enabling the individual to develop autonomy, self-reflection, self-regulation, and reality-based object representations which typify a more integrated personality structure. Rather than a conscious attempt to think about inner states, RF tends to be an implicit process, working at the level of procedural memory, which shapes the internal representations of the partner in the relationship (Fonagy, Target, Steele, & Steele, 1998).

The acquisition of RF depends on opportunities available to the child in early life to observe and explore the mind of its primary caregiver. The caregiver's accurate understanding of the child's mental states, moderated by indications that the adult is able to contain and manage the child's distress, underpins the child's capacity to mentalize their own and others' mental states and helps to foster secure attachment. The securely attached child therefore feels safe in thinking about the mental states of its caregiver. In contrast, infants with an avoidant attachment style shun the mental state of the other, while infants with a resistant style focus disproportionately on their own mental states at the expense of others'. Infants with a disorganized attachment style can appear hypersensitive to the caregiver's mental states yet fail to generalize this to their own mental state (i.e. self-organisation), which remains disregulated and incoherent (Fonagy, 2001). Fonagy and Target (2005) first suggested that it might be the mentalizing capacity of the mother that enables her to create the psychological and physical environment most conducive to the adaptive development of her child. Hence, the study of RF might help to clarify the nature of the transmission gap between adult and infant attachment.

A range of alternative and overlapping terms have been used within the empirical literature to refer to the processes underlying the capacity to mentalize and this has largely been due to how individual researchers have chosen to operationalise the concept. Where authors have used a different term to refer to the processes underlying the capacity to mentalize, those terms will be used in this review. Given that research into the relation between attachment and mentalizing capacity is still in its early stages, it is important to maintain such distinctions since they relate to important differences in how the relatively new psychological construct of mentalizing is being measured. For the purposes of this review, the term *mentalizing* is used, rather than the more common *mentalization*, in order to emphasise mentalizing as a dynamic process, rather than a stable and consistent trait.

Rationale for review

Despite an ever-growing interest in the concept of mentalizing and a substantial amount of theoretical literature on the link between parents' capacity to mentalize and the fostering of secure attachment relationships with their children, there remain relatively few empirical studies demonstrating this link. What evidence does exist presents an array of methodological approaches relating to research design (e.g. longitudinal/cross-sectional, correlational/treatment studies), operationalisation of the relevant theoretical constructs (e.g. RF, mind-mindedness) and theoretical discipline (e.g. psychoanalytic, cognitive developmental, child psychotherapy).

Although there is a need for comparison and consolidation of relevant empirical studies which address the link between mentalizing capacity and attachment security, to review all such studies is beyond the scope of the current review. This review will therefore focus exclusively on those studies which (1) employ longitudinal designs, as these are better placed to demonstrate causal links between effective mentalizing and subsequent attachment

security, (2) are correlational, and (3) utilise the most established conceptualisations of the mentalizing process (e.g. reflective function, mind-mindedness). In consolidating all such studies, this review aimed to address the following questions: (1) what is the evidence of the association between the capacity to mentalize and attachment security in both children and adults?; (2) what is the evidence that effective mentalizing leads to more secure attachment?

Method

Search strategy

An initial literature search was conducted to identify studies investigating the relationship between mentalizing and attachment security. Owing to the large number of extraneous studies identified during preliminary searches, the final search (see Table 3) was limited to those search terms most commonly used by researchers in this field (e.g. reflective function, mentalizing, mind-mindedness), excluded overlapping but distinct search terms (e.g. maternal sensitivity), and was restricted to English language, peer-reviewed journal articles of empirical studies.

The following search terms were inserted into PsycINFO, Medline and Embase, electronic databases to obtain 271 results: (mentaliz* or mentalis* or reflective function* or reflective self-function* or mind-minded*) and attachment*.

Table 3. *Narrowing of search terms*

Search strategy	Search term and restrictions used in PsycINFO, Medline and Embase electronic databases	Results
Preliminary search: Including all terms identified by the reviewer for the capacity to understand mental states underlying behaviour	((mentaliz* or mentalis* or reflective function* or reflective self function* or mind-minded* or maternal sensitiv* or mind-relate* or theory of mind* or emotional understand* or insightful*) and attachment*) Restricted to English language, peer-reviewed journal articles and empirical studies only	560 results obtained
Final search: Including all those terms thought to be most relevant to parental mentalizing and the transmission of attachment	((mentaliz* or mentalis* or reflective function* or reflective self function* or mind-minded*) and attachment*) Restricted to English language, peer-reviewed journal articles and empirical studies only	271 results obtained

Study selection

The majority of the 271 results were excluded because they were had very limited or no relevance to the subject of this review, i.e. the link between mentalizing and attachment security. The remaining 51 studies were narrowed down further to include only those studies relevant to this review, based on the following eligibility criteria:

- The study must use a longitudinal, correlational design explicitly investigating the relationship between mentalizing ability and attachment

- The study must include suitable behavioural measures of mentalizing ability and infant and adult attachment security

- Data analysis must be quantitative

Based on the above eligibility criteria, 12 studies were identified for inclusion in this review.

Please see Figure 1 for a flowchart of study selection.

Identification

271 records identified through database searching

Screening

271 records screened based on information contained in Abstract, Method and other relevant sections

220 records excluded

Eligibility

51 full text articles assessed for eligibility

39 full text articles excluded:

- No explicit investigation of the link between mentalizing and attachment

- No longitudinal or correlational design

- No suitable behavioural measures of mentalizing ability and attachment security

- No quantitative analysis

Included

12 studies selected for review

Figure 1. Flowchart of study selection

Quality assessment

All of the studies in this review were evaluated using the Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields (QualSyst; Kmet, Lee, & Cook, 2004), a quality assessment tool developed to address the need for quality assessment of a broad range of studies, which may not necessarily have a randomised or experimental design. QualSyst is peer-reviewed (Kmet, et al., 2004) and based upon established quality assessment tools (Cho & Bero, 1994; Timmer, Sutherland, & Hilsden, 2003) that have previously been developed for quantitative studies. It gives a score of 2 ('YES'), 1 ('PARTIAL') or 0 ('NO') depending on the degree to which a particular study accords with up to 14 separate criteria. Those checklist items which are not relevant to a particular study design are marked as non-applicable ('N/A') and excluded from the total summary score. Please refer to Table 4, where the 14 assessment criteria are listed along with the scores allocated to each study.

While QualSyst can be useful as an aid to the assessment of research quality, it has its limitations. Ratings for each checklist item are based on the reviewer's own perception of the quality of research and are therefore highly subjective and prone to bias. Given the absence of standard operational definitions of internal validity in the literature or a 'gold standard' measure to which QualSyst can be compared, there is no way accurately to assess its validity. Furthermore, it has very limited inter-rater reliability and was developed using a small sample of test studies, which prevented its developers from estimating standard statistical measures of agreement. The QualSyst ratings in this review should therefore be received with an element of caution.

Table 4. *QualSyst (Kmet, et al., 2004) ratings of study quality*

| | *Item number* and corresponding score | | | | | | | | | | | | | | |
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Score
Arnott & Meins (2007)	2	2	2	2	-	-	-	2	0	2	2	2	2	1	0.86
Demers, et al. (2010)	2	2	2	2	-	-	-	2	1	2	2	1	2	1	0.86
Fonagy et al. (1991a; 1991b)	2	2	2	2	-	-	-	2	2	2	2	1	1	2	0.91
Grienenberger, Kelly & Slade (2005)	2	2	2	2	-	-	-	2	1	2	2	1	2	1	0.86
Laranjo, Bernier & Meins (2008)	2	2	2	2	-	-	-	1	2	2	2	2	2	2	0.95
Lundy (2003)	2	2	2	2	-	-	-	0	0	2	2	0	2	0	0.64
Meins (1998)	2	2	2	2	-	-	-	1	1	2	2	0	2	1	0.77
Meins (2013)	2	2	2	2	-	-	-	1	2	2	2	2	1	2	0.91
Meins et al. (2012)	2	2	2	2	-	-	-	2	2	2	2	2	2	2	1.00
Meins, et al. (2001)	2	2	2	2	-	-	-	1	2	2	2	2	2	2	0.95
Meins et al. (1998)	2	2	2	2	-	-	-	1	1	2	2	2	2	2	0.91
Slade, et al. (2005a)	2	2	2	2	-	-	-	2	1	2	1	1	2	1	0.82

* Items:
1. Method of comparison group selection or source of input variables described and appropriate?
2. Study design evident and appropriate?
3. Method of comparison group selection or source of input variables described and appropriate?
4. Subject (and comparison group, if applicable) characteristics sufficiently described?
5. If interventional and random allocation was possible, was it described?
6. If interventional and blinding of investigators was possible, was it reported?
7. If interventional and blinding of subjects was possible, was it reported?
8. Outcome and exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?
9. Sample size appropriate?
10. Analytic methods described/justified and appropriate?
11. Some estimate of variance is reported for the main results?
12. Controlled for confounding?
13. Results reported in sufficient detail?
14. Conclusions supported by the results?

Results

Twelve studies are presented in five separate sections: the development of the RF scale;

maternal reflective functioning; mind-mindedness; maternal sensitivity; mind-mindedness as

a multi-dimensional construct. Relevant information for each study is summarised in Table 5.

Table 5. *Summary of studies (ordered by date of publication)*

Author	Participants	Measures	Results
ARNOTT & MEINS (2007)	- Mother-father-infant triads (**n = 25**) and mother-infant dyads (**n = 3**) recruited in the third trimester of pregnancy and assessed at 6, 12 and 15 months - Recruited through local classes and advertisements in local media - UK	**Adult Attachment Interview** (T1) - Mothers' and fathers' attachment status **Reflective Functioning Scale** (T1) - **based on the Adult Attachment Interview** - Mothers' and fathers' reflective function **Mind-mindedness coding system** (T2) - Mothers and fathers' appropriate and *inappropriate mind-related comments*, coded from observations of free-play **Strange Situation Procedure** (T3) - Infants' attachment status	- Mothers' antenatal RF was negatively correlated with *inappropriate mind-related comments* - Fathers RF scores were positively correlated with *appropriate mind-related comments* - Autonomous-group mothers attained higher RF scores than non-autonomous group mothers - Autonomous-group fathers attained higher RF scores than non-autonomous group fathers
DEMERS, BERNIER, TARABULSY, & PROVOST (2010)	- Mothers assessed when their infant was 6 months old and then assessed with their infant when the infant was 18 months old (*N* = **106**) - A convenience sample recruited from advertisements in local media and through help from maternity and public health nurses - Canada	**Adult Attachment Interview** (T1) - Mothers' and fathers' attachment status **Maternal Behaviour Q-Sort** (T2) - Maternal sensitivity **Mind-mindedness coding system** (T2) - Mothers' mind-mindedness, including comments on their infant's a) mental state, b) mental processes, c) emotional engagement,	- Adult mothers used significantly more neutral mental descriptors than adolescent mothers and significantly richer descriptions than their adolescent counterparts - There was a positive correlation between positive mind-mindedness and attachment coherence and a positive relationship between mother's attachment coherence and the richness of their descriptions of their children - Attachment coherence accounted for a unique 5.7% of the variance of positive mind-mindedness

		d) attempts to manipulate other people's thoughts, as well as e) comments which involve the mother speaking for the infant - Comments coded for valence and richness	- There was no significant association between *overall* descriptors of mental states and maternal sensitivity
FONAGY, STEELE & STEELE (1991A), & FONAGY, STEELE, STEELE, MORAN & HIGGITT (1991B)	- Prenatal mothers and fathers assessed in the last trimester of their first pregnancy ($N = $ **100**), followed by their children at 12 and 18 months of age ($N = $ **96**) - Sample recruited from prenatal classes at University College London Hospital - 50% participation rate - UK	**Adult Attachment Interview** (T1) - Mothers' and fathers' attachment status **Reflective-Self Function rating Scale (RSS) - based on the Adult Attachment Interview** (T1) - Mothers' and fathers' reflective function **Strange Situation Procedure** (T2) - Infants' attachment status	- RF scores and attachment classification were strongly associated for both mothers - There was a strong relationship between RF scores and infant attachment status for mothers and a slightly weaker, but also significant, relationship for fathers - Parental RF correlates more strongly with infant security than any of the AAI scales for mothers and fathers
GRIENENBERGER, KELLY, & SLADE (2005A)	- Mothers and their infants assessed when the infants were 10 and 14 months ($N = $ **45**) - Same sample as Slade et al. (2005a) - USA	**Parent Development Interview** (T1) - maternal reflective function **Strange Situation Procedure** (T2) - Infants' attachment status **AMBIANCE** (T2) - Mothers' disrupted affective communications during the Strange Situation, including: affective communication errors; role or boundary confusion; fearful/disorientated/dissociative/disorganised	- Negative maternal caregiving behaviour at 14 months was inversely correlated with RF at 10 months - There were significant differences between the AMBIANCE scores of secure- and insecure-group mothers - Secure-group mothers to have higher AMBIANCE scores than both insecure-resistant and disorganised groups - Maternal behaviour played a (partial) mediating role between maternal RF and infant attachment

		behaviour, intrusiveness or negativity; and withdrawal	
LARANJO, BERNIER, & MEINS (2008)	- Mother-infant dyads, assessed when the infants were 12-13 months old and again at 15-16 months ($N = $ **50**) - Random recruitment through birth lists - Canada	**Maternal Behaviour Q-Sort** (T1) - Maternal sensitivity **Mind-mindedness coding system** (T1) - Mothers' mind-mindedness, including comments on their infant's a) mental state, b) mental processes, c) emotional engagement, d) attempts to manipulate other people's thoughts, as well as e) comments which involve the mother speaking for the infant - Comments classified as appropriate or inappropriate **Attachment Q-Sort** (T2) - Infants' attachment security rated by an observer	- *Comments on infants' mental states* was related to maternal sensitivity and infant attachment - Maternal sensitivity was a significant mediator of the common variance between mental state comments (mind-mindedness) and infant attachment security
LUNDY (2003)	- Both parents assessed with their infants when the infant was aged 6 and 13 months ($N = $ **16** triads) - Recruited through local paediatricians, day care facilities, newspapers and psychology department subject pool - USA	**Mind-related comments** (T1) - Adapted from Meins et al.'s (2001) system - General thought processes, knowledge or desires; mental processes relevant to problem-solving or to the completion of a task; emotional engagement; attempts to manipulate others' thoughts; speaking from the infants' perspective	- Only comments related to infants' general thought processes, knowledge or desires, significantly predicted higher infant-mother and infant-father attachment security - Frequency of interactional synchrony predicted infant attachment security for mothers and fathers, accounting for 40 and 47% of the variance, respectively - Interactional synchrony mediated the relationship between mothers' and fathers' mind-related comments and infant-mother/father attachment security

		- Coded from observations of a 6 minute interaction	
		Interactional synchrony (T1)	
		- Adapted from Belsky, Taylor & Rovine (1984)	
		- At least three contingent steps between parent and infant	
		Attachment Q-Set, Revision 3 (T2)	
		- Parents' ratings of their infant's attachment security	
MEINS (1998)	- Mother-infant dyads (N = **48**) - Sample recruited via general practitioners and health visitors - UK	**Strange Situation Procedure** (T1) - Infant's attachment status **Mother's attribution of meaning to child's vocalisations** (T2) - Mothers' reports of their children using non-standard words to which they could attribute a reliable meaning - Mothers' reports of their children's vocal but meaningless (VBM) speech	- Secure-group mothers were more likely to include non-standard words in their reports of their children's vocabularies and were less likely to report their children engaging in VBM speech - Authors argued that such differences in maternal interpretation indicate the secure group mothers' greater attribution of meaning to their children's early vocalizations
MEINS (2013)	Reanalysis of data from Meins et al. (2001; see above)	**Maternal Sensitivity rating scale** (T1) - Mother's overall sensitivity in relation to their infant rated from observations of free-play	- Appropriate mind-related comments and non-attuned mind-related comments were the only variables to predict dichotomous (secure/insecure) attachment

		Mind-mindedness coding system (T1)	- Non-attuned comments were a stronger predictor of attachment than appropriate comments
		- maternal responsiveness to change in infant's gaze; maternal responsiveness to infants object-directed action; imitation; encouragement of autonomy; maternal appropriate mind-related comments	- Secure-group mothers made fewer non-attuned comments than insecure-group mothers
		- coded from observed free-play session	
		Strange Situation Procedure (T2)	
		- Infants' attachment status	
MEINS, FERNYHOUGH, DE ROSNAY, ARNOTT, LEEKAM, & TURNER (2012)	- Mother-infant dyads ($N = 206$) assessed when infants were 8 months and 15 months old	**Mind-mindedness coding system** (T1) - Mothers' mind-mindedness, including comments on their infant's a) mental state, b) mental processes, c) emotional engagement, d) attempts to manipulate other people's thoughts, as well as e) comments which involve the mother speaking for the infant - Comments classified as inappropriate or non-attuned **Maternal Sensitivity rating scale** (T1) - Mother's overall sensitivity in relation to their infant rated from observations of free-play **Strange Situation Procedure** (T2) - Infants' attachment status	- Mind-mindedness predicted organised attachment (ABC) classification, disorganised attachment, four-way (ABCD) attachment classification and two-way (secure/insecure classification - Mothers' sensitivity scores failed to predict attachment security even at the conservative dichotomous secure/insecure level

MEINS, FERNYHOUGH, FRADLEY, & TUCKEY (2001)	- Infant-mother dyads assessed when the infant was aged 6 months and again at 12 months ($N = \mathbf{71}$) - Recruited through local health centres and baby clinics - 60% participation rate - UK	**Maternal Sensitivity rating scale** (T1) - Mothers' overall sensitivity in relation to their infant rated from observations of free-play **Mind-mindedness coding system** (T1) - maternal responsiveness to change in infant's gaze; maternal responsiveness to infants object-directed action; imitation; encouragement of autonomy; maternal appropriate mind-related comments - coded from observed free-play session **Strange Situation Procedure** (T2) - Infants' attachment status	- Maternal sensitivity predicted infant attachment, accounting for 6.5% of the variance - *Appropriate mind-related comments*, independently predicted infant attachment, accounting for a greater share of the variance (12.7%) than maternal sensitivity. - *Appropriate mind-related comments* could distinguish between infants later classified as secure, insecure-resistant and insecure-avoidant in their attachment - There was no significant difference in *sensitivity* scores between the secure and resistant mothers
MEINS, FERNYHOUGH, RUSSELL & CLARK-CARTER (1998)	- Mother-infant dyads ($N = \mathbf{30}$) - Sample recruited via general practitioners and health visitors - UK	**Strange Situation Procedure** (T1) - Infants' attachment status **Maternal Interview** (T2) - Mother's inclination to use mental characteristics when describing her child	- Secure-group mothers were likelier than insecure-group mothers to focus on their child's mental characteristics over their physical or behavioural attributes
SLADE, GRIENENBERGER, BERNBACH, LEVY, & LOCKER (2005A)	- Mothers assessed when pregnant with their first child and then when their child was age 10 and 14 months ($N = \mathbf{40}$ dyads) - Recruited via flyers in relevant sites and advertisements in local papers	**Adult Attachment Interview** (T1) - mothers' attachment status **Parent Development Interview** (T2) - maternal reflective function	- Maternal reflective functioning was highly predicted by mothers' prenatal attachment status for secure/insecure and for F, D, E, U classification groups

- USA	**Strange Situation Procedure** (T3) - Infants' attachment status	- Mothers' capacity to reflect on their child's thoughts and emotions predicted the quality of their infant's attachment status for secure/insecure and for F, D, E, U classification groups - Adult and infant attachment were weakly positively correlated in the sample - RF largely accounts for the modest link between adult and infant attachment security

The development of the RF scale

While reading transcripts from the AAI collected as part of the London Parent-Child Project (Fonagy, Steele, & Steele, 1991a), the authors noticed a large amount of variation in the degree to which parents' responses included attempts to understand their own and others' behaviour with reference to mental states. This variation was mostly captured by the Metacognitive Monitoring Scale on the AAI, which assesses parents' capacity to monitor and reflect on their own speech and thought processes. Peter Fonagy and colleagues (1991b) attempted to expand the subscale so that it also assessed the capacity to reflect on mental states, but when this proved beyond the scope of the scale, they developed the 6-point Reflective Self Scale (RSS), which eventually became the Reflective Function (RF) Scale (Fonagy, Target, Steele & Steele, 1998). The RF scale comprises the following broad dimensions: 1) *Awareness of the nature of mental states*; 2) *Explicit effort to tease out mental states underlying behaviour*; 3) *Recognition of developmental aspects of mental states*; and 4) *Mental states in relation to the interviewer*. RF is coded by rating the level of reflection in different passages from the AAI, with those questions which encourage the interviewee to reflect ('demand' as opposed to 'permit' questions) carrying more weight. Transcripts are given an overall rating based on ratings for the four dimensions combined with consideration of the interview as a whole. Ratings fall on an 11-point scale ranging from -1 (*systematic dismissal*, *derogation* or *hostility at any attempts at reflection*) to 9 (*exceptional sophistication in the understanding of complex mental states*), and a score of 5 is given to interviews which show a *coherent model of the mind*. Sub-classifications can also be assigned to low ratings (<3), specifying the type of low RF exhibited (e.g. rejection of RF, disavowal of RF, over-analytical or hyperactive RF).

Fonagy et al. (1991b) proceeded to validate the original RSS using data from the aforementioned London Parent-Child Project, which examined 100 mothers and fathers from a primarily middle class sample prior to the birth of their child. Reliability scores for the

interview were high for both mothers (r = .59-84) and fathers (r = .79-89) and no significant relationship was found between RF ratings and personality and IQ. Results indicated that the RSS was an even stronger predictor of attachment security on the AAI for both mothers (F (2,94) = 6.11) and fathers (F (2,81) = 14.6) than the AAI coherence scale (measuring the degree to which interviews have few internal contradictions and are spontaneous and credible), which had previously been regarded as the most reliable indicator of attachment security. Parents at the high end of the scale showed the capacity to provide a coherent mental representation of other people's thoughts and feelings, to offer a credible understanding of the beliefs and intentions of their parents and the psychological origins of their own motivations, both in childhood and adulthood. Parents at the low end of the scale were either unwilling or unable to reflect on their own thoughts and feelings or those of others.

Building on these findings, Fonagy and colleagues (1991b) observed mothers and fathers (N = 96) from the same project interact with their child during the Strange Situation at 12 months and 18 months respectively. Again, each parent's mentalizing capacity was assessed by applying the RSS retrospectively to narratives obtained using the AAI. The authors proceeded to examine the proportion of mothers of avoidant, resistant and secure infants falling into the six categories measured by the scale. Mothers of resistant infants had only slightly lower RSS scores than those of secure infants. While 52% of the mothers of secure infants were rated in the top two categories, only 10% of mothers of avoidant infants did so. There was a strong relationship between RSS scores and infant attachment status for mothers, X^2 (2) = 14.4, $p < 0.001$, and a slightly weaker, but also significant, relationship for fathers, X^2 (1) = 7.35, $p < 0.01$, suggesting that parents' mentalizing capacities were highly predictive of their subsequent attachment relationship with their children. In addition, parents' RSS scores were more strongly associated with infant security than any other measure used in this study (e.g. their AAI attachment classification or any of the AAI scales) for both mothers (r = -.51) and fathers (r = .36). Parents' reflective self-function was also strongly associated with

observer ratings of their infants' behaviour in the Strange Situation, with infants of mothers with high RSS scores showing better maintenance of contact ($r=.30$) and less avoidant behaviour ($r = -.37$). Parents' scores on the RSS were the most powerful determinants of their AAI classification and the most powerful predictor of attachment patterns between children and parents. As noted by the authors, however, the study did not control for potential changes to the mentalizing capacity of mothers after the birth of their child – for example, the process of becoming a parent might have increased or decreased the level of activation of certain internal working models, leading to changes in attachment-related thoughts and behaviours. The methodological quality of the two studies by Fonagy et al. (1991a; 1991b) was nevertheless high and the combined studies were given a rating of .91 using the QualSyst (Kmet et al., 2004) critical appraisal tool.

Fonagy et al. (1991a; 1991b) is the first study empirically to demonstrate the dynamic function of RF as a key determinant of infant security. It is also significant for its development of a scale to measure this function. Since the development of the RSS and RF scales, RF has been operationalised into two distinct but related constructs: *adult* and *parental/maternal RF*. Whereas the former is primarily rated from the AAI and is a measure of adults' capacity to reflect on their own childhood experiences of being parented, parental RF is a measure of adults' capacity to reflect on their relationship with their children. This distinction is maintained throughout this review.

Maternal Reflective Functioning

The results from Fonagy et al.'s (1991a, 199b) studies are limited because they infer parents' capacity to mentalize from parents' narratives about their own childhood and not by focusing directly on their capacity to mentalize in relation to their child. Others have attempted to address this problem by developing semi-structured interviews along the same lines as the AAI focusing specifically on parents' representations of their children, their relationships with

them and themselves as parents. These include an addendum to the RF coding manual (Slade, Bernbach, Grienenberger, Levy, & Locker, 2004) for specific use on the Parent Development Interview (PDI; Aber, Slade, Berger, Bresgi, & Kaplan, 1985), and the Working Model of the Child Interview (WMCI; Zeanah & Benoit, 1995).

Arietta Slade and colleagues (2005a) examined the association between attachment outcomes in 40 mothers and their babies, as measured by the AAI and the Strange Situation respectively, and maternal RF as measured by the PDI, and found a highly significant association between the two. This effect was evident between secure and insecure mothers, F $(1,38) = 13.164$, $p < .001$, and across all four attachment classification groups, i.e. secure, dismissing, preoccupied, unresolved, F $(3,36) = 6.46$, $p < .001$. Autonomous mothers had significantly higher RF scores compared to dismissing ($p < .023$), preoccupied ($p < .043$) and unresolved mothers ($p = .000$), and dismissing and preoccupied mothers had higher RF scores than unresolved ones ($p <. 077$ and $p <. 032$ respectively). This suggested that maternal attachment status assessed during pregnancy was a reliable predictor of maternal RF when the baby was 10 months old. Significant associations were also found between maternal RF and infant attachment status. A comparison of secure and insecure infants, F $(1,38) = 7.567$, $p <$ $.001$, found the association to be significant with a large effect size of .81, while comparison across different infant attachment classification groups, F $(3,36) = 4.759$, $p <. 001$, was also found to be significant. In order to test the hypothesis that RF plays a mediating role between maternal attachment and infant attachment, the authors carried out a preliminary test of mediation, which suggested that maternal RF largely accounts for the link between adult and infant attachment in their sample, with the size of the influence being equivalent to a correlation of .41.

Slade et al.'s (2005a) study is the first to show that a mother's capacity to mentalize about her own child relates both to her own attachment status (as assessed by the more representational AAI) and the attachment classification of her child (coded through observations of the

Strange Situation). Given the modest size of the sample (albeit relatively large effect sizes) and the weak positive correlation between adult and infant attachment ($r = .24$), this finding should be interpreted with caution. Nevertheless, it is consistent with the assumption that mothers who are better able to reflect on their child's internal states tend to be secure in relation to their own attachment history and presumably are better able to reflect on their own adult attachment narratives. Previous findings in this area were somewhat limited since they only measured parents' capacity to mentalize in relation to their own childhood and assumed, rather than observed, a capacity to do likewise with their child (Fonagy et al., 1991b; Fonagy, Steele, Steele, Higgitt, & Target, 1994). Given certain limitations of the study (e.g. small sample size; sample not randomly selected for), Slade et al. (2005a) achieved a rating of .82 using the QualSyst (Kmet et al., 2004) critical appraisal tool.

Grienenberger et al. (2005a) explored the transmission of attachment from mother to child using a similar sample to Slade et al. (2005a), but focusing more closely on the importance of maternal caregiving sensitivity, specifically at times of a child's heightened arousal, since the mother's ability to manage this is crucial to the development of the child's own ability to regulate their own emotions. As a measure of maternal caregiving sensitivity they used the Atypical Maternal Behaviour Instrument for Assessment and Classification measure (AMBIANCE; Bronfmann, Parsons, & Lyons-Ruth, 1999; Lyons-Ruth, Bronfmann, & Atwood, 1999), which was developed to code atypical maternal behaviour during the Strange Situation and focuses specifically on mothers' ability to regulate her infant's affective experience. The concept of mentalizing is therefore built into the AMBIANCE measure, as the behavioural observations it is intended to capture should show mothers with a greater capacity to mentalize to exhibit fewer atypical behaviours that are suggestive of failures to interpret and respond to the infant's intentionality. Accordingly, the AMBIANCE measures five dimensions of caregiving behaviour: (1) affective communication errors; (2) role or boundary confusion; (3) fearful/disorientated/dissociative/ disorganised behaviour; (4)

intrusiveness or negativity; and (5) withdrawal. The authors measured adult RF using the PDI.

The study found a significant negative association ($r = -.481$, $p = .000$), with a substantial effect size ($d = 1.1$), between maternal RF, measured when the infant was 10 months old, and the level of disrupted affective communication between mother and child as measured by AMBIANCE when the child was 14 months old. The size of the effect may be considered surprising given the disparity of the domains of measurement, the AMBIANCE being a behavioural measure based on a single interaction and RF being coded from a narrative (Fonagy & Target, 2005). This suggests a strong relationship between the observed frequency of behaviours that indicate a disruption of affective communication between mother and infant and narratives that appear to show little appreciation of the infant's intentionality. The strong correlation suggests that the organisation of the mother's narratives about her child and the inhibitory regulation of certain aspects of her behaviour with the child may share the same control mechanism (Fonagy & Target, 2005).

ANOVA analysis showed significant differences between the AMBIANCE scores of secure- and insecure-group mothers, $F(3,41) = 4.02$, $p = .014$, with post-hoc analyses revealing secure-group mothers to have higher AMBIANCE scores than both the insecure-resistant ($p = .043$) and disorganised ($p = .005$) groups. The researchers then carried out a regression analysis to evaluate the degree of overlap between maternal RF and maternal behaviour in predicting infant attachment. They found that the originally significant relationship between maternal RF and infant attachment ($r = -.345$, df = 43, $p = 0.009$) was reduced after accounting for the influence of maternal caregiving sensitivity (partial $r = -.217$, df = 42, p = .087), and that maternal caregiving sensitivity remained significantly positively correlated with infant attachment after accounting for the role of maternal RF (partial $r = 3.03$, df = 42, $p = .03$). This suggests that maternal behaviour acts as a mediator between maternal RF and infant attachment, i.e. that the mother's reflective capacities manifested themselves through

her overt behaviour during interactions with her child. However, as the influence of maternal RF on infant attachment was also approaching significance at the .05 level ($p = 0.087$), maternal behaviour might be best understood as a partial mediator, with RF likely to account for a unique amount of variance independently of maternal behaviour. Given its use of a largely identical sample to Slade et al. (2005a), Grienenberger et al. (2005a) shared some of the limitations of that study and therefore achieved a similar rating of .86 using the QualSyst (Kmet, 2004) critical appraisal tool.

In summary, Slade et al. (2005a) and Grienenberger et al. (2005a) expanded on Fonagy et al.'s (1991a; 1991b) finding of an association between a mother's capacity to mentalize and her child's attachment security by demonstrating this association for maternal, as opposed to adult, RF. Slade and colleagues' (2005a) study also showed that this association holds for unresolved infant classification, which was not measured by Fonagy et al. (1991b). Grienenberger et al. (2005a) found evidence in support of a possible role for maternal caregiving behaviour in mediating the association.

Mind-mindedness

Mary Ainsworth and colleagues (1969; 1971; 1978) proposed that *maternal sensitivity* - the mother's capacity for perceiving and interpreting accurately her child's signals and communications - was the most relevant maternal dimension for predicting infant attachment. However, their prediction of a strong predictive relationship between maternal sensitivity and infants' attachment status has not subsequently been replicated, leading others (De Wolff and Van Ijzendoorn, 1997) to conclude that maternal sensitivity is only moderately predictive of attachment security. Subsequent failure to replicate Ainsworth et al.'s prediction may be due to the highly global and interpretive nature of their original (1971;1974) sensitivity scale, which may have led to maternal sensitivity becoming an umbrella concept for numerous aspects of early infant-caregiver interaction (Meins, 2013). In an attempt to refocus on what

they deemed a central aspect of Ainsworth et al.'s (1971; 1974) description of a sensitive caregiver – namely, appropriateness of response to the infant – Elizabeth Meins and colleagues (1998; 2001) reconceptualised the concept of maternal sensitivity by focusing specifically on the ability of mothers accurately to read their infants' states, which they referred to as *mind-mindedness*. This construct is similar to RF in its focus on the understanding of internal states in interpreting behaviour.

In a study of 30 dyads, Meins and colleagues (1998) reported an association between infant attachment security and mothers' descriptions of their children at 3 years. Mothers whose children were observed to be securely attached in the Strange Situation at 11 or 13 months were likelier than their insecure-group counterparts to focus on their child's mental characteristics over their physical or behavioural attributes when asked to give an open-ended description of their children 2 years later, $F (1,26) = 6.19$, *MS treatment* $= 0.40$, $p < 0.025$. Mothers in the secure-group were also shown to employ more sensitive tutoring strategies compared to their insecure-group counterparts in a box-construction task, $F (1,26) = 8.37$, *MS treatment* $= 0.36$, $p < 0.01$. In a different study, looking specifically at the influence of attachment security on language acquisition, Meins (1998) observed that secure-group mothers were significantly more willing or able to attribute meaning to their children's early vocalisations, e.g. understanding that utterances which that did not conform to actual English words were nevertheless being used intentionally by their children to convey a specific meaning. Secure-group mothers were more likely to include non-standard words in their reports of their children's vocabularies, $X^2 (1, 48) = 4.04$, $p < .05$, and were less likely to report their children engaging in verbalised but meaningless speech, $X^2 (1, 48) = 17.07$, $p <.001$. Meins et al. (1998) and Meins (1998) were rated .91 and .77 respectively using the QualSyst (Kmet et al., 2004) critical appraisal tool.

In both of these studies, however, it was not clear if mothers' proclivity for mind-mindedness was present in early infancy and had an influence on subsequent infant attachment. With the

aim of operationalising the concept of mind-mindedness and investigating the extent to which it *predicts* later attachment security, Meins et al. (2001) video-recorded mothers freely interacting with their six month old infants ($N = 71$) and coded these interactions for infant behaviours and maternal sensitivity using Ainsworth's (1971;1974) maternal sensitivity scale. Randomly selecting recordings of six separate interactions, the authors developed a coding system comprising the following five indexes of mind-mindedness: a) *Maternal responsiveness to infant's direction of gaze;* b) *Maternal responsiveness to infant's object-directed action;* c) *Imitation;* d) *Encouragement of autonomy;* and *e) Appropriate mind-related comments*, which involves the mother voicing out aloud what she thinks the child might be thinking or feeling. To be classified as appropriate, the mind-related comment needed to be seen by the coder 1) to be an accurate interpretation of the child's mental state, 2) to be linked with a past or future event that had an obvious relation to the child's current activity, or 3) to provide clear instructions to the child on how to proceed after a lull in the interaction. Comments were not coded as appropriate if they did not meet these criteria or if the referent of the mother's comment was not clear. Infant attachment status was assessed six months later using the Strange Situation.

Results of the study indicated that it is possible to differentiate between maternal sensitivity and maternal mind-mindedness in mothers' interactions with their six month old infants. All five indexes of mind-mindedness were positively correlated with maternal sensitivity, but those which were most strongly related to it (*Maternal responsiveness to change in infant's direction of gaze* and *Appropriate mind-related comments*) each only accounted for 16% of its variance. This suggests that the constructs of maternal sensitivity and mind-mindedness capture related but distinct aspects of maternal caregiving behaviour, and that any relationship between mind-mindedness and subsequent attachment security is not to be explained simply in terms of equivalence between these two constructs. In line with the authors' expectations, maternal sensitivity was found to predict subsequent infant attachment security, X^2 ($N = 65$) = 8.30, $p < .05$, accounting for 6.5% of the variance. A logistic regression was run in order to

determine the extent to which each of the five indexes of mind-mindedness predicted attachment security. Of the five indexes, only one, *Appropriate mind-related comments*, was found to be an independent predictor of attachment, X^2 (N =65) = 17.62, p < .001, but accounted for a greater share of the variance (12.7%) than maternal sensitivity. Furthermore, *Appropriate mind-related comments* could distinguish between infants later classified as secure, insecure-resistant and insecure-avoidant in their attachment. In contrast, there was no significant difference in *sensitivity* scores between secure- and resistant-group mothers, with the latter group actually scoring marginally higher on this measure than secure-group mothers. Therefore, mothers' capacity to make appropriate mind-related comments in response to their infants' behaviour appears more effective than maternal sensitivity in distinguishing between infants across the three attachment categories. However, these results should be considered preliminary given the low number of infants in this study classified as disorganised (n = 3) and their omission from the final analyses, as well as low numbers of infants in the study categorised as insecure (n = 20). Notwithstanding this, Meins et al. (2001) is a high quality study and was given a rating of .95 using the QualSyst (Kmet et al., 2004) critical appraisal tool.

Arguing that Ainsworth et al.'s (1971; 1974) original maternal sensitivity scale does not differentiate a mother's recognition of her infant's needs and the appropriateness of her response to those needs (Meins et al., 2001), Lundy (2002) proposed *interactional synchrony* as a means of measuring differences in parents' ability to recognise and accurately to interpret their infant's perceptions *and* their ability to engage in appropriate and well-coordinated interactions. Where synchronous interactions are experienced as reciprocal and mutually rewarding, asynchronous interactions are not, e.g. the parent will stimulate the infant when he/she fusses or cries (Isabella, Belsky, & von Eye, 1989; Lundy, 2002).

Lundy (2003) examined the relationship between parents' (N = 16) appropriate mind-related comments to their 6 month old infants and subsequent infant attachment security and found

interactional synchrony to mediate the relationship between mind-related comments and attachment security for both mothers and fathers. Parents were filmed with their infants during a six minute interaction session, which was subsequently coded for mind-related comments, measured using a modified version of Meins et al.'s (2001) coding system, and interactional synchrony, defined as an exchange involving three or more contingent steps between the parent and infant. Infant attachment status was assessed approximately seven months later using the Attachment Q-Sort (AQS; Pederson, Moran, Sitko, Campbell, Ghesquire, & Acton, 1990), a 90-item measure completed by the observer immediately after the visit and yielding a score for attachment security ranging from from−1.0 (highly insecure) to 1.0 (highly secure). Lundy (2003) found a modest correlation between mothers' and fathers' *comments relating to infants' general thought processes, knowledge or desires* and interactional synchrony, both of which were predictive of higher infant attachment security (mothers: $R^2 = 33$, $p < .05$; fathers: $R^2 = 41$, $p < .01$). A further stepwise regression showed that only interactional synchrony significantly predicted infant attachment for both mothers and fathers, accounting for 40% and 47% of the variance respectively. Using Baron and Kenny's (1986) four step regression, the author investigated the possibility that interactional synchrony mediates the relationship between parental RF and infant attachment security, concluding that it does. The small sample size and other methodological limitations of this study, however, mean that its results should be interpreted with caution. The interactions on which assessments were based were very short (six minutes) and the same video recording was used to assess both RF and interactional synchrony for each parent-infant dyad, leading to increased risk of common method variance. Furthermore, the validity of the Attachment Q-Sort remains unclear raising questions regarding the validity of its attachment ratings. Given these shortcomings and certain omissions in the reporting of results, Lundy (2003) was rated relatively lowly using the QualSyst (Kmet et al., 2004) critical appraisal tool, achieving a score of .64.

Neither Slade et al. (2005a) and Grienenberger et al. (2005a) had combined AAI data with an independent measure of mother-child interaction. Slade et al. (2005a) measured RF using the PDI, which assesses the mother's representations of her child and herself as parent, making it difficult to establish if a mother scoring highly for RF when talking about her relationship with her child would score similarly highly when responding to her child's internal states during real-life interactions. Grienenberger et al. (2005a) assessed maternal caregiving sensitivity and infant attachment status concurrently from the same observation of the Strange Situation and did not include AAI classification. Arguing that the methodological shortcomings of these two studies mean that they inadequately address the question of whether RF mediates the transmission gap, Arnott and Meins (2007) conducted a study to determine whether parents who score highly on RF during the AAI are similarly skilled in reflecting on their infants' internal states during real-life 'online' interactions with them. The authors assessed the attachment status and RF, using the AAI and RF scale respectively, of 21 mothers and 17 fathers expecting their first child. When the child was six months old, they assessed mind-mindedness using the Meins et al. (2001) coding system during a 30 minute free-play laboratory interaction. Six months later, when the infants were 12 months old, they assessed infant-mother (n = 18) and infant-father (n = 15) attachment security using the Strange Situation.

The authors found a correlation between parents' mind-mindedness and high parental RF, suggesting that parents' ability to tap into their child's mental states is associated with the more representational measure of RF. Furthermore, in line with Fonagy et al.'s (1991b) original finding, they found that autonomous parents had significantly higher RF compared to non-autonomous parents: mothers, $t(26) = 4.12$, $p < .001$, two–tailed ($d = 1.60$); fathers, $t(23) = 2.15$, $p < .05$, two–tailed ($d = 0.90$). However, parental mind-mindedness was found to be unrelated to parental AAI classification for both mothers and fathers, suggesting that autonomous and non-autonomous parents do not differ in their proportional use of appropriate mind-minded comments.

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Mothers' antenatal RF was found to be unrelated to their proportional use of *appropriate mind-minded comments* but negatively related to *inappropriate comments* ($r = .41$), and accounted for 17% ($R^2 = .17$) of the variance in their scores for inappropriate mind-minded comments. This suggests that mothers who were more likely to make appropriate mind-related comments relating to themselves and their children during the AAI were less likely to comment inappropriately on their 6 month old infant's internal states during online interactions. By contrast, father's ante-natal RF was found to be related to their proportional use of *appropriate mind-minded comments* ($r = .50$) but not to inappropriate comments. Therefore, fathers who were more likely to make appropriate mind-related comments relating to themselves and their children during the AAI were more likely to comment appropriately on their infants' internal states during free-play interactions with them at six months. Fathers were more likely than mothers to make inappropriate comments on their children's mental states, $t (36) = 2.35$, $p < .025$, two–tailed, $d = 0.77$. However, autonomous fathers were found to make more appropriate than inappropriate mind-related comments to their children, $t (36) = 2.35$, $p < .05$, two-tailed, $d = 1.19$, and had children who were more securely attached to them than non-autonomous fathers.

In line with Fonagy et al. (1991b), parents classified as autonomous in relation to their attachment history attained higher RF scores than their non-autonomous counterparts: mothers: $t (26) = 4.12$, $p < .001$, two-tailed ($d = 1.6$); fathers: $t (23) = 2.15$, $p < .05$, two-tailed ($d = .9$). Infant-parent attachment security was also found to be related to parental mind-mindedness, replicating previous findings (Meins et al., 2001; Lundy, 2003). Although the relationship between mind-mindedness and attachment security did not reach significance level, there was a large effect size ($d = 1.02$) for the relationship between mothers' inappropriate mind-minded comments and mother-infant attachment security and a medium effect size ($d = 1.02$) for the relationship between their appropriate mind-minded comments and security of attachment with their infant. This suggests that mothers of securely attached

infants made proportionately fewer inappropriate mind-minded comments and proportionately more appropriate mind-minded comments during interactions with them at six months. Fathers of securely attached infants made proportionately more appropriate mind-minded comments at 6 months, but there were no attachment-related differences with respect to inappropriate mind-minded comments. Given the small sample size of this study, it was not possible to perform a mediational analysis, leaving open the question of the role of RF in mediating the transmission gap. As the low number of participants and the non-significant results make it difficult to draw firm conclusions from this study, the Arnott and Meins (2007) study was given a rating of .86 using the QualSyst (Kmet et al., 2004) critical appraisal tool.

In summary, the construct of mind-mindedness arose out of an attempt to reconceptualise the construct of maternal sensitivity (Ainsworth et al., 1971; 1974). It is similar to RF in its focus on the understanding of internal states in interpreting behaviour, but with an emphasis on the direct observation of caregiving behaviour over the recording of caregivers' representations. Meins et al. (2001) Lundy (2003) and Arnott and Meins (2007) all showed parental mind-mindedness to be related to infant attachment security, with one mind-mindedness index in particular, *Appropriate mind-related comments*, shown to be an independent predictor of infant attachment security (Meins et al., 2001). Two studies *(*Meins et al., 2001; Lundy, 2003) showed mind-mindedness to be more predictive of infant attachment security than maternal sensitivity. While Meins et al. (2001) showed mind-mindedness to be independent of maternal caregiving behaviour, Lundy (2002; 2003) showed maternal caregiving behaviour (theorised through the construct of interactional synchrony) to mediate the relationship between mind-mindedness and attachment. The differences between the two studies may be explained by the contrasting methods they used to measure caregiving behaviour. Methodological shortcomings, however, limit the extent to which the findings may be interpreted and generalised.

Maternal sensitivity

Laranjo and colleagues (2008) investigated the relationship between maternal sensitivity, mind-mindedness and infant attachment in a random sample of 50 mother-infant dyads. Mothers' sensitivity and mind-mindedness towards their 12 month old infants were assessed separately during a 90-minute home visit, while attachment security of each infant was assessed by an independent observer three months later. The Maternal Behaviour Q-Sort (MBQS; Pederson et al., 1990), a 90-item measure of the quality of maternal behaviour during mother–infant interactions in the home, was used as a measure of maternal sensitivity. Maternal mind-mindedness was assessed from observing 10 minutes of video-recorded interactions, which were subsequently coded and assessed for appropriateness using Meins et al.'s (2001) system, which distinguished mothers' comments on their infant's a) mental state, b) mental processes, c) emotional engagement, d) attempts to manipulate other people's thoughts, as well as e) comments which involve the mother speaking for the infant. The measure of mind-mindedness therefore yielded five scores representing the number of appropriate comments in each category. Infant attachment security was measured using the AQS. All assessments were conducted using Pederson and Moran's (1995) procedure aimed at reproducing the natural conditions of everyday parental life. Results indicated that, of all the mind-mindedness variables listed, only one - *comments on infants' mental states* - was related to maternal sensitivity ($r = .28, p = < .05$) and infants' attachment status ($r = .28, p = < .05$). All other categories of comments were therefore discarded from the subsequent analyses of mediation. Using Baron and Kenny's (1986) procedure for establishing mediation, the authors found maternal sensitivity to mediate the common variance between *comments on infants' mental states* and infant attachment security.

These findings are consistent with Lundy (2003) and Grienenberger et al. (2005a), suggesting that effective mentalizing is a necessary requirement for caregiving behaviour to foster secure attachment. These results, however, are inconsistent with Meins et al. (2001), who found that

both RF and maternal sensitivity independently predicted attachment security. These conflicting results may be explained by methodological differences between the studies relating to the research settings and assessment tools used. For example, Laranjo et al. (2008) based their assessments on 10 minute home-based interactions in contrast to the 20 minute laboratory-based interactions used by Meins et al. (2001). As a measure of attachment status, Laranjo et al. (2008) used the AQS, which correlates only moderately with the Strange Situation, the corresponding measure used by Meins et al. (2001) (Van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). Laranjo et al. (2008) used the MBQS as a measure of maternal sensitivity in contrast to Meins et al. (2001), who used Ainsworth's (1969) original Sensitivity Scale. Both Lundy (2003) and Laranjo et al. (2008) report a relative low frequency of mind-minded comments, suggesting that longer observations are necessary to provide a more thorough assessment of mentalizing. The low frequency of such comments might also reflect a lack of understanding regarding the manifestations of mentalizing during unstructured daily interactions, of which more research is needed (Meins, et al., 2001). Despite these limitations, Laranjo et al. (2008) was given a high QualSyst (Kmet, et al., 2004) rating of .95, with particular strengths of the study being its efforts to control for the effects of sampling and measurement bias and its detailed reporting.

Demers et al. (2010) argue that Meins et al.'s (1998) original descriptive measure of mind-mindedness is insufficiently complex, consisting merely of a ratio of mind-related descriptors to overall number of descriptors. They suggest that while this may be appropriate for studies of low risk samples, mothers presenting with a higher risk of caregiving difficulties (e.g. adolescent mothers) require a more detailed assessment. Positing that such high risk groups might find it more difficult to converse in a rich and positive way about their child, perhaps due to a lack of appropriate normative points of comparison regarding their child's development, they elaborate on Meins et al.'s (1998) original method of measuring mind-mindedness by considering both the valence (e.g. positive, negative, or neutral) of mothers' descriptions of their children and their richness (i.e. the sum of the total number of descriptors

and the total number of examples used by mothers to enrich and support their descriptions).

In order to investigate the magnitude and direction of the relationship between mind-mindedness and maternal sensitivity, the authors studied 106 mother-infant dyads, comparing 37 adult mothers with 69 adolescent mothers. They used the AAI to assess mothers' current state of mind with regard to past attachment experiences (i.e. attachment coherence), adopting Main, Goldwyn and Hesse's (2003) classification system. In addition to measuring mind-mindedness and adult attachment, they assessed the quality of maternal behaviours using the MBQS. Mothers were administered the AAI when their infants were 6 months old. At 18 months, two research assistants visited dyads at their home, each carrying out separate assessments for mind-mindedness and quality of maternal behaviours. Adult mothers used significantly more ($p < 0.05$) neutral mental descriptors ($M = 1.37$, $SD = 1.83$) than adolescent mothers ($M = .68$, $SD = .95$), and used significantly richer ($p < 0.1$) descriptions ($M = 7.54$, $SD = 5.17$) than their adolescent counterparts ($M = 5.18$, $SD = 2.98$). They did not, however, differ in their mean score for attachment coherence. In line with predictions, there was a positive correlation between positive mind-mindedness and attachment coherence ($r = .27$, $p < .05$) and a positive relationship between mother's attachment coherence and the richness of their descriptions of their children ($r = .23$, $p < .05$). Subsequent hierarchical regression analyses showed that attachment coherence accounted for a unique 5.7% of the variance of positive mind-mindedness ($\beta = .24$, $p < .05$). Contrary to expectations, there was no significant association between Meins et al.'s (1998) original measure of *overall* descriptors of mental states and maternal sensitivity. The correlation came close to significance at the $p = .05$ level, mainly due to a significant positive association ($r = .20$, $p < .05$) between mothers' use of *positive* mind-related descriptors and maternal sensitivity, suggesting that the more a mother used positive descriptors, the more sensitive she was observed to be in response to her child's signals. Also contrary to expectations, there was no negative association between negative mind-related descriptors and maternal sensitivity. The authors explain this finding as a possible consequence of mothers using few negative mental descriptors overall, thereby reducing statistical power. They also suggest, in line with previous findings (e.g. Benoit et al,

1997; Oppenheim, Koren-Karie, & Sagi, 2001), that mothers who are able flexibly to consider both positive and negative characteristics of their child are more likely to have securely attached children. As predicted, an association was found between mothers' attachment coherence and richer and more mind-minded comments towards their child. This suggests that a mother's degree of autonomy with respect to her past experience in relationships enables her more effectively to evaluate these experiences, helping her in turn to be more attuned to her child's signals and to interpret them in a less distorted fashion. Demers et al. (2010) is a good quality study, benefiting from its longitudinal, multi-method design, which reduces the likelihood of methodological artefacts, like shared method variance, contributing to Type I error. It was given a QualSyst (Kmet et al., 2004) rating of .86.

In summary, Laranjo et al. (2008) and Demers et al. (2010) investigated the association between mind-mindedness and maternal sensitivity. Both studies showed an association between the two constructs, suggesting that effective mentalizing is a necessary requirement for caregiving behaviour to foster secure attachment. Laranjo et al. (2008) showed one mind-mindedness variable, *comments on infants' mental states*, to be predictive of maternal sensitivity over and above all other categories of comments, and, in line with previous studies (Grienenberger et al., 2005a; Lundy, 2003), showed maternal caregiving behaviour to mediate the relationship between mentalizing capacity and infant attachment status. Demers et al. (2010) expanded on previous research by investigating both the valence and richness of mother's mind-minded comments. The authors showed positive mind-minded comments only to be associated with maternal sensitivity.

Mind-mindedness as a multi-dimensional construct

Meins et al.'s (2001) study treated mind-related comments unidimensionally, focusing exclusively on those comments which were seen as appropriate. However, not all mind-related comments in the study were seen as such, leading the authors to define criteria for

those mind-related comments which were not attuned to the infant's internal state, e.g.: a) the attributed internal state was incongruent with the infant's behaviour; b) the internal state relating to the infant's past or future behaviour was unrelated to the infant's current behaviour; c) the caregiver queried what the infant wanted when the infant was already clearly engaged in an activity; d) the referent of the internal state was not clear. They posited that interactions with a higher proportion of non-attuned mind-related comments were more likely to be experienced by the infant as disjointed and non-collaborative, whereas those with a higher proportion of appropriate mind-related comments were more likely to foster a sense of partnership and attunement between infant and caregiver, broadly equivalent to Lundy's (2002) concept of interactional synchrony. In a separate study looking at relations between early mind-mindedness and children's mentalization in early years, Meins et al. (2003) found appropriate and non-attuned mind-related comments to be unrelated. The former was found to have a modest positive correlation with maternal sensitivity, whereas there was no correlation between maternal sensitivity and the latter. This would suggest that an apparently sensitive behaviour could be classified as either appropriate or non-attuned, and an apparently insensitive behaviour can be accompanied by an appropriate mind-related comment.

While Laranjo et al. (2008), Lundy (2003) and Meins et al. (2001) all reported a predictive role for caregivers' use of appropriate mind-related comments and subsequent attachment status, none of these studies addressed whether a) non-attuned (i.e. inappropriate) comments predicted further unique variance in attachment security or b) mind-mindedness predicts security across the full range of attachment classifications. Furthermore, none of these studies investigated the possibility that the different dimensions of maternal mind-mindedness - appropriate and non-attuned mind-related comments - might relate to maternal sensitivity and attachment security in contrasting and independent ways.

In order to address these questions, Meins et al. (2012) investigated whether the appropriateness or non-attunement of mind-related comments independently predicted

attachment security, treating the latter as a multi-dimensional construct, e.g. employing three-way (ABC), organised/disorganised, four way (ABCD), and two-way (secure/insecure) attachment classifications. They found that both indices of mind-mindedness - 1) appropriate and 2) non-attuned mind-related comments - predicted unique variance in attachment security independently of maternal sensitivity and socio-economic status (SES). Infant-mother dyads ($N = 206$) were assessed for maternal mind-mindedness and maternal sensitivity at 8 months using transcripts from a video-taped 20-minute free play sessions with the only instruction being for mothers to play with their infants as they would do during spare time at home. A researcher blind to all other measures classified mind-related comments as inappropriate or non-attuned using Meins et al.'s (2001) criteria described above. A separate blind researcher scored the free play interactions for sensitivity using Ainsworth et al.'s (1974) 1-9 point scale, with five anchor points between "highly sensitive" (9) and "highly insensitive" (1). Attachment security was assessed at 15 months using the Strange Situation. The authors expected to replicate Meins et al.'s (2001) finding that secure group mothers scored highly for appropriate mind-related comments. Based on Ainsworth et al.'s (1971) characterisation of secure-group mothers as highly sensitive and attuned to their infant's needs, they predicted that this group would be associated with low levels of non-attuned mind-related comments. Avoidant-group mothers were predicted to score low on appropriate comments and highly on non-attuned comments due to their documented (Ainsworth et al., 1971) unwillingness to engage with their child's needs and tendency to follow their own agenda rather than their child's cues. The authors considered the possibility that resistant-group mothers might score highly on both dimensions due to the observation (Ainsworth et al., 1971) that this group tended to score low on sensitivity, cooperation and accessibility, but moderately highly for acceptance of their child's cues.

The authors initially investigated predictors of organised attachment (ABC) classification only using a hierarchical multinomial regression model (with securely attached mothers as the reference point), entering maternal sensitivity and SES at the first step. Only when mind-

mindedness predictors were added in the second step did a significant model result, $X^2(8) = 57.76$, $p < .009$, Nagelkirche pseudo-$R^2 = .36$. In line with predictions, secure group mothers used significantly fewer non-attuned mind-related comments than avoidant and resistant mothers. They also used more appropriate mind-related comments than their avoidant- and resistant-group counterparts, although this comparison was non-significant for the latter group. The authors subsequently investigated predictors of disorganised attachment using binary logistic regression. Again, a significant model resulted only when mind-mindedness variables were added to maternal sensitivity and SES, $X^2(4) = 12.01$, $p < .017$, Nagelkirche pseudo-$R^2 = .12$.

Prompted by indications that the difference in mind-mindedness between organised and disorganised attachment groups might be explained by differences specifically between the secure and disorganised groups, the authors conducted a further multinomial regression analysis on the entire sample, using four-way (ABCD) attachment classification as the outcome variable and the disorganised group as the reference point. Again a significant model resulted only when the mind-mindedness variables were added to SES and maternal sensitivity scores, $X^2(12) = 72.22$, $p < .001$, Nagelkirche pseudo-$R^2 = .35$. Mothers in the disorganised-group used proportionately fewer appropriate mind-related comments and proportionately higher non-attuned comments than those in the secure-group, although this effect was marginal ($p = .06$), indicating that disorganised-group mothers used fewer non-attuned comments than their resistant-group counterparts. There was no difference between disorganised and avoidant-group mothers on either mind-mindedness variable.

Given the low number of dyads in this study classified as insecure-resistant and the relatively low number classified as insecure-disorganised, the authors investigated if the aforementioned findings based on three- and four-way attachment classification would be consistent with a more conservative two-way classification into secure and insecure groups. Again, adding the mind-mindedness variable at the second step resulted in a significant model, $X^2(4) = 60.76$, p

$< .001$, Nagelkirche pseudo-$R^2 = .36$. Overall, 50.4% of secure-group mothers exceeded the overall mean percentage (5.34) of appropriate mind-related comments compared to only 27.3% of insecure-group mothers. Conversely, 62.1% of insecure-group mothers exceeded the overall mean percentage (1.58) of non-attuned mind-related comments compared to 21.9% of secure-group mothers.

In contrast to these clear differences between different attachment groups in relation to the mind-mindedness, the Meins et al. (2012) study failed to predict attachment security from mothers' sensitivity scores, not even at the conservative dichotomous secure/insecure level. Although contrasting with the findings of Ainsworth et al (1971) and Meins et al. (2001), this failure to find a relationship between sensitivity and dichotomous attachment is consistent with findings from a number of studies on wide-ranging populations (e.g., Goldberg, Perrotta, & Minde, 1986; Isabella, 1993; Lyons-Ruth, Connell, Zoll, & Stahl, 1987; Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996). Overall, Meins et al. (2012) is a high quality study, benefitting from a large sample size, multi-method design and thorough reporting of results. It was given a maximum QualSyst (Kmet et al., 2004) rating of 1.00.

Meins et al.'s (2012) study suggests that it is what caregivers say in response to their infants, rather than what they do, which determines subsequent attachment security. While Meins et al.'s (2001) study had predicted that none of the behavioural indices of mind-mindedness (i.e. response to infant gaze, response to infant object-directed activity, imitation, encouragement of autonomy) were predictors of attachment security, the possibility remained that a measure which includes *both* mind-minded behaviour and mind-related comments could be predictive of later attachment. In light of the Meins et al.'s (2012) findings, Elizabeth Meins (2013) reanalysed Meins et al.'s (2001) data, using the same logistic regression employed in that study, in order to investigate whether a) appropriate and non-attuned comments independently predicted attachment security and b) a composite score involving both behavioural and speech-based indices of mind-mindedness also predicted attachment security, and succeeded

in replicating the pattern of findings of the 2012 study in a separate sample. The two indices of mind-mindedness were the only variables to predict dichotomous (secure/insecure) attachment, with non-attuned comments (Wald = 7.06, $p < .001$, $R^2 = .17$) being a stronger predictor than appropriate comments (Wald = 4.70, $p < .05$, $R^2 = .09$), and secure-group mothers making fewer non-attuned comments ($M = 0.81$, $SD = 1.35$) than their insecure-group counterparts ($M = 3.13$, $SD = 2.63$). In order to investigate the second research question, she reran the analysis, this time replacing appropriate mind-related comments with a composite score combining three of the original five indices of mind-mindedness (appropriate mind-related comments, response to infant gaze, and response to infant object-directed activity) found to be robustly positively correlated with each other in the 2001 study. Only non-attuned comments predicted dichotomous attachment security (Wald = 7.50, $p < .01$, $R^2 = .21$) with all other variables, including the composite measure, failing to do so. Elizabeth Meins' (2013) reanalysis has therefore consolidated the findings of her and her colleagues' 2012 study in providing evidence for mind-mindedness as a multidimensional construct, in which the speech-based indices of appropriate mind-related comments and non-attuned comments are more successful in predicting attachment security. The study was given a QualSyst (Kmet et al., 2004) rating of .91. This is slightly lower than the rating given to Meins et al. (2001) on account of less thorough reporting of results.

Discussion

Even though research on mentalizing remains in its early stages, a growing number of longitudinal studies suggest an association between RF/mind-mindedness and infant and adult attachment security.

Overall, the quality of research and reporting of the studies included in this review was high, with 10 studies receiving a rating defined as strong (>80%) and two studies achieving a rating defined as adequate (50-70%; Lee, Packer, Tang, & Girdler, 2008). All studies found some

evidence of a relationship between mentalizing and attachment security, while three of these (Lundy, 2003; Grienenberger, et al., 2005a; Laranjo, et al., 2008) found maternal behaviour to have a mediating role in the relationship between mothers' mentalizing and subsequent infant attachment. Differences in how attachment status was classified for the purposes of analysis (e.g. autonomous/non-autonomous, secure/insecure, secure/avoidant/resistant, etc.) is likely to have contributed to variation in the strength of association reported by different studies.

The majority of longitudinal studies investigating the relationship between mentalizing and infant attachment involve mothers rather than fathers, which limits the conclusions that can be drawn about the relationship of paternal mentalizing to infant attachment status and its role in the intergenerational transmission of attachment. The evidence relating to the link between maternal mentalizing and attachment security varies greatly due to differences in how these variables, particularly those relating to mentalizing, have been operationalised.

For the purposes of this review, RF has been defined as the psychological processes underlying the capacity to mentalize, i.e. to perceive and understand oneself and others in terms of each other's mental states (Fonagy et al., 2002). However, it is not clear how closely the concept of RF relates to other similar constructs, such as mind-mindedness, defined as the mother's proclivity to treat her child as an individual with a mind, rather than as a mere creature with needs to be satisfied (Meins et al., 2001). There is currently very little research into the relationship between different concepts of mentalizing or the comparative validity and reliability of measurement instruments capturing these concepts. In the first systematic review of its kind, summarising and describing all the instruments currently available to measure mentalizing capacity and other similar constructs, Julia Schiborr and colleagues (2013) concluded that, in spite of their conceptual similarities, mentalizing constructs differ greatly in their theoretical foundations and the tools developed to assess them present highly varying levels of psychometric evaluation, availability, feasibility and content domains. Bouchard and colleagues (2008) compared RF as measured by the RF scale with two other

methods of rating mentalizing capacity from AAI transcripts, the Mental States Measure (MSRS) and the Grille de L'Elaboration Verbale de L'Affect (GEVA). Each measure emphasised three different facets of the mentalizing process, with the RF scale focusing on the understanding of relationships in terms of intentional mental models, the MSRS focusing on psychoanalytic ego-psychological and object-relational formulation of the ego's attitudes towards emotional experiences, and the GEVA measuring how words and images are linked to unprocessed affective states. Of the three measures only the RF scale was found to be related to attachment status. Falkenström and colleagues (2014) compared the RF scale to a measure of mindfulness and a measure of affect consciousness and found RF to share some common variance with the former but, contrary to expectations, not with the latter, offering the possible explanation that the high end of the affect consciousness scale measures a mature capacity for mentalized affective experience, while RF acts mainly as a buffer against trauma and adversity. So far no study has explored in extensive detail the relationship between the two mentalizing constructs that have been shown to be most strongly associated with attachment status, namely RF and mind-mindedness. In their study reviewed here, Arnott and Meins (2007) propose that RF and mind-mindedness interact in unexpected ways and may be distinct but related phenomena. Further research, however, is required to clarify the relationship between these two constructs, and how they map onto the more general theoretical concept of *mentalizing*.

A key distinction that has characterised attempts to operationalise the concept of mentalizing relates to whether it can be more accurately measured through direct observation of infant-caregiver behaviour or by recording caregivers' representations of their mentalizing abilities. Meins et al. (2001, 2012) aimed to assess the quality of the parents' thinking about the child in real time by observing mothers' verbalisations to their infants during the course of an 'online' interaction. In Nina Koren-Karie and colleagues' cross-sectional study (2002) of mothers' 'insightfulness' into their child's internal experience, mothers provided 'offline' commentaries on their own previously recorded playful interaction with their child. Fonagy

and Target (2005) suggest that the 'episodic' nature of such measures, designed to give an indication of the parent's quality of mentalization at a particular moment of interaction, are not able to measure the extent to which mothers mentalize the *nature* of their relationship with their child, i.e. their idea of their relationship with their idea of their child. Instead, they argue that a more representational measure, such as the PDI, in reflecting many hundreds of interactions between infant and caregiver, provides a more stable and accurate cross-situational index of individual differences in mentalizing and is more robust to situational biases than laboratory-based or brief home-based observations, which have the potential to distort or unduly enhance or inhibit mentalization. So far, research has not fully investigated how parents' mentalizing during interaction with their child relates to these more representational measures of attachment. Arnott and Meins' (2007) study provides some evidence in support of an association between the two, but the sample size of the study was very small, limiting the conclusions that can be drawn from it. Investigating these relationships more fully therefore represents another direction for future research.

There are a number of problems with RF as an empirical measure. The RF scale is primarily rated from the AAI or other similar interviews. These are both expensive and time-consuming, limiting their use to research settings. As a result, there have been efforts to find an alternative, more cost-effective and less time-consuming measure of RF, such as the Brief Reflective Function Interview (BRFI; Rudden, Milrod, & Target, 2005; Rutimann & Meehan, 2012) and the RF Scale (RFRS; Meehan, Levy, Reynoso, Hill, & Clarkin, 2009). These have shown encouraging results regarding validity and reliability, although more research is needed to refine these measures. A brief version of the RF scale, the Reflective Function Questionnaire (RF-Q; Fonagy & Ghinai, 2008) is also in the process of being validated. The RF scale has been criticised for generating a single, global score, which does not do justice to the complexity of the mentalizing process. Other scales (Meins et al., 2012; Meins, 2013; Demers et al., 2010) have attempted to address this complexity by investigating the appropriateness and valence of mentalizing discourse.

The studies reviewed here suggest that mentalizing alone does not fully account for the intergenerational transmission of attachment. However, a number of findings (Grienenberger et al., 2005a; Laranjo et al., 2008; Lundy, 2003) suggest that further research involving mentalizing *and* maternal behaviour (i.e. the behavioural manifestations of mentalizing in the mother-infant relationship) might succeed in filling the transmission gap. Fonagy and Target (2005) have suggested that the secure attachment history of the mother enables her to explore her own mind, which in turn facilitates a similar openness towards the mental state of her young child, but not to an extent that precludes a genuine awareness of her child's status as an independent being. This awareness helps to reduce the frequency of behaviours that might serve to undermine the child's natural progression towards developing a sense of its own mental self through the dialectic of its interactions with the mother. Therefore maternal attachment is translated *through mentalizing* into behaviour which directly influences the child's attachment security. Even though certain studies (Meins et al., 2012; Meins, 2013) have shown the speech-based dimensions of mind-mindedness to be more predictive of attachment security than the behavioural dimensions of mind-mindedness, the possibility remains that the behavioural manifestations of the mentalizing process do play a role in mediating the transmission gap and that these have hitherto been inadequately operationalised. *Parental embodied mentalization* (Shai & Belsky, 2011), a new conceptualisation of infant-caregiver interaction focusing on caregivers' kinaesthetic behaviours as a marker of their capacity to mentalize, has been proposed as a possible behavioural index of mind-mindedness (Meins, 2013). A potentially profitable area of future research might be the further development of behavioural constructs of RF. It needs to be said, however, that while mothers' capacity to mentalize is clearly significant, it is likely that other factors which are not addressed in this review, such as child temperament and developmental age, also have an influential role in fostering infant attachment security (Sharp & Fonagy, 2008).

All of the studies in this review used Western, predominantly middle class, samples. A number of studies (for a review, see Van Ijzendoorn & Sagi-Schwartz, 2008) provide some support for the universality of attachment, although there appear to be significant cultural and contextual factors which influence attachment security and parents' attachment representations (e.g. Sagi, van Ijzendoorn, Scharf, Joels, Koren-Karie, & Aviezer, 1997). More culturally representative research is needed to elucidate the roles of RF and attachment across different populations.

Clinical implications

Mentalizing appears to be an important construct related to secure attachment, the formation of which has been linked to a broad range of positive developmental outcomes (Arend, Gove, & Sroufe, 1979; Bohlin, Hagekull, & Rydell, 2000; Booth, Rose-Krasnor, & Rubin, 1991; Matas, Arend, & Sroufe, 1978; Sroufe, 1983).

Fonagy (2004) has argued that early attachment relationships have a significant impact on the subsequent development of the mental processes which underlie personality and psychopathology. A secure attachment relationship can be described as one in which the child, on the basis their experience, is able to assume that their mental state will be appropriately reflected on and responded to accurately by their primary caregiver (Fonagy, 1991b). The child's confidence in this assumption will facilitate their exploration of the world of intentions, feelings and beliefs. Secure attachment therefore provides a safe environment for such exploration, aiding the development of the child's capacity to reflect both on their own mental world or those of others. This sense of safety, evolving as part of an initially shared mental process between infant and caregiver, will subsequently stay with the child as a relatively stable aspect of mental functioning throughout the lifespan (Fonagy, 1991b). A child's early attachment relationships are therefore crucial because they determine the quality of subsequent relationships, equipping the individual with a mental processing system which

is able to generate mental representations, and therefore representations of relationships (Fonagy, 2004).

In support of this proposal, research has shown that mothers' effective mentalizing in the first year of life predicts children's mentalizing abilities throughout the preschool years (Laranjo, Bernier, Meins, & Carlson, 2010; Meins, Fernyhough, Arnott, Leekam, & de Rosnay, 2013; Meins et al., 2003), highlighting how differences in the quality of early infant–caregiver interaction are able to predict core developmental abilities beyond the establishment of the attachment relationship. Children of parents who have been shown to be more effective mentalizers tend to have better perspective-taking abilities (Meins et al., 1998), which play an important role in young children's ability to establish and maintain friendships, which are important for children's social adaptation (Hartup, 1992; Katz & McClellan, 1997). Failure to establish friendships during early childhood has been shown to predict subsequent problems related to self-esteem, academic motivation and mental health (Hartup, 1992).

Slade et al. (2005a) linked their finding that RF supports the regulation of emotions to Winnicott's (1960) concept of good enough mothering, suggesting that RF serves a modulating function once the mother-infant relationship has become dysregulated. Through her capacity to mentalize, the 'good enough' mother is better able to give vocal and physical expression to her child's inner experience, making these experiences real for the child through a mirroring process, thereby making a dysregulated state more manageable. Similarly, Grienenberger et al. (2005a) linked the concept of mentalizing to Bion's (1962) concept of containment, proposing that mentalizing serves as a buffer against breakdowns in emotional regulation during times of stress and that mothers with high RF have a greater capacity to regulate their child's fear and to interact with their child without frightening or disorganising them. These suggestions that infant security may be enhanced by modulating the frightening or disruptive behaviour of caregivers through improving their understanding of their child's mental states has obvious implications for early intervention. If parental mentalizing is key to

a child's socio-emotional adaptation, then clinical interventions need to address the fostering of the development of this capacity in parents (Slade et al., 2005a).

Parenting represents a challenge to parents, not only in attempting to understand the child, but also in terms of self-reflection. Where the birth of a child can lead some parents to a healthy reorganization of previously established representations of self and others, other parents struggle to meet the psychological demands of parenthood, leading to great discrepancies in the degree to which parent-child interactions become dominated by the emotional needs of the parent as opposed to the child (Grienenberger et al., 2005a). Attempts to modify parental behaviour have been variously successful (Stern, 1994), principally because one of the most common approaches - a focus on parenting skills - has been shown to be largely ineffective. By contrast, a focus on mentalizing aims to help parents to read the intentions and mental states of their child, i.e. to *think* about, rather than change, their behaviour (although behavioural changes may proceed from changes in thinking and representation).

It has been tentatively suggested that RF bridges the gap between behaviour and representation (Slade et al., 2005a). This might help to explain the success of certain mother-infant interventions, such as infant–parent psychotherapy, which are geared towards changing maternal representations of the child by helping mothers to see their child's internal life as separate from her own. In line with this thinking, a range of ''mentalization based'' treatments have recently been developed (Bateman & Fonagy, 2004), with a specific focus on facilitating and enhancing reflective functioning in parents and thus transforming developing relationships between mothers and their infants (Grienenberger, Popek, Stein, Solow, Morrow, Levine, Alexander, Ibarra, Wilson, Thompson, & Lehman, 2005b; Slade, 2002; Slade, Sadler, de Dios-Kenn, Webb, Currier-Ezepchick, & Mayes, 2005b; Slade, Sadler, &Mayes, 2005c; Baradon, Broughton, Gibbs, James, Joyce, & Woodhead, 2005).

In discussing the implications of RF for adult psychotherapy, Fonagy (2000) suggests that the principal aim of treatment is to help the patient to find meaning in their own and other's behaviour. The therapist's clinical practice should be therefore be guided by an attempt to help patients to locate themselves within the mind of the therapist as an intentional being, i.e. experience the therapist as someone who thinks about them as a thinking and feeling person. Internalisation by the patient of the therapist's interest in their psychological states may then facilitate a curiosity towards their own internal processes. Similarly, a parent-infant or child psychotherapist may show the same curiosity regarding the mental states of the child patient. Parent and therapist may then work together, within the context of a safe and containing relationship, to understand the child's thoughts, feelings, motivations, intentions, and behaviours. The therapeutic process itself, in addition to any insights gained from the therapy, can therefore be integrated into the parent's personality to be utilised in their relationship with their child (Grienenberger et al, 2005b). Other techniques, such as video feedback, could be used to assist parents while they work on paying greater attention to their child's mental life by facilitating more in depth reflection on the child's internal states that are revealed through their behaviour.

Sable (2007) has highlighted the critical function of positive affects such as joy, comfort, and contentment in human attachment experiences, proposing that the therapist's role should to help adults to interpret their past experiences in terms of new perspectives and find a positive outlook on these experiences. Such work could help parents with difficult attachment histories to reframe their past experiences with attachment figures and develop the capacity to notice and to draw their child's attention to positive elements emerging from their personality.

Over two decades have passed since Fonagy et al.'s (1991b) finding of a link between attachment status and reflective functioning. Research since has built on and elaborated on these findings, which has resulted in improved methods for assessing attachment security and mentalizing as well as an improved understanding of the predictive value of parental

mentalizing capacity on attachment relationships. It is difficult, however, to ignore the fact that research in this field remains very much governed by a debate about how to define and operationalise the mentalizing construct. Given the profound implications for clinical intervention of the finding of a robust link between mentalizing capacity and attachment security, this debate seems, at best, a trifling distraction, at worst, a failure to maximise the potential of such findings to make a real difference to the lives of people with attachment and mentalizing problems. Why progress in this area has been so slow is open to speculation. The bulk of research in this area has been concerned with the theoretical or methodological aspects of the relationship between attachment security and mentalizing. While firm theoretical and methodological foundations for these constructs are a necessary prerequisite for examining their clinical utility, it might be pertinent to ask whether the balance of research in this area has been weighted too heavily in favour of academic rather than clinical endeavours. The semantic distinction between RF and mind-mindedness is a very subtle one and the different terminology reflects little more than contrasting approaches to measuring essentially the same construct. Research into the phenomena of attachment and reflective functioning stands to benefit from making greater use of a range of methods in order better to understand which methods are effective in operationalising these constructs. So far, researchers have seemed generally content to assert on the basis of theoretical considerations, rather than sufficiently robust empirical comparisons of contrasting methodologies, that their choice of methodology is the most appropriate one. Greater dialogue and collaboration between advocates of competing constructs may lead to increased consensus among researchers regarding whether mentalizing capacity can be more accurately measured through 'online' observation of live interactions between infants and caregivers or by recording caregivers' representations, and the degree to which these competing constructs may complement each other or should remain mutually exclusive. Until such questions are adequately addressed, the potential for the literature to inform clinical practice is likely to remain hampered.

Limitations of the literature review

The findings of this review need to be considered in the context of a number of limitations. The studies which have been reported are those which were identified through using a narrow range of search terms and which subsequently met strict inclusion criteria. In any review of this kind, search terms and eligibility criteria are sources of bias which are likely to influence the reporting of results. For example, the (still broadening) range of terms used to refer to the mentalizing process between caregiver and infant may have led to certain relevant studies being excluded from this review. The impossibility of documenting within the scope of a word-limited review the full range of approaches to operationalising the mentalizing process (e.g. as a speech-based or behavioural measure, as a representational measure incorporating autobiographical memories or as a real time 'online' interactional process) mean that it is inevitable that certain approaches are privileged over others. The reviewer has therefore made certain choices, one of which has been to focus in more detail on those search terms most commonly used by researchers in this field (e.g. reflective function, mentalizing, mind-mindedness) and to exclude overlapping but distinct search terms (e.g. maternal sensitivity, affect consciousness, theory of mind). Another choice, that of limiting the studies to those employing longitudinal designs, has meant that other relevant studies have been excluded.

In summary, there is a growing and compelling evidence for (1) a relationship between mothers' *adult* RF (i.e. their ability to reflect on their own childhood experiences of being parented) and their *parental* RF (i.e. their ability to reflect on their relationship with their children), and (2) a relationship between mothers' ability to see their children as intentional beings and to reflect on their internal states and the security of the attachment relationship between them. This evidence is limited by the relatively small number of studies, the small sample sizes of most of these studies (particularly for participants classified as insecure or disorganised) and, perhaps most significantly, theoretical and methodological differences between studies relating to how to define and measure the mentalizing process.

References

Aber, J., Slade, A., Berger, B., Bresgi, I., & Kaplan, M. (1985). *The parent development interview.* Unpublished manuscript.

Ainsworth, M. (1969). Maternal sensitivity scales. *Power, 6,* 1379-1388.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1971). Individual differences in Strange Situation behaviour of one year olds. In H. R. Schaffer (Ed.), *The origins of human social relations*. New York: Academic Press.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1974). Infant-mother attachment and social development: Socialisation as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), *The introduction of the child into a social world*. London: Cambridge University Press.

Ainsworth, M. D. S., & Wittig, B. A. (1969). *Strange Situation*. London, England: Methuen.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: Assessed in the strange situation and at home*. Hillsdale, NJ: Erlbaum.

Arend, R., Gove, F., & Sroufe, L. A. (1979). Continuity and individual adaptation from infancy to kindergarten: A predictive study of ego resiliency and curiosity in preschoolers. *Child Development*, *50*, 950–959.

Arnott, B., & Meins, E. (2007). Links among antenatal attachment representations, postnatal mind-mindedness, and infant attachment security: A preliminary study of mothers and fathers. *Bulletin of the Menninger Clinic, 71*(2), 132-149.

Baradon, T., Broughton, C., Gibbs, I., James, J., Joyce, A., & Woodhead, J. (2005). *The practice of psychoanalytic parent – infant psychotherapy*. London: Routledge.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Bateman, A. W., & Fonagy, P. (2004). *Psychotherapy for borderline personality disorders: Mentalization based treatment.* Oxford: Oxford University Press.

Benoit, D., Parker, K. C. H., & Zeanah, C. H. (1997). Mothers' representations of their infants assessed prenatally: Stability and association with infants' attachment classifications. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 38*(3), 307-313.

Bion, W. R. (1962). A theory of thinking. *International Journal of Psychoanalysis, 43*, 306 – 310.

Bohlin, G., Hagekull, B., & Rydell, A. M. (2000). Attachment and social functioning: A longitudinal study from infancy to middle childhood. *Social Development*, *9*, 24–39.

Booth, C. L., Rose-Krasnor, L.,&Rubin, K. H. (1991). Relating preschoolers' social competence and their mothers' parenting behaviors to early attachment security and high-risk Status. *Journal of Social and Personal Relationships*, *8*, 363–382.

Bouchard, M. A., Target, M., Lecours, S., Fonagy, P., Tremblay, L. M., Schachter, A., & Stein, H. (2008). Mentalization in Adult Attachment Narratives: Reflective Functioning, Mental States, and Affect Elaboration Compared. *Psychoanalytic Psychology, 25*(1), 47-66.

Bowlby, J. (1969/2005). *A Secure Base*. New York: Routledge Classics.

Bowlby, J. (1980). *Attachment and loss*. New York, NY: Basic Books; US.

Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry, 52*(4), 664-678.

Bronfman, E., Parsons, E., & Lyons-Ruth, K. (1999). Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE): Manual for coding disrupted affective communication. *Unpublished manuscript. Cambridge, MA: Harvard Medical School*.

Carlson, E. A., & Sroufe, L. A. (1995). Contribution of attachment theory to developmental psychopathology *Developmental psychopathology, Vol 1: Theory and methods* (pp. 581-617). Oxford, England: John Wiley & Sons; England.

Cho, M. K., & Bero, L. A. (1994a). Instruments for assessing the quality of drug studies published in the medical literature. *Journal of the American Medical Association, 272*(2), 101-104.

Daniel, S. (2006). Adult attachment patterns and individual psychotherapy: A review. *Clinical psychology review, 26*(8), 968-984.

De Wolff, M. S., & van Ijzendoorn, M. H. (1997a). Sensitivity and attachment: a meta-analysis on parental antecedents of infant attachment. *Child development, 68*(4), 571-591.

Demers, I., Bernier, A., Tarabulsy, G. M., & Provost, M. A. (2010). Maternal and child characteristics as antecedents of maternal mind-mindedness. *Infant Mental Health Journal, 31*(1), 94-112.

Falkenstrom, F., Solbakken, O. A., Moller, C., Lech, B., Sandell, R., & Holmqvist, R. (2014). Reflective functioning, affect consciousness, and mindfulness: Are these different functions? *Psychoanalytic Psychology, 31*(1), 26-40.

Fonagy, P. (2001). The human genome and the representational world: The role of early mother-infant interaction in creating an interpersonal interpretive mechanism. *Bulletin of the Menninger Clinic, 65*(3), 427-448.

Fonagy, P. (2000). Attachment and borderline personality disorder. *Journal of the American Psychoanalytic Association, 48*, 1129 – 1146.

Fonagy, P. (2004). *Attachment theory and psychoanalysis*. London: Karnac Books.

Fonagy, P. (2008). The mentalization-focused approach to social development. In J. Allen & P. Fonagy (Eds.), *Mentalization: The theoretical considerations, research findings, and clinical implications* (pp. 53-100): Chichester: John Wiley & Sons.

Fonagy, P., & Bateman, A. (2007). Mentalizing and borderline personality disorder. *Journal of Mental Health, 16*(1), 83-101.

Fonagy, P., & Bateman, A. (2008). The development of borderline personality disorder-a mentalizing model. *Journal of Personality Disorders, 22*(1), 4-21.

Fonagy, P., Gergely, G., Jurist, E., & Target, M. (2002). *Affect regulation, mentalization, and the development of the self*: Other Press, New York.

Fonagy, P. & Ghinai, R.A. (2008). *A self-report measure of mentalizing development and preliminary test of reliability and validity of the Reflective Function Questionnaire (RFQ).* Unpublished manuscript. London: University College.

Fonagy, P., Steele, M., Moran, G., Steele, H., & Higgitt, A. (1993). Measuring the ghost in the nursery: An empirical study of the relation between parents' mental representations of childhood experiences and their infants' security of attachment. *Journal of the American Psychoanalytic Association, 41*(4), 957-989.

Fonagy, P., Steele, H., & Steele, M. (1991a). Maternal representations of attachment during pregnancy predict the organization of infant-mother attachment at one year of age. *Child Development, 62*(5), 891-905.

Fonagy, P., Steele, M., Steele, H., Moran, G. S., & Higgitt, A. C. (1991b). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal, 12*(3), 201-218.

Fonagy, P., Steele, M., Steele, H., Higgitt, A., & Target, M. (1994). The Emanuel Miller Memorial Lecture 1992. The theory and practice of resilience. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 35*(2), 231-257.

Fonagy, P., & Target, M. (2001). Translation of Mentalization and the changing aims of child psychoanalysis (1998). Psychoanalytic Dialogues, 8, 87-114. Translated in. *Kinderanalyse*, *9*, 229-244.

Fonagy, P., & Target, M. (2005). Bridging the transmission gap: an end to an important mystery of attachment research? *Attachment & Human Development, 7*(3), 333.

Fonagy, P., Target, M., Steele, H., & Steele, M. (1998). *Reflective functioning manual (version 5) for application to adult attachment interviews*: Unpublished manuscript. University College London.

Fraiberg, S., Adelson, E., & Shapiro, V. (1987). Ghosts in the nursery: a psychoanalytic approach to the problems of impaired infant-mother relationships. In S. Fraiberg (Ed.), *Selected Writings of Selma Fraiberg*: Ohio State University.

George, C., Kaplan, N., & Main, M. (1987). *The adult attachment interview*. Unpublished manuscript. University of California, Berkeley.

Goldberg, S., Perrotta, M., Minde, K., & Corter, C. (1986). Maternal behavior and attachment in low-birth-weight twins and singletons. *Child Development, 57*(1), 34-46.

Grienenberger, J. F., Kelly, K., & Slade, A. (2005a). Maternal reflective functioning, mother-infant affective communication, and infant attachment: Exploring the link between mental states and observed caregiving behavior in the intergenerational transmission of attachment. *Attachment & Human Development, 7*(3), 299-311.

Grienenberger, J., Popek, P., Stein, S., Solow, J., Morrow, M., Levine, N., Alexander, D., Ibarra, M., Wilson, A., Thompson, J., & Lehman, J. (2005b). *Reflective Parenting Program Workshop Training Manual*. Unpublished manual, Wright Institute Los Angeles, Los Angeles, CA.

Hartup, W. W. (1992). Friendships and their developmental significance. In H. McGurk (Ed.), *Childhood social development: Contemporary perspectives* (pp. 175–206). Hove, UK: Erlbaum.

Hesse, E. (2008). The adult attachment interview. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 395-433). New York: The Guilford Press.

Isabella, R. A., Belsky, J., & Von Eye, A. (1989) Origins of infant-mother attachment: An examination of interactional synchrony during the infant's first year. *Developmental Psychology, 25, 12-21.*

Katz, L. G., & McClellan, D. E. (1997). *Fostering children's social competence: The teacher's role*. Washington, DC: National Association for the Education of Young Children.

Katznelson, H. (2014). Reflective functioning: A review. *Clinical Psychology Review*, *34*(2), 107-117.

Kmet, L. M., Lee, R. C., & Cook, L. S. (2004). *Standard quality assessment criteria for evaluating primary research papers from a variety of fields*: Alberta Heritage Foundation for Medical Research.

Koren-Karie, N., Dolev, S., Sher, E., & Etzion-Carasso, A. (2002). Mother's insightfulness regarding their infants' internal experience: Relations with maternal sensitivity and infant attachment. *Developmental Psychology, 38*(4), 534.

Laranjo, J., Bernier, A., & Meins, E. (2008). Associations between maternal mindmindedness and infant attachment security: Investigating the mediating role of maternal sensitivity. *Infant Behavior and Development, 31*(4), 688-695.

Laranjo, J., Bernier, A., Meins, E., & Carlson, S. M. (2010). Early manifestations of children's theory of mind: The roles of maternal mind-mindedness and infant security of attachment. *Infancy, 15*(3), 300-323.

Lee, L., Packer, T. L., Tang, S. H., & Girdler, S. (2008). Self-management education programs for age-related macular degeneration: A systematic review. *Australasian Journal on Ageing, 27*(4), 170-176.

Lundy, B. L. (2002). Paternal socio-psychological factors and infant attachment: The mediating role of synchrony in father-infant interactions. *Infant Behavior & Development, 25*(2), 221-236.

Lundy, B. L. (2003). Father-and mother-infant face-to-face interactions: Differences in mind-related comments and infant attachment? *Infant Behavior and Development, 26*(2), 200-212.

Lyons-Ruth, K., Bronfman, E., & Atwood, G. (1999). A relational diathesis model of hostile-helpless states of mind: Expressions in mother-infant interaction. In J. Solomon & C. George (Eds.), *Attachment disorganization* (pp. 33-70). New York, NY: Guilford Press; US.

Lyons-Ruth, K., Bronfman, E., & Parsons, E. (1999). Atypical attachment in infancy and early childhood among children at developmental risk. IV. Maternal frightened, frightening, or atypical behavior and disorganized infant attachment patterns.

Monographs of the Society for Research in Child Development, 64(3), 67-96.

Lyons-Ruth, K., Connell, D. B., Zoll, D., & Stahl, J. (1987). Infants at social risk: Relations among infant maltreatment, maternal behavior, and infant attachment behavior. *Developmental Psychology*, *2*(2), 223-232.

Main, M. (1995). Recent studies in attachment: Overview, with selected implications for clinical work *Attachment theory: Social, developmental, and clinical perspectives* (pp. 407-474). Hillsdale, NJ: Analytic Press, Inc; US.

Main, M. (2000). The organized categories of infant, child, and adult attachment: flexible vs. inflexible attention under attachment-related stress. *Journal of the American Psychoanalytic Association, 48*(4), 1055-1096; discussion 1175-1187.

Main, M., & Goldwyn, R. (1984). *Adult attachment scoring and classification system*. Unpublished manuscript, University of California at Berkeley.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development*, 66-104.

Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized/ disoriented during the Ainsworth Strange Situation. *Attachment in the preschool years: Theory, research, and intervention, 1*, 121-160.

Matas, L., Arend, R. A., & Sroufe, L. A. (1978). Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. *Child Development*, *49*, 547–556.

Meehan, K. B., Levy, K. N., Reynoso, J. S., Hill, L. L., & Clarkin, J. F. (2009). Measuring reflective function with a multidimensional rating scale: comparison with scoring reflective function on the AAI. *Journal of the American Psychoanalytic Association, 57*(1), 208-213.

Meins, E. (1998). The effects of security of attachment and maternal attribution of meaning on children's linguistic acquisitional style. *Infant Behavior & Development, 21*(2), 237-252.

Meins, E. (1999). Sensitivity, security and internal working models: Bridging the transmission gap. *Attachment & Human Development, 1*(3), 325-342.

Meins, E. (2013). Sensitive attunement to infants' internal states: operationalizing the construct of mind-mindedness. *Attachment & Human Development, 15*(5-6), 524-544.

Meins, E., Fernyhough, C., Arnott, B., Leekam, S. R., & de Rosnay, M. (2013). Mind-mindedness and theory of mind: mediating roles of language and perspectival symbolic play. *Child Development, 84*(5), 1777-1790.

Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment at 12 months. *Journal of Child Psychology and Psychiatry, 42*(5), 637-648.

Meins, E., Fernyhough, C., de Rosnay, M., Arnott, B., Leekam, S. R., & Turner, M. (2012). Mind-mindedness as a multidimensional construct: Appropriate and nonattuned mind-related comments independently predict infant-mother attachment in a socially diverse sample. *Infancy, 17*(4), 393-415.

Meins, E., Fernyhough, C., Russell, J., & Clark-Carter, D. (1998). Security of attachment as a predictor of symbolic and mentalising abilities: A longitudinal study. *Social Development, 7*(1), 1-24.

Meins, E., Fernyhough, C., Wainwright, R., Clark- Carter, D., Das Gupta, M., Fradley, E., et al. (2003). Pathways to understanding mind: Construct validity and predictive validity of maternal mind-mindedness. *Child Development, 74*, 1194–1211.

Oppenheim, D., Koren-Karie, N., & Sagi, A. (2001). Mothers' empathic understanding of their preschoolers' internal experience: Relations with early attachment. *International Journal of Behavioral Development, 25*(1), 16-26.

Pederson, D. R., & Moran, G. (1995). A categorical description of infant-mother relationships in the home and its relation to Q-sort measures of infant-mother interaction. *Monographs of the Society for Research in Child Development, 60*(2-3), 111-132.

Pederson, D. R., Moran, G., Sitko, C., Campbell, K., Ghesquire, K., & Acton, H. (1990). Maternal Sensitivity and the Security of Infant-Mother Attachment: A Q-Sort Study. *Child Development, 61*(6), 1974-1983.

Rudden M.G., Milrod B., Target M. *(*2005*). The Brief Reflective Functioning Interview.* New York*:* Weill Cornell Medical College.

Rutimann, D. D., & Meehan, K. B. (2012). Validity of a Brief Interview for Assessing Reflective Function. *Journal of the American Psychoanalytic Association, 60*(3), 577-589.

Sable, P. (2007). Accentuating the positive in adult attachments. *Attachment & Human Development*, 9(4), 361.374.

Sagi, A., van IJzendoorn, M. H., Scharf, M., Joels, T., Koren-Karie, N., & Aviezer, O. M. O. (1997). Ecological constraints for intergenerational transmission of attachment. *International Journal of Behavioral Development, 20*(2), 287-299.

Schiborr, J., Lotzin A., Romer G., Schulte-Markwort, M., & Ramsauer, B. (2013). Child-focused maternal mentalization: A systematic review of measurement tools from birth to three. *Measurement, 46*(8), 2492-2509.

Seifer, R., Schiller, M., Sameroff, A. J., Resnick, S., & Riordan, K. (1996). Attachment, maternal sensitivity, and infant temperament during the first year of life. *Developmental Psychology, 32*(1), 12-25.

Shai, D., & Belsky, J. (2011). When words just won't do: Introducing parental embodied mentalizing. *Child Development Perspectives, 5*, 173–180.

Sharp, C., & Fonagy, P. (2008). The parent's capacity to treat the child as a psychological agent: Constructs, measures and implications for developmental psychopathology. *Social Development, 17*(3), 737-754.

Slade, A. (2000). The development and organization of attachment: Implications for psychoanalysis. *Journal of the American Psychoanalytic Association, 48*(4), 1147-1174.

Slade, A. (2002). Keeping the baby in mind: A critical factor in perinatal mental health. *Zero to Three, June/July*, 10 – 16.

Slade, A. (2004). The move from categories to process: Attachment phenomena and clinical evaluation. *Infant Mental Health Journal, 25*(4), 269-283.

Slade, A., Bernbach, E., Grienenberger, J., Levy, D., & Locker, A. (2004). Addendum to Fonagy, Target, Steele & Steele reflective functioning scoring manual for use with the Parent Development Interview. *Unpublished manuscript. New York, NY: The City College and Graduate Center of the City University of New York*.

Slade, A., Grienenberger, J., Bernbach, E., Levy, D., & Locker, A. (2005a). Maternal reflective functioning, attachment, and the transmission gap: A preliminary study. *Attachment & Human Development, 7*(3), 283-298.

Slade, A., Sadler, L. S., de Dios-Kenn, C., Webb, D., Currier-Ezepchick, J., & Mayes, L. (2005b). Minding the Baby: A reflective parenting program. Psychoanalytic Study of the Child.

Slade, A., Sadler, L. S., & Mayes, L. (2005c). Minding the baby: Enhancing reflective functioning in a nursing/ mental health home visiting program. In L. Berlin, Y. Ziv, L. Amaya-Jackson, & E. M. Cummings (Eds.), *Enhancing early attachment: Theory, research, intervention, and policy* (pp. 152 – 177). New York: Guilford.

Solomon, J., & George, C. (2008). The measurement of attachment security and related constructs in infancy and early childhood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment*. New York: Guilford Press.

Sroufe, L. A. (1983). Infant–caregiver attachment and patterns of adaptation in preschool: The roots of maladaptation and competence. In M. Perlmutter (Ed.), *Minnesota Symposium in Child Psychology* (Vol. 16, pp. 41–81).

Steele, M., Steele, H., Croft, C., & Fonagy, P. (1999). Infant mother attachment at one year predicts children's understanding of mixed emotions at 6 years. *Social Development, 8*, 161–178.

Stern, D. N. (1994). *The motherhood constellation*. New York: Basic Books.

Timmer, A., Sutherland, L. R., & Hilsden, R. J. (2003). Development and evaluation of a quality score for abstracts. *BMC Medical Research Methodology, 3*(1), 2.

Van Ijzendoorn, M. (1995). Adult attachment representations, parental responsiveness, and infant attachment: a meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin, 117*(3), 387.

Van Ijzendoorn, M., Vereijken, C., Bakermans-Kranenburg, M., & Riksen-Walraven, M. (2004). Assessing attachment security with the attachment Q sort: Meta-analytic evidence for the validity of the observer AQS. *Child Development, 75*(4), 1188-1213.

Van Ijzendoorn, M. H., & Sagi-Schwartz, A. (2008). Cross-cultural patterns of attachment: Universal and contextual dimensions. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment, theory, research and clinical applications*. New York: The Guilford Press.

Van Ijzendoorn, M. H., Vereijken, C. M. J. L., Bakermans-Kranenburg, M. J., & Riksen-Walraven, J. M. (2004). Assessing attachment security with the attachment Q sort: Meta-analytic evidence for the validity of the observer AQS. *Child Development, 75*(4), 1188-1213.

Winnicott, D. W. (1960). Ego distortion in terms of true and false self. In *The maturational processes and the facilitating environment* (1965) (pp. 140 – 152). New York: International Universities Press.

Zeanah, C. H., & Benoit, D. (1995). Clinical applications of a parent perception interview in infant mental health. *Child and Adolescent Psychiatric Clinics of North America, 4*(3), 539-554.

Part 2: Empirical Study

An investigation of the role of reflective functioning in mediating the relationship

between attachment style and psychopathology

Abstract

Aims: This study investigated the role of reflective functioning (RF) in mediating the relationship between attachment style and psychopathology.

Method: Individuals with and without a diagnosis of personality disorder ($N = 185$) were compared in attachment style, RF, structural integration and general psychopathology. The scale reliability and criterion validity of a potential measure of RF, the Operationalized Psychodynamic Diagnosis Structure Questionnaire (OPD-SQ), was examined. Participants' responses were analysed in order to investigate group differences and the extent to which RF mediates attachment-related differences in psychopathology.

Results: Group comparisons showed unexpected findings for RF and attachment style. RF was shown to mediate attachment-related differences in psychopathology in the total and non-clinical samples only.

Conclusion: Conclusions are compromised by limitations of the self-report questionnaires used to measure attachment style and RF. The study would benefit from replication with a broader range of measures, using a longitudinal design and with less heterogeneous clinical and non-clinical samples.

Introduction

During the development process of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013), the DSM–5 Work Group on Personality and Personality Disorders drafted a number of proposed revisions that would have significantly altered the classification system for personality disorders (PD). These proposals were motivated by concerns over the unclear delineation of existing diagnostic categories and their perceived failure to represent the dimensional nature of personality pathology. The proposed revisions were based on the broad consensus that a dimensional rating of the severity of personality dysfunction should be a central aim for the future assessment of PD (see www.dsm5.org) and suggested a hybrid dimensional-categorical model which might help to overcome the limitations outlined above. To this end, the DSM–5 work group proposed a Levels of Personality Functioning Scale (LPFS) to account for different levels of impairment in self and interpersonal domains (Morey, Berghuis, Bender, Verheul, Krueger & Skodol, 2011). Although the decision was ultimately taken to retain the DSM-IV categorical approach with the same ten personality disorders, proposed revisions which were not accepted for the main body of the DSM-5 were approved and included in a separate chapter in Section III of DSM-5, with the aim of encouraging further study on how this new methodology could be used to assess personality and diagnose personality disorders in clinical practice.

Dimensional approaches to personality dysfunction have a long tradition in psychodynamic theory and research. One such approach that has met with increasing international dissemination is provided by the Operationalized Psychodynamic Diagnosis System (OPD; OPD Taskforce 2001, 2008). The OPD is a form of multiaxial diagnostic and classification system based on psychodynamic principles, analogous to those based on other principles such as DSM-IV and ICD-10. The OPD is based on five axes: I - experience of illness and prerequisites for treatment; II - interpersonal relations; III - conflict; IV - structure; and V -

mental and psychosomatic disorders (in line with Chapter V (F) of the ICD-10). It covers different aspects of the self and interpersonal functioning, assessing the individual's experience of the illness, resources, vulnerabilities and patterns of interaction.

The OPD system provides a scale, the Levels of Structural Integration Axis (LSIA), which is highly similar to the LPFS proposed by the DSM–5 work group and which has successfully been used in clinical research and practice for more than 15 years. The LSIA measures individual differences in severity of personality dysfunction and is rooted in psychodynamic theory. Structural integration refers specifically to the dynamic organization of mental processes, which are repetitive and familiar to the individual (OPD Task Force, 2008). Well-integrated structures allow the individual to regulate and adapt to a wide range of intrapsychic and interpersonal contexts. Personality structure develops through the experiences of relationships, which establish internal images of important objects as well as images of the self. As the self develops it gains coherence, as well as the capacity to self-organise. Secure attachment contributes to the development of self-autonomy, allowing secure separation from the object and provides the grounds for the development of efficient internal self-regulating capacities (Schauenburg & Grande, 2011). The original OPD defines four levels of structural integration (high, moderate, low, disintegrated). High and moderate levels of integration are seen in individuals with a relatively autonomous self, a capacity for self-reflection and regulation, and reality-based perceptions of others. Individuals with low integration are characterized by impaired understanding of self and others, a tendency to enact internal conflicts in relationships and severely impaired self-regulation. Disintegrated levels are seen in fragmented and psychotic clients, who exhibit a central fear of merging with the object (OPD Task Force, 2008).

The OPD was originally designed as a manualised interview assessment. The interview-based version of the OPD-LSIA has been thoroughly researched and has shown good inter-rater reliability and construct validity (Chan, Rogers, Parisotto, & Biesanz, 2011). However, similar

to other interview-based procedures, the LSIA rating is time-consuming and requires intensive training to reduce rater biases (Chan et al., 2011). In addition, it does not account for patients' perspectives. As the constructs explored by the OPD-LSIA are relatively constant and accessible to awareness, the development of a time-efficient self-report measure was seen as an ideal solution. In recent years a self-report measure based on the OPD inventory has been developed in Germany (Ehrenthal, Dinger, Horsch, Komo-Lang, Klinkerfuß, Grande & Schauenburg, 2012). The German version of the OPD Structure Questionnaire (OPD-SQ) has been shown to differentiate between healthy and clinical populations, as well as between different mental health problems which present with varied personality disorders. Ehrenthal and colleagues (2012) have also shown it to highly correlate with personality and attachment measures. Since then, the manual has been translated into many languages and is widely used in China, Italy, Spain, Chile, and Hungary. The OPD-SQ has recently been translated to English using a comprehensive and collaborative translation procedure referred to as the 'committee approach'. This is generally the recommended procedure for survey translations and is designed to ensure a translation of the highest quality.

Many of the self and interpersonal functions that have been identified by the Personality Disorder Work Group are identified by the OPD system and therefore operationalised in the OPD-SQ. Therefore this measure has the potential to become a valuable tool in the development and validation of the LPFS (Zimmerman, Ehrenthal, Cierpka, Schauenburg, Doering & Benecke, 2012). For example, showing that clinicians can reliably apply a highly similar scale to clinical interview material strengthens the empirical base of the proposed LPFS. Furthermore, the OPD–LSIA could serve as a standard of comparison for assessing the comprehensiveness of both the severity dimension and the content domains of the LPFS. The fact that the OPD-SQ has not been available in English may have kept this otherwise potentially valuable tool from being used by the DSM–5 Work Group in their review of clinician-rated measures of personality dysfunction (Bender, Morey, & Skodol 2011).

The concept of structural integration, with its emphasis on the importance of the dynamic organisation of mental processes to the structure and development of personality, is very closely related to the concept of reflective functioning (RF; Fonagy & Target, 1997). RF is a basic component of psychic structure and refers to the psychological processes underlying the capacity to mentalize, i.e. perceive and understand oneself and others in terms of mental states (Fonagy, Gergely, Jurist & Target, 2002). Over and above introspection and empathy, RF encompasses the ability to create sense and meaning (Fonagy et al., 2002). It enables the person in conflict situations to become conscious of his or her own intentions, wishes, thoughts and feelings, and to perceive the other in the relationship as a being with intentions and feelings. It is therefore a pivotal function in enabling the individual autonomy, self-reflection, self-regulation, and reality-based object representations which typify individuals with higher levels of structural integration. Rather than a conscious attempt to think about inner states, RF tends to be an implicit process, working at the level of procedural memory, which shapes the internal representations of the partner in the relationship (Fonagy, 1998). One study (Müller, Kaufhold, Overbeck, & Grabhorn, 2006) found a significant correlation between the OPD structure axis and the Reflective Functioning Scale (RF Scale) developed by Fonagy and coworkers (Fonagy, Target, Steele & Steele, 1998) in a sample of 24 (female) patients. Impaired RF has been shown to be a risk factor for increased psychopathology and difficulties in adult functioning (Fonagy, Leigh, Steele, Steele, Kennedy, Mattoon, et al., 1996; Bateman & Fonagy, 2008).

RF is closely linked to attachment security, which has been shown to be a good predictor of metacognitive capacity in the domains of memory, comprehension and communication (Moss, Parent, & Gosselin 1995) and in belief-desire reasoning in young children (Fonagy, Redfern, & Charman, 1997). The acquisition of RF depends on opportunities available to the child in early life to observe and explore the mind of its primary caregiver. The caregiver's accurate understanding of the child's mental states, moderated by indications that the adult is able to contain and manage the child's distress, underpins the child's capacity to mentalize its

own and others' mental states and helps to foster secure attachment. The securely attached infant feels safe in thinking about the mental states of its caregiver. In contrast, infants with an avoidant attachment style shun the mental state of the other, while infants with a resistant style focus disproportionately on their own mental states at the expense of others'. Infants with a disorganized attachment style can appear hypersensitive to the caregiver's mental states yet fail to generalize this to their own mental state (self-organisation), which remains disregulated and incoherent (Fonagy, 2004). A number of studies have shown that attachment disorganisation in children is associated with the development of externalising disorders (see Lyons-Ruth & Jacobvitz, 1999, for a review), deficits in the capacity to self-regulate anxiety (Siegel, 1999), and deficits in social skills, which may adversely affect later functioning (Cassidy & Mohr, 2001). Insecure attachment has also been shown to be associated with internalising symptoms (Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg & Fearon, 2012), although the strength of this association is less than for disorganised attachment. There is also evidence to suggest that attachment-related differences in psychopathology are mediated by the ability of individuals to reflect on their interpersonal experiences. Fonagy and colleagues (1995) have shown RF to mediate the association between early trauma and later psychopathology in an inpatient population. Adults who were able to process their own interpersonal experiences of early deprivation and trauma in a reflective way were much less likely to develop borderline personality disorder than adults with low RF who had undergone similar early life experiences. Impairments in RF have also been linked to the development of borderline phenomena (Fonagy, 2000). In a longitudinal study of a risk sample (Carlson, Egeland & Sroufe, 2009), mentalizing was shown to have a significant mediating effect on the association between attachment disorganisation and borderline symptoms. A recent study (Taubner & Curth, 2013) showed mentalizing to mediate the association between early abuse and subsequent aggressive behaviour in adolescents. Another recent study (Chiesa & Fonagy, 2014) showed RF to be a significant mediator of the associations between adversity and PD diagnoses and between adversity and psychiatric distress both in borderline and non-borderline samples. RF therefore appears to serve both a protective and mediating function in

the development of psychopathology. The studies listed above mostly used interview-based measures of attachment and the evidence base is far less established for self-report measures of attachment and the related construct of mentalizing/RF.

The primary focus of the current study was to investigate the extent to which self-report measures of RF are able to demonstrate relationships between attachment style, RF and psychopathology in line with predictions based on existing research. A secondary but related focus of the study was the introduction and validation of the English language translation of the OPD-SQ. The OPD-LSIA conceptualises psychopathology as a function of structural integration, of which RF is a basic component, and therefore expands upon the symptom-based, description-orientated classifications of mental disorders, such as the DSM-5, which conceptualise psychopathology in terms of the quantity and severity of specific symptom groups. The OPD-SQ therefore represents a new and distinct way of measuring general psychopathology, one which views mental disorders principally in terms of the individual's capacity to self-organise and self-regulate (i.e. mentalize). The study investigated the criterion validity of the OPD-SQ as a self-report measure of RF by comparing two groups hypothesised to vary in their mentalizing capacities – individuals with Borderline Personality Disorder (BPD) and Anti-Social Personality Disorder (ASPD), hypothesised as 'poor' mentalizers, and individuals diagnosed as not having a personality disorder, hypothesised as 'good' mentalizers. The scale reliability of the OPD-SQ was also investigated. Although there is growing evidence for the significant mediating role of RF in the link between early attachment experience and subsequent psychopathology, the evidence remains limited as to the extent to which mentalizing influences attachment-related differences in psychopathology in both clinical and non-clinical groups.

The current study addressed the following research questions:

1. Does a PD diagnosis predict lower levels of RF? Given that previous studies have used interview-based measures of RF, the current study investigated if this relationship could be demonstrated self-report measures. The study therefore hypothesised that PD participants would show lower levels of RF and its related construct of structural integration compared to non-PD participants.

2. Are lower levels of RF associated with higher levels of psychopathology, regardless of diagnosis of PD? Given that PD patients tend to manifest higher severity scores on most symptom scales, the current study investigated if the association between RF scores and PD could be simply a reflection of this higher level of disturbance or something specific and potentially of aetiological significance in relation to PD (see question 4).

3. Do individuals with lower levels of RF show higher levels of fearful attachment? Given previous work linking RF as a mediator between attachment style and mental health outcomes, the current study investigated if the relationship between attachment style and RF scores could be replicated using a self-report measure. The study therefore hypothesised that PD participants would show higher rates of fearful attachment on a self-report measure of attachment.

4. (Related to questions 2 and 3) To what extent does RF mediate the relationships between attachment style and severity of general psychopathology in clinical and non-clinical samples? The study hypothesised (1) that participants' scores for reflective functioning and structural integration would account for a significant component of the common variance between attachment style and general psychopathology and (2) that the mediating role of RF in the relationship between attachment style and general psychopathology would be significant both across groups (i.e. across clinical and non-clinical samples) and within groups (e.g. within the PD sample).

Method

The current study formed part of a joint project with *Dissociative symptoms and the quality of structural integration in BPD* (Sole, 2014).

Recruitment

Participants were recruited from an ongoing neuroimaging study of individuals diagnosed with BPD and ASPD and healthy controls that was being conducted at the Wellcome Trust Centre for Neuroimaging (WTCN): "Probing Social Exchanges – A Computational Neuroscience Approach to the Understanding of Borderline and Anti-Social Personality Disorder" (REC ref number: 12/LO/0283). Responsibility for recruitment was entirely undertaken by the team at the WTCN. The clinical sample for this study was recruited from outpatient and community services receiving referrals for BPD and ASPD in North London and Greater London. Additionally, some participants with ASPD were recruited via and assessed at London Probation Services. Clinical participants were identified by the involved clinical services and provided with basic information about the study and contact details for the research team. They could then either contact the study team directly or through their mental health practitioner. A protocol for recruitment of patients with ASPD was also agreed with the London Probation Service.

Community participants (healthy controls) were recruited from Greater London through purposive sampling, which involved the distribution of posters and other advertising material providing basic information about the study and details on how to contact the research team. Individuals who contacted the research team and who were also willing to provide their name, age, sex and contact details were understood to have made an expression of interest. Control participants were assessed at one or both of the two sites – the Wellcome Trust Centre for Neuroimaging (WTCN), University College London and the Developmental Neuroscience Unit UCL, Anna Freud Centre.

The assessment was carried out over two sessions, each lasting a few hours. Prior to completing the assessment, participants were asked to give their written consent. Participants were informed of the study's objectives, their right to withdraw from the study and all potential harms and benefits were communicated to them. The information sheet given to participants included details on compensation. Participants were remunerated for each assessment block of the study at a rate of £10 per hour (at least 2 x £40). As part of the computational tests of reward processing that were part of each assessment for the MRI and cognition blocks, participants were expected to win approximately £10 on average per task (i.e. £50 inclusive across all tasks). Participants also had the option of consenting to provide a venous blood sample for the genetics cohort, for which they were paid £15. The maximum remuneration payable over the course of study participation was £145. All payments were paid as soon as possible after completion of the relevant assessment visits. Participants were also paid to cover costs of travel and related expenses incurred in attending the WTCN in Central London.

Participants were deemed eligible to be included in the study if they were: male or female, aged 16-60 at the time of assessment; fluent in writing and understanding English; able and willing to attend two assessments, each with a duration of several hours; had normal corrected vision; had a DSM-IV diagnosis of BPD or ASPD (clinical sample) or negative screening results for psychopathologies (e.g. SAPAS total score <3; non-clinical sample). Participants were excluded if they had a current or past history of neurological disorders or trauma including epilepsy, head injury, loss of consciousness; had a learning disability requiring specialist educational support and/or medical treatment; were unable to understand written or spoken English; had any metallic material in body, including piercings, or did not satisfy other standard MRI safety exclusion criteria; met standard safety exclusion criteria for venous blood sampling. The following demographic data was collected: participants' age, gender, ethnicity, education, profession, socio-economic status and marital status.

Participants were assigned a unique study-specific participant code and their details were recorded for subsequent database screening, the purpose of which was to avoid multiple invitations. Identifying information was stored on an encrypted, password protected secure database with limited access, which was located separately to anonymised data. All identifying information and anonymised data was subject to good practice as laid down in the Data Protection Act and local policies of University College London.

Participants

Data were available for 165 participants (80 clinical, 85 non-clinical) after participants who had submitted incomplete data for one or more of the measures of relevance to this study were removed from the total sample. Seventy-two of the 80 PD participants had received a diagnosis of BPD and 8 had received a diagnosis of ASPD. Control participants had not received a diagnosis of PD and were not attending psychological services at the time of testing. As far as was possible, attempts were made to match participants from both groups in age, gender, socioeconomic status (SES). The data set for the present study was made available to the author in February 2014 when the neuro-imaging study was still ongoing. At this point a significantly disproportionate number of females had been recruited to the clinical sample (59 female, 20 male, 1 undisclosed) compared to the non-clinical sample (44 female, 41 male), leaving males with a PD diagnosis underrepresented. This gender imbalance may have been resolved at a later point by those responsible for recruitment, but owing to time constraints it was not possible for the author to wait for this data to become available before beginning data analysis. While gender differences in the prevalence of Axis I disorders have been well-documented (Rosenfield & Mouzon, 2013), gender patterns in relation to Axis II disorders are less well understood (Grant, Chou, Goldstein, Huang, Stinson, Saha et al., 2008; Sansone & Sansone, 2011). Gender differences in mentalizing ability have also been reported in the literature (Abu-Akel & Bo, 2013; Krach, Blümel, Marjoram, Lataster, Krabbendam,

Weber et al., 2009), but research in this area remains very limited and existing findings are based on very small sample sizes. Both groups differed significantly in their level of household income, $X^2(6, N = 153) = 34.94, p < .001$, but not in level of education, $X^2(6, N = 161) = 8.30, p > .05$. Differences in SES between PD and non-PD populations has been well-documented (Ullrich & Coid, 2007; Walsh, Shea, Yen, Ansell, Grilo, McGlashan et al., 2013) so the difference in household income between the two groups was not unexpected. There was no significant difference in age between the groups, $U(164) = 2926.50, Z = -1.42$, n.s. The mean age of participants was 29.4 years (PD group = 30.47 years; non-PD group = 28.45 years). The groups were broadly balanced in the distribution of ages with 80.0% of the PD group and 72.2% of the non-PD group being under the age of 35. Rather than reduce the size of each group in order to accommodate matching for gender and SES, which would have compromised the power of the study, the author took the decision not to match groups and to investigate by regression analysis the predictive effects of both gender and SES on the main variables of interest.

In order to screen for personality disorders, participants were required to complete the Standardised Assessment of Personality – Abbreviated Scale (SAPAS; Moran, Leese, Lee, Walters & Thornicroft, 2003), an eight-item screening interview which has previously shown good concurrent validity with other measures of personality functioning (Moran et al., 2003; Hesse & Moran, 2010; Germans, Heck, Moran & Hodiamont, 2008). These tests of concurrent validity were conducted on small, clinical samples and the evidence remains unclear as to the sensitivity of the SAPAS in identifying the possible presence of personality disorders in non-clinical populations. Forty of the 85 control participants in the current study scored above the SAPAS's clinical cut-off of 3. T-tests were conducted to investigate whether these control participants differed from the 45 control participants who had scored below the clinical cut-off in all the main variables of interest. No significant differences were shown between the two groups on all of the variables, suggesting that they did not represent separate populations and that the SAPAS was not a reliable indicator of personality functioning in this

sample. In light of the lack of evidence for the predictive validity of the SAPAS on non-clinical populations and the statistical unlikelihood of a purposive control sample, such as the one in the current study, presenting with 47% prevalence of personality disorders, differences in participants' SAPAS scores were not subsequently considered in the analysis. The absence of an effective screening measure for personality disorders meant that it remained difficult to determine the possible presence of personality dysfunction in the control sample and the extent to which the two groups under comparison represented overlapping populations.

Measures

The current study employed a cross-sectional, questionnaire-based design. Participants were administered a test battery comprising the following self-report questionnaires of relevance to this study (in addition to other self-report questionnaires and a range of computational and cognition tasks which formed part of the neuroimaging study but which are not relevant to this study). Responsibility for administering the test battery was shared between a number of researchers, of which the author of the current study was one.

The Experiences in Close Relationships-Revised (ECR-R) Questionnaire (Fraley, Waller & Brennan, 2000) – see Appendix IX

The ECR-R assesses self-reported attachment anxiety and attachment avoidance specifically in relation to the general experience of emotionally intimate relationships. It includes 36 items each rated on a 7-point scale, 18 of which assess attachment-related anxiety and 18 of which assess attachment-related avoidance. The anxiety and avoidance scales have demonstrated high internal reliabilities (Cronbach's α = .95; Cronbach's α = .93 respectively; Sibley & Liu, 2004).

The ECR-R can be scored both continuously and categorically. The designers of the scale suggest that attachment is most effectively measured dimensionally and advise against classifying individuals on the basis of their continuous scores (Fraley & Waller, 1998; Fraley & Spieker, 2003a, 2003b; Roisman, Fraley, & Belsky, 2007). Individuals' attachment styles can be categorised on the basis of their ECR-R scores by separately computing the median scores for avoidance and anxiety and assigning people to one the following four groups: (a) 'secure' if their scores fell below the median for both avoidance and anxiety; (b) 'preoccupied' if their scores fell below the median for avoidance but above that for anxiety; (c) 'dismissing' if they scored above the median for avoidance but below the median for anxiety; and (d) 'fearful' if their scores fell above the median for both avoidance and anxiety.

The Reflective function questionnaire (RFQ-54; Fonagy & Ghinai, 2008; Moulton-Perkins, Rogoff, Fonagy, & Luyten, 2011) – see Appendix X

The RFQ-54 is self-report measure, still under development, of the individual's capacity to mentalize themselves and others. It includes 54 items, with two hypothesised factors, Internal-other and Internal-self, and is rated on a 7-point scale. Respondents are asked about their capacities in thinking about or making sense of their own and others' cognitive and emotional experiences, e.g. "People's thoughts are a mystery to me". Twenty-six of the items generate independent scores for two sub-dimensions, 'too certain mental states about self and others' and 'too uncertain mental states about self and others', higher scores on which indicate greater impairment in RF. Participants' scores for these two sub-dimensions only were analysed in the current study. So far, a single study (Moulton-Perkins, Rogoff, Fonagy & Luyten, 2011) has shown the RFQ-54 to have good internal reliability (Cronbach's α = .82) and convergent construct validity, correlating positively with measures of allied (but not equivalent) constructs, such as mindfulness, r = .40, p < .001, and cognitive empathy, r = .48, p < .001

Operationalised Psychodynamic Diagnostics – Structure Questionnaire (OPD-SQ; Ehrenthal et al., 2012) – see Appendix XI

The OPD-SQ consists of 95 items yielding 8 scales, which are named after the LSIA scales from the OPD interview: perception of (1) self and (2) objects, regulation of (3) self and (4) relationships, communication with the (5) internal and (6) external world, and attachment to (7) internal and (8) external objects. Each of these scales is built out of three subscales, which explore concrete and clinically relevant traits. All items are rated on a 5-point Likert scale ranging from "no agreement at all" to "total agreement" (Schauenburg & Grande, 2011). It includes 12 reversed items for reliability calculations and produces individual scores for each subscale, as well as an overall level of structural functioning. The mean of all scales is taken as an indicator for overall structural level of functioning. The German language version of the OPD-SQ has shown internal consistency scores of between Cronbach's α=.71 and .91 for the subscales and Cronbach's α=.96 for the overall scale (Ehrenthal et al., 2011) in three separate samples ($N = 734$ healthy control participants, $N = 172$ patients attending outpatient psychotherapy and $N = 204$ patients attending inpatient psychotherapy).

The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983)

The BSI is a 53-item self-report questionnaire asking participants to rate the extent to which they have been bothered by various symptoms (0 ="not at all" to 4="extremely") in the past week. The BSI has nine subscales designed to assess individual symptom groups: somatisation, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The BSI also includes three scales that capture global psychological distress: the Global Severity Index (GSI), which is the mean of all of the subscale scores; the Positive Symptoms Total (PST), which is a count of the number of items endorsed at a level higher than zero, and the Positive Symptoms Distress Index (PSD), which is the sum of all item values divided by the PST.

There is general agreement that the BSI is an appropriate measure of general psychopathology and psychological distress (Skeem, Schubert, Odgers, Mulvey, Gardner & Lidz, 2006). Reliability for the GSI is reported as .95 (Derogatis & Melisaratos, 1983). The utility of the BSI's subscales for measuring symptom groups, however, is more questionable (cf. Benishek et.al., 1998), with multiple factor analytic and other studies suggesting that the discriminant validity of several BSI subscales is poor. The current study used the GSI only as its measure of symptomatology.

Results

Preliminary Analyses

Mean and *SD* values for all variables are presented in Table 1 for the PD group ($n = 80$) and the non-PD group ($n = 85$). A correlation matrix of all variables is presented in Table 2.

Assumptions of normality were tested for the main variables of interest. In cases for which assumptions of normality were not met, square root transformations were computed and values reflected for negatively skewed distributions. The Kolmogorov-Smirnov tests for normality (Field, 2007) were carried out on all variables and statistics both pre- and post-transformation are presented in Table 3. The transformations were successful in normalising all distributions except one: ECR-R attachment anxiety scores for the PD group; however, as this distribution came close to achieving normality post-transformation and appeared to be relatively normally distributed on inspection of its normality plots, it was retained for the purposes of analysis.

Table 1. *Means (SDs) on the RFQ-54, OPD-SQ, ECR-R and GSI*

Variable	PD Group (*n* = 80)	Non-PD Group (*n* = 85).
RFQ too certain about mental states of self and others***	14.48 (10.11)	25.12 (13.21)
RFQ too uncertain about mental states of self and others***	25.91 (11.50)	9.80 (6.75)
OPD-SQ total***	2.79 (.60)	1.37 (.55)
ECR-R attachment avoidance**	3.87 (.51)	4.06 (.32)
ECR-R attachment anxiety***	4.25 (.65)	3.49 (.59)
Global Severity Index***	1.95 (.78)	.49 (.47)
Household income ***†	1.50 (1.06)	2.44 (1.35)
Level of education ‡	4.28 (1.52)	4.68 (1.37)

Note. Household incomes are based on categorical scores distributed as follows: 1 = < £10K, 2 = £10-20K, 3 = £20-35K, 4 = £35-50K, 5 = £50-75K, 6 = £75-100K, 7 = > £100K. Level of education is based on categorical scores distributed as follows: 1 = No qualifications, 2 = Other qualification not listed, 3 = Vocational, 4 = GCSE, 5 = A-level, 6 = Higher education or professional/vocational equivalent, 7 = Post-graduate education or professional/vocational equivalent. RFQ = Reflective Function Questionnaire; OPD = Operationalised Psychodynamic Diagnostics – Structure Questionnaire; ECR-R = Experiences in Close Relationships-Revised Questionnaire.

*significant difference between PD and Non-PD groups: *t* test, chi square; ** *p* < .01, *** *p* < .001.
†Total sample: *N* = 154; PD group: *n* = 74; Non-PD group: *n* = 79.
‡ Total sample: *N* = 162; PD group: *n* = 76; Non-PD group: *n* = 85.

Table 2. *Correlation matrix of RFQ too certain about mental states of self and others, RFQ too uncertain about mental states of self and others, OPD-SQ total, ECR-R attachment avoidance, ECR-R attachment anxiety and Global Severity Index*

	1	2	3	4	5	6
1. RFQ too certain about mental states of self and others						
2. RFQ too uncertain about mental states of self and others	-.685***					
3. OPD-SQ total	-.553***	.743***				
4. ECR-R attachment avoidance	.216**	-.254***	-.370***			
5. ECR-R attachment anxiety	-.333***	.454***	.604***	-.589***		
6. Global Severity Index	-.511**	.683**	.839***	-.353***	.545***	

** Correlation is significant at the 0.01 level, *** Correlation is significant at the 0.001 level

Table 3. *Kolmogorov-Smirnov statistics (p) for the RFQ-54, OPDSQ, ECR-R and GSI*

Variable	PD group		Non-PD group	
	Pre-transform	Post-transform	Pre-transform	Post-transform
RFQ too certain about mental states of self and others	.147 (.000)*	.082 (.200)	.110 (.013)	.056 (.200)
RFQ too uncertain about mental states of self and others	.121 (.005)*	.060 (.200)	.135 (.001)*	.089 (.182)
OPD-SQ total	.126 (.003)*	.114 (.011)	.087 (.164)	.102 (.034)
ECR-R attachment avoidance	.084 (.200)	N/A	.085 (.184)	N/A
ECR-R attachment anxiety	.130 (.002)*	.121 (.005)*	.107 (.018)	.112 (.010)
Global Severity Index	.178 (.000)*	.106 (.026)	.060 (.200)	.095 (.053)

*significance below the 0.01 threshold for non-normality

Research question 1: Does a PD diagnosis predict lower levels of RF in a questionnaire measure of reflective functioning?

The two groups differed significantly in their RF as measured by the RFQ-54, although not entirely in the manner expected. There was a significant effect for uncertainty about the mental states of self and others ('too uncertain' RF), $t(163) = 11.45$, $p < .001$, with the PD group, as predicted, receiving higher scores than the non-PD group. There was also a significant effect for certainty about the mental states of self and others ('too certain' RF), $t(163) = 6.04$, $p < .001$; however, this was not in the direction predicted, with non-PD participants scoring significantly higher (i.e. more impaired) than their non-PD counterparts. A bivariate correlation of the 'too certain' and 'too uncertain' scales of the RFQ-54 revealed a highly significant negative association between the two variables, $r = .685$, $p < 0.001$. As participants with high scores on one scale would be expected to have low scores on the other scale and vice-versa, this finding was in line with predictions and therefore does not appear to explain the unexpected finding.

The author investigated if the surprising finding could be related to problems with the reliability of the RFQ-54. A Cronbach's alpha of .734 was calculated for the 26 items which generate scores for both the 'too certain' and 'too uncertain' scales of the RFQ-54. Although this statistic is above the threshold of .70 generally considered the acceptable threshold for reliability, closer inspection of individual scale items suggested that not all items provided the same level of internal consistency. Seven of the 26 items had a corrected item total correlation of less than .20, suggesting that these items contributed less effectively to the reliability of the scale. The items in question were: item 2 - "It's easy for me to figure out what someone else is thinking or feeling"; item 7 - "I know exactly what my close friends are feeling"; item 8 - "I always know what I feel"; item 14 - "Understanding what's on someone else's mind is never difficult for me"; item 18 - "It's really hard for me to figure out what goes on in other people's heads"; item 35 - I trust my feelings"; and item 52 - "I believe

there's no point trying to guess what's on someone else's mind". Three of these seven items (nos. 8, 35, 52) actually had a negative corrected total item correlation, suggesting that these RFQ-54 items were highly unreliable and most responsible for reducing the percentage of variance in RF accounted for by the scales.

The author analysed between group differences for the aforementioned seven items using Mann-Whitney analysis to determine if scores for these items were in the predicted direction (see Tables 4 and 5). The non-PD group scored higher on the 'too certain' RF scale on all seven items, which was not in the predicted direction, and this difference was significant for five of the seven items. In line with predictions, the PD group scored higher on the 'too uncertain' RF scale for all seven items and significantly so for six of the items.

Table 4. *Mann-Whitney U test statistics and Z values for internally inconsistent items contributing to reduced reliability of the 'too certain' RF scale*

RFQ-54 item	Mann-Whitney U	Z
Item 2 - "It's easy for me to figure out what someone else is thinking or feeling"	2931.00	-1.64
Item 7 - "I know exactly what my close friends are feeling"*	2811.00	-2.10
Item 8 - "I always know what I feel"***	1552.00	-6.78
Item 14 - "Understanding what's on someone else's mind is never difficult for me"*	2859.00	-2.03
Item 18 - "It's really hard for me to figure out what goes on in other people's heads"***	2279.50	-3.93
Item 35 - I trust my feelings"***	2316.00	-3.77
Item 52 - "I believe there's no point trying to guess what's on someone else's mind"	3240	-.56

* Significant at the 0.05 level, *** Significant at the 0.001 level

Table 5. *Mann-Whitney U test statistics and Z values for internally inconsistent items contributing to reduced reliability of the 'too uncertain' RF scale*

RFQ-54 item	Mann-Whitney U	Z
Item 2 - "It's easy for me to figure out what someone else is thinking or feeling"**	2807.00	-2.58
Item 7 - "I know exactly what my close friends are feeling"**	2608.50	-3.25
Item 8 - "I always know what I feel"***	1383.50	-7.41
Item 14 - "Understanding what's on someone else's mind is never difficult for me"**	2700.00	-2.60
Item 18 - "It's really hard for me to figure out what goes on in other people's heads"***	2108.00	-5.11
Item 35 - "I trust my feelings"***	1906.50	-5.82
Item 52 - "I believe there's no point trying to guess what's on someone else's mind"	3119.00	-1.18

** Significant at the 0.01 level, *** Significant at the 0.001 level

The seven items in question, and the three in particular (nos. 8, 35 and 52) with negative corrected total item correlations, may have compromised the reliability of the RFQ-54 in distinguishing PD and non-PD participants. One item, no. 52 ("I believe there's no point trying to guess what's on someone else's mind"), did not appear able to distinguish the groups in either direction. This is perhaps not surprising given the phrasing of this question, which, at face value, appears as likely to generate higher scores from people who believe there is no point trying to guess what is on someone else's mind because they deem other people's thoughts to be ultimately unknowable, as from people who believe there is no point trying to guess what is on someone else's mind because they deem other's people's thoughts to be transparent. It is possible that the other six items, although less ambiguous than item 52, lend themselves to a greater flexibility of interpretation than those RFQ-54 items which

demonstrated greater internal consistency. For example, the verb "to know" in item 8 ("I always *know* what I feel") might be variously interpreted by participants as synonymous with "to be aware of" (e.g. "I always *am aware of* what I feel"), arguably suggestive of healthy RF, or as synonymous with "to be certain of" (e.g. I always *am certain of* what I feel"), suggestive of unhealthy RF. It is therefore possible that participants with healthy RF might have provided misleadingly high scores on the 'too certain' dimension for this item if they were inclined towards the former rather than the latter interpretation of the verb "to know". By contrast, an individual presenting with excessively uncertain RF might be expected to score consistently low on such items, regardless of which interpretation (i.e. lack of awareness or lack of certainty) they favoured. For this reason, participants' scores on the 'too uncertain' dimension may arguably be more reliable than participants' scores on the 'too certain' dimension, even though the same items contribute to both scales. The verb "to trust" in item 35 is arguably open to similar flexibility of interpretation. The RFQ-54 is still a measure in development so inconsistency between items is perhaps to be expected. It may be that the general population is more likely to respond to certain RFQ-54 items differently from a PD population, perhaps due to the ambiguous wording of items or due to other as yet unidentified reasons, e.g. characteristics of the healthy control sample used in the current study, not necessarily shared by the population at large, which may have inclined them to respond to certain items in a less predictable manner. One consideration, as the RFQ-54 continues to be revised and refined, would be to examine if its scale reliability and criterion validity can be improved by excluding the aforementioned highly internally inconsistent items. As examination of the reliability and validity of the RFQ-54 was not a central concern of the current study, the author did not pursue this course of action; however, it remains a recommendation for future research into the self-report measure.

The OPD-SQ comprises 8 subscales and one global scale. The eight subscales are: self perception, object perception, self regulation, object relations, inward emotional communication, external emotional communication, internal attachment, and external attachment. Cronbach's alphas for the global and individual subscales of the OPD-SQ were calculated and are presented in Table 6.

Table 6. *Cronbach's alphas for the OPD-SQ and its subscales*

Scale	No. of items	Cronbach's α
Self perception	12	.96
Object perception	17	.90
Self regulation	13	.83
Object relations	12	.90
Inward emotional communication	11	.84
External emotional communication	14	.83
Internal attachment	8	.91
External attachment	8	.65
OPD-SQ	95	.96

Alpha coefficients for the eight of the nine scales, including the global scale (.96), were significantly above .70, which is generally considered the acceptable threshold for reliability.

This suggests that the items comprising these scales have high internal consistency and that the scale's level of internal consistency is highly similar to that of the original German version of the questionnaire (Ehrenthal et al., 2011). One scale (External attachment) produced an alpha coefficient of .65, which is slightly below the .70 threshold for 'acceptance'. Closer inspection of individual scale items for the global scale showed that 90 of 95 items had corrected item total correlations of between .20 and .90, suggesting that these items contributed effectively to the internal consistency of the scale. Five items (item 12 - "It's easy for me to accept help when people offer it"; item 13 - "I've usually got a good grip on myself, even when I'm boiling with rage"; item 38 - "All in all, I'm happy with the way I am"; item 47 - "If I can't cope on my own I ask others for help"; and item 72 - "I find it easy to get in contact with other people") had negative item total correlations, suggesting that these items were especially unstable. As the proportion of unstable questionnaire items was low (5%), it remains unlikely that the five items in question significantly compromised the reliability of the OPD-SQ global scale, which was the only OPD-SQ scale subsequently used for analysis in the current study.

The English language version of the OPD-SQ is still a measure in development and underwent revisions while the current study was ongoing. One consequence of this concurrent development was that two different translations of the OPD-SQ were used in the current study. The differences between the two versions of the questionnaire concerned a total of 23 of the 95 items. Eight alterations (items no. 4, 5, 20, 34, 63, 64, 75 & 95) involved changes which affected to varying degrees the semantics of a particular item. In four of these eight items, it can be argued that the change altered the meaning of the sentence, e.g. item 5 - "If I lose something that is *special* to me, I easily lose my footing" changed to "If I lose something that is *familiar* to me, I easily lose my footing"; item 95 - " I have really regretted some arguments later on because *something was destroyed by them*" changed to "I have really regretted some arguments later on because *they were damaging to the relationship*" (author's italics). Four of the eight semantic changes did not appear to represent significant alterations

in the meaning of the original item. e.g. item 4 - " My inner images and ideas frighten me" changed to "The images and ideas in my mind frighten me"; item 64 - "I often experience myself more like an object than a human being" changed to "I often perceive myself more like an object than a human being". Six of the 23 altered items (nos. 23, 37, 41, 45, 62, 93) involved changes to the syntax of the item in a way which did not appear to modify its meaning, e.g. "When I'm angry, I frequently cause harm in relationships" changed to " I frequently cause harm in relationships when I'm angry". Six of the 23 altered items (nos. 48, 54, 55, 65, 66, 68) involved the replacement of a word with a synonym in a way which did not appear to modify the meaning of the original item, e.g. item 54: " I've been told repeatedly that I'm not considerate enough *about* other people's needs" changed to " I've been told repeatedly that I'm not considerate enough *of* other people's needs" (author's italics). Three alterations (items no. 29, 78, 81) involved a grammatical change which did not appear significantly to alter the meaning of the original item, e.g. item 78 - "I've been hurt badly because of misjudging someone" changed to "I've been hurt badly because I misjudged someone". Cronbach's alpha analysis of the OPD-SQ global scale for all 165 participants (i.e. both versions combined) showed all of the 23 altered items to have corrected item total correlations of between .20 and .80, which suggests a good level of internal consistency regardless of which version was used. If the alterations had made a significant difference to how participants responded to the items in questions, one might expect the altered items to show comparatively less internal consistency, but this was not the case. The revised version of the questionnaire and a tracked changes version showing alterations to the earlier version are included as appendices to this report (see Appendices XI and XII).

There were a number of reasons why the author took the decision not to conduct tests to determine possible differences in sensitivity of the two versions of the OPD-SQ. No reliable and accurate record of which participants completed which versions of the test was included in the dataset. Researchers were informed of the changes to the OPD-SQ by email and asked to use the newer version with immediate effect. The author deemed the date of the email in

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question to be an unreliable guide to when researchers had started using the newer questionnaire for the following reasons: researchers may not have read and responded to the email at the same time; older versions of the questionnaire may still have been in circulation and being administered (made more difficult to monitor as research was being conducted across a number of sites); it was unclear if the OPD-SQ had always been administered during the first as opposed to second assessment session, making it more difficult to determine the exact date the questionnaire was completed. Even if one were to take the date of the email point as rough cut-off point, other problems persisted. Regular testing of controls started considerably earlier than regular testing of PD participants, resulting in a mismatch between the numbers of participants from each group who had completed the questionnaire before or after the date in question, thus making comparisons between groups more problematic. An alternative option to doing a sensitivity test might have been to control for version number in all analyses involving the OPD-SQ. This would have resulted in the loss of a degree of freedom in the analyses which may have been an unnecessary concession given the encouraging data regarding the questionnaire's robust reliability. Furthermore, with the exception of a maximum of eight items, the altered items in the newer version appeared to be semantically identical to their equivalents in the older version. The decision was therefore taken not to distinguish the different versions of the questionnaire in the analyses and subsequently to observe the degree to which OPD-SQ responses performed in line with predictions.

Differences in RF between the two groups were also measured using the OPD-SQ, which, as a measure of structural integration, encompasses RF as a core component. The criterion validity of the OPD-SQ as a measure of RF was first assessed by carrying out a bivariate correlation with the RFQ-54, which has previously been shown to have good internal reliability and convergent construct validity (see *Measures* section). A correlation matrix of both RF dimensions, the OPD-SQ and all OPD-SQ subscales is presented in Table 7. The OPD-SQ was found to correlate highly significantly with both scales of the RFQ-54: a strong

positive association was found with the 'too uncertain' scale and a strong negative association was found with the 'too certain' scale. The strong positive association of the OPD-SQ with the 'too uncertain' scale of the RFQ-54 suggests that they measure related constructs.   Given the finding of higher than predicted scores in the healthy control sample on the 'too certain' RF scale, and the suggestion that this unexpected finding may be due to compromised reliability of the scale, the negative correlation of 'too certain' RF with the OPD-SQ was to be expected and should be interpreted with caution.

A t-test showed a highly significant difference in OPD-SQ scores between the PD and non-PD groups, $t(163) = 15.65$, $p < .001$, with PD participants scoring predictably higher (i.e. more impaired) on the scale, indicating lower levels of structural integration in keeping with PD presentations.

Table 7. *Correlation matrix of RFQ too certain about mental states of self and others, RFQ too uncertain about mental states of self and others, OPD-SQ total and OPD-SQ subscales*

	1	2	3	4	5	6	7	8	9	10	11
1. RFQ too certain about mental states of self and others											
2. RFQ too uncertain about mental states of self and others	-.685**										
3. OPD self perception	-.561**	.705**									
4. OPD object perception	-.519**	.663**	.823**								
5. OPD self regulation	-.553**	.711**	.906**	.852**							
6. OPD self regulation	-.518**	.612**	.733**	.829**	.810**						
7. OPD internal emotional communication	-.511**	.647**	.790**	.629**	.734**	.563**					
8. OPD external emotional communication	-.519**	.674**	.847**	.866**	.850**	.773**	.662**				
9. OPD internal attachment	-.454**	.682**	.867**	.850**	.863**	.754**	.701**	.851**			
10. OPD external attachment	-.448**	.620**	.788**	.752**	.820**	.672**	.625**	.804**	.783**		
11. OPD-SQ total	-.566**	.739**	.945**	.917**	.955**	.851**	.787**	.924**	.933**	.869**	

** Correlation is significant at the 0.01 level

Research question 2: Are lower levels of RF associated with higher levels of psychopathology, regardless of PD diagnosis?

Bivariate correlation showed associations between both RF dimensions and psychopathology, as measured by the GSI. In line with the initial hypothesis, a strong and significant positive association was found between 'too uncertain' RF and the GSI, $r = .683^{**}$, $p < 0.01$. A strong and significant negative association, however, was found between 'too certain' RF and the GSI, $r = -.511^{**}$, $p < 0.01$ (i.e. greater certainty in RF was associated with reduced symptoms), which ran contrary to initial expectations. Higher levels of 'too certain' RF would ordinarily be expected to indicate greater impairment of RF, which the evidence suggests is a risk factor for increased psychopathology and difficulties in adult functioning (Fonagy et al., 1996; Bateman & Fonagy, 2008). Given the inconsistency of certain items on the RFQ-54 previously outlined in this report, which may have contributed to the unreliably high scores on the 'too certain' scale, this finding should be interpreted cautiously. When bivariate correlations of the RFQ-54 'too uncertain' scale and the GSI were conducted separately for each sample, the size and significance of the relationships between RF and severity of symptoms were very similar for the two groups: $r = .335$ ($p < 0.01$) for PD participants and $r = .377$ ($p < 0.01$) for healthy controls. A stepwise multiple regression was carried out in order to measure the variance accounted for by RF in predicting global severity of symptoms. The predictor variables entered into the regression model were: age, gender, household income, education level, attachment avoidance, attachment anxiety, 'too certain' RF, and 'too uncertain' RF. Global severity of symptoms was entered as the criterion variable. Missing demographic information relating to age, gender and SES reduced the size of the total sample for this analysis ($N = 149$). The regression analysis resulted in a significant model, Adjusted $R^2 = .549$; $F(4,144) = 46.0$, $p < 0.001$, containing four variables: 'too uncertain' RF, attachment anxiety, household income and gender. In line with the existing evidence outlined above that low RF is a risk factor for increased psychopathology, 'too uncertain' RF was shown to predict symptomatology significantly over and above attachment anxiety, household income and gender, R^2 change $= .460$, $F(1,147) = 125.2$, $p < .001$, while attachment anxiety predicted symptomatology over and above household income and gender, R^2 change $= .065$, $F(2,146)$

= 80.6, $p < .001$. Household income, R^2 change = .019, $F(3,145) = 57.6$, $p < .05$, and gender, R^2 change = .017, $F(4,144) = 46.0$, $p < .05$, also added significantly to the model, although less so compared to the other two variables.

Research question 3: Do individuals with lower levels of RF show higher levels of fearful attachment?

The two groups were shown to differ significantly in attachment style as measured by the ECR-R, although again not in the manner predicted. There was a statistically significant effect for attachment anxiety, $t(163) = 7.80$, $p < .001$, with PD participants scoring predictably higher than their non-PD counterparts. Contrary to expectations, the non-PD group showed significantly higher levels of attachment avoidance than the PD group, $t(163) = 2.78$, $p < .01$, although the magnitude of this effect was less than for attachment anxiety. The mean attachment avoidance score for the non-PD group of 4.09 was considerably higher than would be expected in the general population; norms based on a much larger sample ($N = >17,000$) suggest a mean avoidance score of around 3.00 (Fraley, 2012) for non-clinical populations. The sample used in the current study may therefore not have been large enough to produce ECR-R avoidance scores that are more representative of the general population.

Based on their ECR-R scores for attachment avoidance and anxiety, participants were assigned to different attachment categories. Participants whose scores fell below the median for both avoidance and anxiety were categorised as 'secure'; those whose scores fell below the median for avoidance but above that for anxiety were categorised as 'preoccupied'; those who scored above the median for avoidance but below that for anxiety were categorised as 'dismissing'; and those whose scores fell above the median for both avoidance and anxiety were categorised as 'fearful'. The frequencies for each attachment grouping are presented in Table 8.

Table 8. *Frequencies for attachment groupings based on participants' ECR-R scores*

	Total sample ($N = 165$)	PD group ($n = 80$)	Non-PD group ($n = 85$)
Secure	8	3	5
Preoccupied	45	35	10
Dismissing	84	24	60
Fearful	28	18	10

It had been predicted that the PD group would show higher levels of 'fearful' attachment; however, a significant proportion (35.7%) of participants categorised as 'fearful' were from the non-PD group. A surprisingly high proportion of non-PD participants (71%) could be categorised as 'dismissing' on the basis of their ECR-R scores. Only eight participants (5%) across both groups could be categorised as 'secure'. This is considerably lower than previously reported distributions for secure attachment style (Mickelson, Kessler & Shaver, 1997), which generally are in excess of 50%. Participants were subsequently categorised as 'organised' if they scored below the mean on at least one of the two ECR-R dimensions (i.e. were secure/preoccupied/dismissing in their attachment style) and categorised as 'disorganised' if they scored above the mean on both dimensions (i.e. were fearful in their attachment style).

Bivariate correlations showed a statistically significant positive association between attachment anxiety and 'too uncertain' RF, $r = .454***$, $p < 0.001$, and a statistically significant negative association between attachment anxiety and 'too certain' RF, $r = -.333***$, $p < 0.001$. A statistically significant negative association was found between attachment avoidance and 'too uncertain' RF, $r = -.254***$, $p < 0.001$, while a significant positive association was found between attachment avoidance and 'too certain' RF, $r = .216**$, $p < 0.01$. Stepwise multiple regression analyses ($N = 152$) were carried out in order to measure the variance accounted for by attachment style (i.e. avoidance and

anxiety) in predicting both dimensions of the RFQ-54 respectively. The predictor variables entered into both regression models were: age, gender, household income, education level, attachment avoidance and attachment anxiety. 'Too certain' RF, and 'too uncertain' RF respectively were entered as criterion variables. The first analysis, looking at factors which predict the 'too certain' RF dimension, resulted in a significant model, Adjusted R^2 = .144; $F(2,149) = 13.7$, $p < 0.001$, containing two variables: attachment anxiety and household income. Attachment anxiety predicted 'too certain' RF significantly over and above household income, R^2 change = .123, $F(1,150) = 21.1$, $p < .001$, with household income, R^2 change = .023, $F(2,149) = 13.7$, $p < .001$ also adding significantly to the model. The second analysis, looking at factors which predict the 'too uncertain' RF dimension, also resulted in a statistically significant model, Adjusted R^2 = .233; $F(2,149) = 23.9$, $p < 0.001$, containing two variables: attachment anxiety and household income. Attachment anxiety predicted 'too uncertain' RF significantly over and above household income, R^2 change = .213, $F(1,150) = 40.6$, $p < .001$, with household income, R^2 change = .030, $F(2,149) = 23.9$, $p < .001$, also being a significant predictor. These results seem to provide further evidence of the robust and well-documented link between the quality of attachment relationships and the capacity to generate mental representations of the self and others (Fonagy, Steele & Steele, 1991; Fonagy, 2004).

Attachment avoidance did not significantly predict either RF dimension when attachment anxiety was also included in the regression model. Separate regression analyses ($N = 152$) were run in order to investigate the extent to which attachment avoidance predicted the two RF dimensions when attachment anxiety was excluded from the model. The exclusion of attachment anxiety from the regression analyses resulted in statistically significant models for 'too certain' RF, Adjusted R^2 = .91; $F(2,149) = 8.6$, $p < 0.001$, and 'too uncertain' RF, Adjusted R^2 = .149; $F(3,148) = 9.8$, $p < 0.001$. Attachment avoidance, however, was not the most significant predictor in either model. Household income predicted 'too certain' RF significantly over and above attachment avoidance, R^2 change = .066, $F(1,150) = 10.6$, $p < .01$, with attachment avoidance, R^2 change = .037, $F(2,149) = 8.6$, $p < .001$, being the only other significant predictor in the model. Household income predicted 'too uncertain' RF significantly over and above attachment avoidance, R^2 change = .078, $F(1,150) = 12.7$, $p < .001$,

with attachment avoidance, R^2 change = .062, $F(2,149)$ = 12.1, $p < .001$, and gender, R^2 change = .026, $F(3,148)$ = 9.8, $p < .001$, also contributing significantly to the model. As the control participants in this study showed comparatively high levels of avoidant attachment behaviour, the excessive certainty shown in their responses to RFQ-54 items may have been a reflection of an associated tendency of those with an avoidant attachment style to shun or underestimate uncertainty relating to their own and others' mental states (Fonagy, 2004), which may be experienced by them as potentially anxiety-provoking. This would suggest that the unexpectedly high levels of certainty in RF among the control sample may not entirely be due to unreliable questionnaire items, as outlined previously in this report, but may also reflect the possible high prevalence of avoidant attachment behaviour in this group. While these findings appear to suggest that an anxious attachment style is related to excessive uncertainty in RF and an avoidant attachment style related to excessive uncertainty in RF, questions regarding the consistency of items within the RFQ-54 and the sensitivity of the ECR-R in measuring and categorising attachment style on smaller samples of participants, mean that these results should be interpreted with caution.

Research question 4: To what extent does RF mediate the relationships between attachment style and severity of general symptomatology in clinical and non-clinical samples?

The author separately investigated the relationships to psychopathology of attachment style (i.e. secure, preoccupied, dismissing, fearful) and attachment organisation (i.e. organised/disorganised). A bivariate correlation showed a statistically significant positive association between attachment anxiety and the GSI, $r = .545^{***}$, $p < 0.001$. A statistically significant negative association was shown between attachment avoidance and the GSI, $r = -.353^{***}$, $p < 0.001$. Individuals with an avoidant attachment style have been shown to under-report or disguise their levels of psychological distress and to minimise expressions of need or vulnerability (Ainsworth & Bell, 1970; Mikulincer & Shaver, 2007), which may help to explain the negative association between attachment avoidance and reported symptoms in this sample. By contrast, individuals with an anxious attachment style may have exaggerated metarepresentations of their emotional responses, which they struggle to limit

through symbolisation, because the original mirroring provided by their primary caregiver during infancy exaggerated their emotions. This, in turn, might lead them to exaggerate symptoms (Fonagy & Target, 1997).

Stepwise multiple regression had already shown attachment anxiety, but not attachment avoidance, to account for a statistically significant amount of the variance in psychopathology within the total sample. A further stepwise multiple regression was carried out to measure the variance accounted for by the more conservative, dichotomous categorisation of organised/disorganised attachment in predicting global severity of symptoms ($N = 152$). The predictor variables entered into the regression model were: age, gender, household income, education level, attachment organisation, 'too certain' RF, and 'too uncertain' RF. Global severity of symptoms was entered as the criterion variable. This analysis resulted in a significant model, Adjusted $R^2 = .515$; $F(3,148) = 54.5$, $p < 0.001$, containing three variables: 'too uncertain' RF, household income and gender. 'Too uncertain' RF predicted symptomatology significantly over and above household income and gender, R^2 change = .476, $F(1,51) = 136.3$, $p < .001$, with household income, R^2 change = .023, and gender, R^2 change = .025, also adding significantly to the model. Contrary to expectations, attachment organisation was found not to predict general psychopathology in this sample, suggesting that participants categorised as disorganised were no more likely to show increased psychopathology than those categorised as organised. A number of studies have shown that attachment disorganisation in children is associated with the development of externalising disorders (see Lyons-Ruth & Jacobvitz, 1999, for a review), deficits in the capacity to self-regulate anxiety (Siegel, 1999), and deficits in social skills, which my adversely affect later functioning (Cassidy & Mohr, 2001). The lack of a finding of an association between attachment organisation and psychopathology could be a consequence of the relatively low number of disorganised participants in the sample ($n = 28$) and/or the fact that the measure of psychopathology used in this study aggregates different types of mental disorder to generate one global score of severity of pathology and is therefore does not distinguish the types of psychopathology most associated with disorganised attachment classification.

Did RF mediate the relationship between attachment style and psychopathology?

In order to investigate the role of RF in mediating the relationship between attachment and psychopathology within and across both samples, mediation analyses were carried out using the PROCESS computational tool for path analysis-based moderation and mediation analysis (Hayes, 2012).   Owing to the minimal association previously shown between 'too certain' RF and psychopathology in this sample and the questionable predictive value outlined above of this dimension of the RFQ-54, the author decided to exclude it from the mediation analyses. Separate mediation models were tested for attachment-related anxiety and avoidance, resulting in six models, two for each group and two for the total sample. These are listed in Table 9. The conceptual mediation model used is presented in Figure 1. The significance of indirect effects was tested using bootstrapping procedures. Unstandardised indirect effects were computed for each of 10,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. Age and gender were entered as covariates of both independent and dependent variables. As two participants in the PD sample did not provide age and gender information respectively, this reduced the total sample size ($N = 163$) and PD group sample size ($n = 78$) for the mediation analyses.

Table 9. *Models investigating the role of RF in mediating the relationship between attachment and symptomatology within and across both samples*

| Group	Mediation model	Predictor (X) variable	Mediating (M) variables	Criterion (Y) variable
PD group	1	Attachment anxiety	'Too certain about mental states of self and others'	General severity of symptoms
	2	Attachment avoidance		
Non-PD group	3	Attachment anxiety	'Too certain about mental states of self and others'	General severity of symptoms
	4	Attachment avoidance		
Total Sample	5	Attachment anxiety	'Too certain about mental states of self and others'	General severity of symptoms
	6	Attachment avoidance		
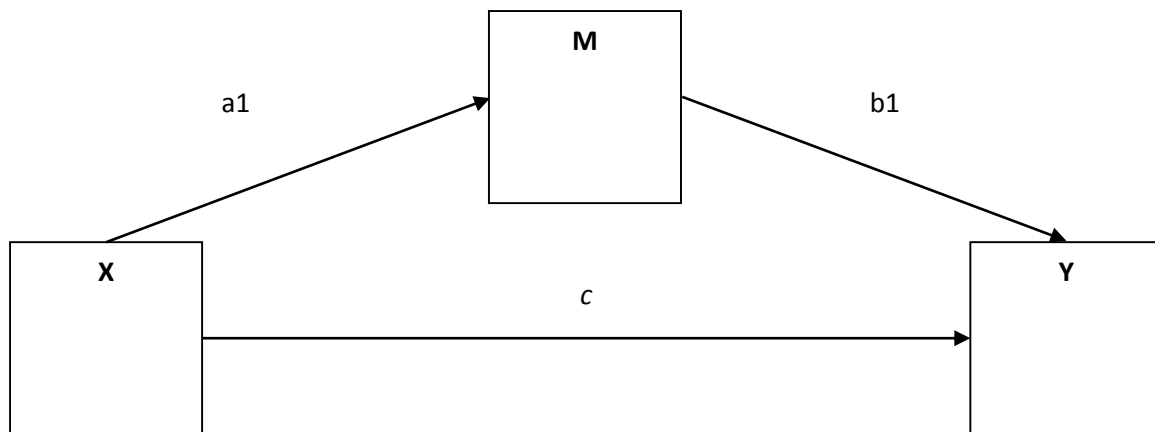
Figure 1. Conceptual mediation model

X = predictor variable (attachment-related avoidance/anxiety)

Y = criterion variable (global severity of symptoms)

M = mediating variable ('too uncertain' RF)

Indirect effects of X on Y: a1b1

c = direct effect of X on Y

There were statistically significant total, direct and indirect effects of attachment anxiety on psychopathology in the total sample when 'too uncertain' RF was entered as the mediating variable. The standardised regression coefficient between 'too uncertain' RF and attachment anxiety was statistically significant ($p < .001$) as was that between 'too uncertain' RF and global severity of symptoms ($p < .001$). The indirect effect was .460 ($t = 5.57$), which was statistically significant, accounting for 45% of the total effect. There were also statistically significant total, direct and indirect effects of attachment anxiety on psychopathology in the corresponding model for the non-PD group. The standardised regression coefficient between 'too uncertain' RF and attachment anxiety was statistically significant ($p < .05$) as was that between 'too uncertain' RF and global severity of symptoms ($p < .01$). The indirect effect of attachment anxiety, as mediated by 'too uncertain', RF was .124 ($t = 2.01$), which was statistically significant, accounting for 22% of the total effect. Mediation analysis showed no significant effects of attachment anxiety on psychopathology in the PD sample,

however, suggesting that attachment anxiety does not explain attachment-related differences in psychopathology in this group.

There was a statistically significant direct effect ($p < .01$) in the total sample of attachment avoidance on psychopathology, which was shown to be mediated by 'too uncertain' RF. The direct effect of attachment avoidance on global severity of symptoms accounted for 56% of the total effect. The standardised regression coefficient between 'too uncertain' RF and attachment avoidance was statistically significant ($p < .01$) as was that between 'too uncertain' RF and global severity of symptoms ($p < .001$). The indirect effect of avoidant attachment, as mediated by 'too uncertain', RF was -.156 ($t = 2.79$), which was statistically significant. There was no statistically significant direct or indirect effect of attachment avoidance on psychopathology in either group.

Did the level of structural integration of personality mediate the relationship between attachment style and psychopathology?

The author also conducted mediation analyses in order to investigate the role of structural integration of personality, as measured by the OPD-SQ, in mediating the relationship between attachment and psychopathology within and across both samples. The PROCESS computational tool was employed for these analyses as previously. Again, separate mediation models were tested for attachment-related avoidance and anxiety, resulting in six models, two for each group and two for the total sample. These are listed in Table 10. The conceptual mediation model used is presented in Figure 2. The significance of indirect effects was tested using the same bootstrapping procedures outlined above. Age and gender were entered as covariates of both independent and dependent variables.

Table 10. *Models investigating the role of structural integration in mediating the relationship*

between attachment and symptomatology within and across both samples

Group	Mediation model	Predictor (X) variable	Mediating (M) variables	Criterion (Y) variable
PD group	1	Attachment avoidance	Structural integration of personality	General severity of symptoms
	2	Attachment anxiety		
Non-PD group	3	Attachment avoidance	Structural integration of personality	General severity of symptoms
	4	Attachment avoidance		
Total Sample	5	Attachment avoidance	Structural integration of personality	General severity of symptoms
	6	Attachment anxiety		
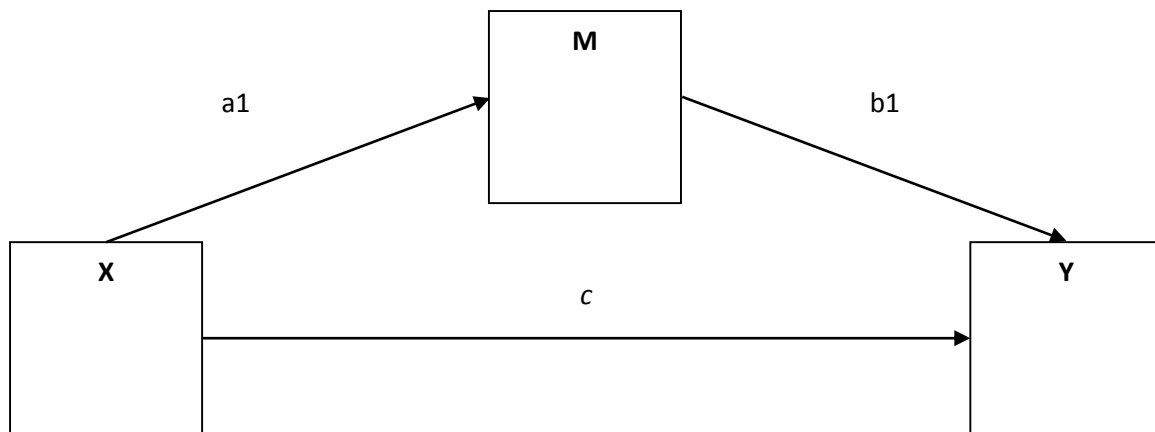
Figure 2. Conceptual mediation model

X = predictor variable (attachment-related avoidance/anxiety)

Y = criterion variable (general symptomatology)

M = mediating variable (structural integration)

Indirect effects of X on Y: a1b1

c = direct effect of X on Y

When structural integration was entered as the mediating variable, the resulting mediation model for the total sample revealed a non-significant direct effect but significant total and indirect effects of attachment anxiety on psychopathology. The standardised regression coefficients between the OPD-SQ and attachment anxiety and global severity of symptoms respectively were statistically significant ($p < .001$). The indirect effect of .927 ($t = 8.46$) was highly statistically significant, accounting for 81% of the total effect. Similarly, the corresponding mediation model for the non-PD group revealed a non-significant direct effect but significant total and indirect effects of attachment anxiety on psychopathology. The standardised regression coefficients were statistically significant between the OPD-SQ and attachment anxiety ($p < .001$) and global severity of symptoms ($p < .001$). The indirect effect was .592 ($t = 4.03$), which accounted for 96% of the total effect. There were no statistically significant total, direct or indirect effects of attachment anxiety on psychopathology in the PD group when structural integration was entered as the mediating variable.

With structural integration entered as the mediating variable, the resulting mediation model for the total sample showed a non-significant direct effect but significant total and indirect effects of attachment avoidance on psychopathology. The standardised regression coefficients between the OPD-SQ and attachment avoidance and global severity of symptoms respectively were statistically significant ($p < .001$). The indirect effect of attachment avoidance, as mediated by 'too uncertain' RF was -.306 ($t = 3.55$), which accounted for 87% of the total effect. The corresponding model for the non-PD group again showed no significant direct effect but significant total and indirect effects of attachment avoidance on psychopathology. The standardised regression coefficient between the OPD-SQ and attachment anxiety was statistically significant ($p < 0.01$) as was that between the OPD-SQ and global severity of symptoms ($p < .001$). The indirect effect was -.200 ($t = 2.80$), which accounted for 67% of the total effect. There were no statistically significant total, direct or indirect effects of attachment avoidance on psychopathology in the PD group when structural integration was entered as the mediating variable.

The indirect effects of attachment style on psychopathology therefore seemed to be broadly similar, whether measured by the RFQ-54 or the OPD-SQ, although the magnitude of effects in mediation models involving the latter measure were considerably stronger. These findings can be seen as providing further evidence that the two questionnaires measure similar constructs. Both measures showed indirect effects of both anxious and avoidant attachment on psychopathology for the total sample and of anxious attachment on psychopathology for the non-PD sample. Neither measure showed indirect effects of either attachment style on psychopathology for the PD group. The OPD-SQ showed an indirect effect of attachment avoidance in the non-PD group, but this was not the case with the RFQ-54. These findings appear to be in line with existing evidence that RF levels influence attachment-related differences in psychopathology, and that this applies to attachment-related differences between people who have received a diagnosis of PD and people who have not, and - to a lesser extent - to attachment-related differences among people who have not received a diagnosis of PD. The mediation models did not provide evidence that RF could explain attachment-related differences among people with a diagnosis of PD. These findings can be seen as providing further

evidence for the crucial importance of early attachment relationships in equipping individuals with the capacity to generate mental representations, and by implication representations of relationships (Fonagy, 2004), and for the key role of this capacity in the subsequent socio-emotional adaptation of individuals and potential exposure to risk of psychopathology. Given that the dependent variable in these analyses was the GSI, a global measure of psychological symptoms, it is not possible to extrapolate these findings to a consideration of how attachment-related differences in specific disorders are mediated by RF.

Discussion

The current study attempted to investigate four key research questions: (1) whether a PD diagnosis was predictive of lower levels of RF when the latter was measured using self-report questionnaires; (2) whether lower levels of RF would be associated with higher levels of psychopathology, regardless of diagnosis of PD; (3) whether individuals with lower levels of RF would show higher levels of fearful attachment; and (4) the extent to which RF mediated the relationships between attachment style and severity of general symptomatology in clinical and non-clinical samples. On the basis of these research questions, the following four hypotheses were explored: (1) PD participants would show lower levels of RF in their scores on the RFQ-54; (2) PD participants would show higher rates of fearful attachment on the ECR-R; (3) RFQ-54 scores would account for a significant component of the shared variance between attachment style and general psychopathology; and (4) the mediating role of RF would be significant both across groups (i.e. across clinical and non-clinical samples) and within groups (e.g. within the PD sample). The first and second hypotheses were partially confirmed, with unexpected findings appearing to be influenced by factors affecting the precision of the self-report measures used, the RFQ-54 and ECR-R. The third and fourth hypotheses were also partially confirmed, with RF being shown to be a significant mediator of attachment-related differences in psychopathology for the total and healthy control samples, but not for PD participants.

The first research question addressed whether participants with a diagnosis of PD would show more impaired RF than non-PD participants on a self-report measure of RF, the RFQ-54. The hypothesis that PD participants would show lower levels of RF than healthy controls was partially confirmed. In line with the initial hypothesis, there was a significant effect for the level of uncertainty about the mental states of self and others, with the PD group scoring higher (i.e. more impaired) than the non-PD group. However, this direction was reversed for the level of certainty about the mental states of self and others, with non-PD participants scoring significantly higher, suggestive of greater impairment, than their non-PD counterparts. It had been expected that BPD participants, who formed the vast majority of participants in the PD cohort of this study, would be more likely to present with RF characterised by a predominance of rigid, automatic and unjustifiably certain assumptions about the mental states of self or others. This profile is evident in the context of attachment-related stress, which, when activated, can lead to typically excessive and inaccurate efforts to interpret other people's mental states, i.e. hypermentalizing (Bleiberg, 2013). The degree of certainty evident in the non-PD sample of the current study was therefore surprising. The author subsequently investigated whether the finding might be related to problems with the reliability of the RFQ-54. A Cronbach's alpha calculation suggested a relatively high degree of internal consistency for the RFQ-54 as a whole. Closer inspection of individual scale items, however, suggested that seven items on the scale (27% of the total number of items on the 'too certain-too uncertain' scale) appeared to be highly inconsistent, perhaps offering one reason for the unexpectedly high certainty scores of the non-PD group. Consideration of the face validity of the inconsistent items suggested that these were potentially subject to a greater flexibility of interpretation than those RFQ items which demonstrated greater internal consistency, and that participants in the healthy control sample may have been more likely than their PD counterparts to favour interpretations which would incline them towards giving a high score for those items. The RFQ-54 is still a measure in development so inconsistency between items is not necessarily unexpected, although it has previously demonstrated good internal consistency when tested on a different sample (Moulton-Perkins & Rogoff, 2011). When both groups were compared using the OPD-SQ, PD participants predictably showed lower levels of structural integration than non-PD participants, and by implication lower levels of RF. As expected, a

significant positive correlation was found between the OPD-SQ and the 'too uncertain about mental states of self and others' scale of the RFQ-54, suggesting that these measures tap a similar construct. By contrast, a strong negative correlation was found between the OPD-SQ and the 'too certain about mental states of self and others' scale of the RFQ-54. While this finding was contrary to expectations prior to the study that individuals with higher levels of structural integration would be more likely to present with less rigid and inflexible RF, it is in keeping with the unexpectedly high scores of the healthy control sample compared to the PD sample on the 'too certain' RF scale, which, as documented above, may be unreliable when applied to this sample. The English language version of the OPD-SQ showed a very high level of internal consistency (Cronbach's α = .96), which was very similar to that shown by the original German version of the questionnaire, suggesting that it may be a highly reliable measure of structural integration, of which RF is a basic component.

The second research question addressed the degree to which RF was predictive of psychopathology. In line with initial expectations, there was a significant positive correlation between 'too uncertain' RF and global severity of symptoms, with participants who showed excessively uncertain RF appearing more likely to present with increased severity of symptoms. Contrary to initial expectations but again in keeping with the pattern of results in the current study, there was a strong and significant negative correlation between 'too certain' RF and the GSI. Greater rigidity in RF would ordinarily be a risk factor for increased psychopathology and difficulties in adult functioning (Fonagy et al., 1996; Bateman & Fonagy, 2008) and is particularly associated with borderline presentations (Fonagy & Bateman, 1998; Bateman & Fonagy, 2008; Bleiberg, 2013). Therefore the finding that participants with PD diagnoses, the vast majority of which were for BPD, scored lower on the 'too certain' scale of the RFQ-54 than healthy controls was especially surprising, raising questions about the validity and reliability of the scale and suggesting that this finding should be interpreted extremely cautiously. However, as the control participants in this study were also more inclined towards avoidant attachment behaviour, the excessive certainty shown in their responses to RFQ-54 items may have been a reflection of an associated tendency to shun or underestimate uncertainty relating to their own and others' mental states, which may have been experienced by them as potentially anxiety-

provoking. Bivariate correlations of the RFQ-54 'too uncertain' scale only and the GSI conducted separately for each sample showed the size and significance of the relationships between RF and severity of symptoms were very similar between the two groups, offering support for the hypothesis that impaired RF is associated with increased severity of symptoms regardless of the presence of PD. Stepwise regression analysis showed 'too uncertain' RF to predict symptom severity significantly over and above all other variables included in the regression model: attachment anxiety, household income and gender, which were also significant predictors of psychopathology, and age, education level, attachment avoidance and 'too certain' RF, which were not.

The third research question addressed the nature of the association between attachment and RF. The second hypothesis of the current study that PD participants would show higher rates of fearful attachment (i.e. scores above a median split for both attachment anxiety and avoidance) on the ECR-R was partially confirmed. PD participants scored predictably higher than their non-PD counterparts on attachment anxiety, but contrary to expectations healthy controls showed significantly higher levels of attachment avoidance than the PD group, although the magnitude of this effect was less than that for attachment anxiety. The mean attachment avoidance score for the non-PD group ($M = 4$.09) was considerably higher than might be expected for non-clinical populations and compared to that found in much larger samples (Fraley, 2012). A significant proportion (35.7%) of participants who met the criteria for fearful attachment came from the control group. A very high proportion of control participants (71%) met the criteria for a 'dismissing' attachment style, which, while consistent with the high scores on the attachment avoidance scale in this group, was not in line with initial expectations. Furthermore, only eight participants across both groups (5%) met the threshold for 'secure' attachment. This is much lower than has previously been reported in the general population (Mickelson, Kessler & Shaver, 1997), although previous studies reporting prevalence of attachment style have not used the same attachment categorisations or based them on ECR-R scores. Taxometric analyses on multiple samples and measures of attachment suggest categorisation on the basis of scores may reduce precision of measurement and lower statistical power and that variation in attachment is best modelled with dimensions rather than categories (Fraley & Waller, 1998; Fraley & Spieker,

2003a, 2003b; Roisman, Fraley, & Belsky, 2007). Categorisation on the basis of ECR-R scores in this sample may have contributed to greater imprecision of measurement, although it remains unclear to what extent this might be explained by the process of categorisation per se or the process of categorising on the basis of ECR-R scores with this particular sample. Bivariate correlations of participants' scores on the RFQ-54 and their continuous scores on the ECR-R showed 'too uncertain' RF to be positively associated with attachment anxiety and negatively associated with attachment avoidance; conversely, 'too certain' RF was shown to be positively associated with attachment avoidance and negatively associated with attachment anxiety. Questions regarding the consistency of items within the RFQ-54 and the sensitivity of the ECR-R in measuring attachment style on smaller samples of participants, however, mean that these results should be interpreted with caution. Furthermore, as the control participants in this study scored comparatively highly on attachment avoidance, the excessive levels of certainty shown in their responses to RFQ-54 items may have been a reflection of an associated tendency of those with an avoidant attachment style to shun or underestimate uncertainty relating to their own and others' mental states (Fonagy, 2004), which may be experienced by them as potentially anxiety-provoking. In addition, the sample used in the current study may not have been large enough to produce ECR-R avoidance scores more representative of the general population and therefore findings relating to avoidant attachment style in the non-clinical sample should not necessarily be regarded as representative of non-clinical populations as a whole. Stepwise multiple regression showed attachment anxiety to be the most important predictor of both RF dimensions, and attachment avoidance to predict neither dimension when attachment anxiety was also included in the regression model. Contrary to expectations (Lyons-Ruth & Jacobvitz, 1999; Cassidy & Mohr, 2001), stepwise multiple regression did not show the categorical variable of organised/disorganised attachment to predict psychopathology in this sample. This finding could be explained by the reduced precision of classification on the basis of scores, particularly given the unexpectedly high scores of non-clinical participants on the avoidance scale of the ECR-R, which increased the median avoidance score of the total sample and therefore the threshold for meeting one of the necessary criteria for secure attachment (i.e. avoidance scores below the group mean). Furthermore, the relatively low number of disorganised participants in the sample ($n = 28$) and the

aggregation of different types of mental disorder to generate one global score of severity of pathology less able to distinguish disorders commonly associated with disorganised attachment classification, are also factors likely to have reduced precision of measurement and statistical power of the regression model.

The fourth and final research question investigated the respective roles of RF and structural integration in mediating the relationship between attachment style and psychopathology within and across both groups. As would be expected given the attachment-related differences between the two groups, there was a strong and significant positive association between attachment anxiety and severity symptoms and a strong and significant negative association between attachment avoidance and severity of symptoms. Individuals with an avoidant attachment style have been shown to under-report or disguise their levels of psychological distress and to minimise expressions of need or vulnerability (Ainsworth & Bell, 1970; Mikulincer & Shaver, 2007), which may help to explain the negative association between attachment avoidance and reported severity of symptoms in this sample. By contrast, individuals with an anxious attachment style may be more inclined to over-report symptoms because they have a diminished capacity to limit exaggerated misrepresentations of their emotional and physical distress due to the failure by their primary caregiver during infancy to mirror their distress in a containing way.

There was a significant total effect of attachment anxiety on psychopathology in the total sample, which was shown to be significantly mediated by 'too uncertain' RF when this was included as the sole mediating variable in the mediation model. The influence of RF appeared to be much less important when each group was investigated separately, with 'too uncertain' RF being shown to have a narrowly significant mediating role in the control group and no mediating role in the PD group. The relationship between attachment avoidance and psychopathology in the total sample was also shown to be significantly mediated by 'too uncertain' RF. This finding was not repeated when the two groups were analysed separately, however, which might be explained by the low numbers of avoidant participants in the PD sample making it difficult to generate meaningful data and a possible tendency

among avoidant participants in the control sample to deny or under-report pathology. When structural integration was entered as the mediating variable, the resulting mediation model for the total sample revealed statistically significant total and indirect effects of attachment anxiety on psychopathology, with the indirect effect taking up a very large proportion (81%) of the variance of the total effect. The corresponding model for the non-PD group revealed also showed significant total and indirect effects of attachment anxiety on psychopathology, with the indirect effect again comprising a very large proportion (96%) of the variance. As was the case when RF was investigated as the mediator, there were no significant effects of attachment anxiety on psychopathology in the PD group when structural integration was entered as the mediating variable. There were significant total and indirect effects of attachment avoidance on psychopathology for the total sample when structural integration was entered as the sole mediating variable, with the indirect effect again comprising a very high proportion (87%) of the variance. A similar pattern was observed in the corresponding model for the non-PD group, with the indirect effect of attachment anxiety accounting for 67% of the variance of the total effect on psychopathology. Again, as was the case with RF as the mediating variable, there were no significant effects of attachment avoidance on psychopathology in the PD group when structural integration was entered as the mediating variable.

The third hypothesis of the current study that RF would account for a significant amount of the common variance in the association between attachment style and general psychopathology and the fourth hypothesis that the mediating role of RF would be significant both across and within clinical and non-clinical samples were therefore only partially confirmed. Furthermore, these findings indicated that differences in RF only partly explained severity of psychopathology, insofar that there is a proportion of the common variance between attachment style and psychopathology that does not appear to be accounted for solely by RF. This could be explained by the measures of RF used in this study being only partial indicators of the underlying construct of RF or RF being just one of several mechanisms mediating the association between attachment style and severity of psychiatric symptoms.

The broadly similar mediating effects of the RFQ-54 and OPD-SQ can be seen as providing further evidence that the two questionnaires measure related constructs. In each instance, the magnitude of the effects of the OPD-SQ as a mediating variable was observed to be much higher than that of the RFQ-54, which might be one explanation for why it was able to demonstrate an effect for attachment avoidance where the RFQ-54 could not. There are a number of possible explanations for the stronger indirect effects shown when the OPD-SQ was included as the mediating variable. The OPD-SQ showed itself to be a much more internally consistent measure than the RFQ-54 in this study and is therefore more likely to have generated more reliable scores for the total sample. By contrast, a number of items of the RFQ-54 lacked internal consistency, which may have resulted in unreliable data for a significant proportion of the sample, thus limiting its predictive validity, e.g. low scorers on the uncertainty scale who may have interpreted ambiguous items in a way which inadvertently inflated their scores on the certainty scale. The OPD-SQ is also not a measure of RF per se but structural integration, of which RF is a basic component. Therefore it may measure other independent constructs which overlap with RF, thus accounting for a greater number of potential mediating constructs, and/or may measure other aspects of RF not measured by the shorter RFQ-54. Some of the sub-dimensions of the OPD-SQ are explicitly intended to measure aspects of RF (e.g. self /object perception, self regulation, inward/external emotional communication), while others are intended to measure aspects of general psychological functioning which, while dissociable from RF to a greater or lesser extent, are nevertheless strongly influenced by the capacity for effective mentalizing (e.g. object relations, internal/external attachment). The OPD-SQ may therefore represent a more comprehensive self-report measure of the RF construct than the RFQ-54. A future direction in the development of the OPD-SQ might be to determine which of its items are most predictive of mentalizing capacity in order further to refine the questionnaire's reliability and validity as a measure of RF.

The indirect effects of both attachment anxiety and attachment avoidance on psychopathology were statistically significant for the total sample. This appears to be in line with existing evidence that low RF/low structural integration is a risk factor for psychopathology and is therefore likely to play a part

in distinguishing PD participants from healthy controls. There were also significant indirect effects of attachment anxiety on psychopathology among healthy controls, suggesting that the capacity to mentalize may also explain attachment-related differences in psychopathology among the general population. These findings can be seen as providing further evidence for the crucial importance of early attachment relationships in equipping individuals with the capacity to generate mental representations, and by implication representations of relationships (Fonagy, 2004), and for the key role of this capacity in the socio-emotional adaptation, and therefore mental health, of individuals. Clinical interventions focused on early intervention therefore need to address the fostering of the capacity to mentalize in infants and also parents, who may be able to modulate frightening or disruptive caregiving behaviour by developing their understanding of their own and their child's mental states.

In contrast with previous findings (Chiesa & Fonagy, 2014; Carlson, Egeland & Sroufe, 2009), which have shown mentalizing capacity to account for a significant component of the common variance in the association of early attachment experience and later psychopathology in clinical samples, there was no significant indirect effect of either attachment dimension on psychopathology in the PD group. This would be appear to suggest that differences in RF do not explain the higher severity scores on most symptom scales shown by PD patients, and that these higher scores are more likely to be a reflection of some higher level of psychological disturbance. While evidence is growing in support of the notion that mentalizing mediates the impact of early attachment experiences on personality functioning (Carlson et al., 2009) - which, to some extent, has been corroborated by the current study - there are other constructs which may have a significant mediating role in this association, for example, affect regulation (Linehan, 1993) or the intensification of aggression and destructiveness (Kernberg & Caligor, 2005). It is possible that these and/or other constructs, rather than RF, are better able to explain attachment-related differences in severity of psychopathology in individuals with a PD diagnosis. One future direction for research would be an investigation of the extent to which a range of possible mediating factors may or may not influence the impact of early deprivation and trauma on subsequent psychopathology both across and within clinical and non-clinical samples. Such research would have

obvious implications for determining the suitability of clinical interventions for treating psychological distress in different populations.

It is possible that the self-report measures used in the current study were inadequate in demonstrating the true nature of the association of the variables under consideration. Previous studies of the influence of the mentalizing on psychopathology have tended to use interview-based assessments of individual's capacity to mentalize. Interview based measures may provide a more stable and accurate cross-situational index of individual differences in mentalizing than self-report measures and may there be more robust to methodological artefacts (Fonagy & Target, 2005). The self-report measures used in the current study, in particular the RFQ-54 and ECR-R, seemed to present a number of methodological shortcomings, as has been documented extensively above. Different self-report measures of the same constructs may be able to provide a more accurate assessment of attachment style and mentalizing ability. Another direction of future research would be to compare the influence of RF on psychopathology using a range of measures (e.g. self-report, interview, observational) in order to investigate their relative predictive power. The larger neuroimaging study in which the current study was embedded did administer an interview-based measure of attachment style and RF, the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1987), but data from the AAI interviews were not available for analysis at the time of writing. When this data becomes available, it will be possible to compare the influence of RF on psychopathology in the current sample using both self-report and interview-based measures of the RF construct. It should also be noted that the ECR-R is a self-report measure of general attachment-related behaviour in close relationships and therefore differs from interview-based measures like the AAI, which place a greater emphasis on specific early attachment experiences, and in particular those which may have been experienced by the participant as traumatic. This might help partly to explain the failure of the current study to replicate the findings of previous research, which, in their use of the AAI, have placed greater emphasis on the influence of early deprivation and trauma. While one would ordinarily expect a high correlation between the nature of early attachment-related experiences and later attachment-related behaviour, methodological shortcomings relating to the ECR-R may mean that it did not accurately reflect the influence of early

attachment experience in this sample. Again, comparison of participants' ECR-R scores with their AAI performance will help to clarify the extent to which their scores on the two measures may be related.

It is important to remember that the measure of psychopathology used in this study, the GSI, does not distinguish between general psychopathology and individual psychological/personality disorders. It is therefore important to exercise caution when extrapolating these findings to a consideration of how RF may explains attachment-related differences in specific disorders. The aggregation of Axis I and II disorders into one global measure of severity of symptoms may therefore not be particularly helpful in terms of drawing implications about how the findings of this study apply to disorder-specific interventions, but may be of value in describing the extent to which RF may explain increased exposure to psychopathology as a result of attachment-related differences. A future direction of research in this area might be to investigate the degree to which attachment-related variance in *specific* disorders is explained by RF, which might make it easier to make more direct inferences regarding the implications of such findings for clinical intervention. This was not done in the current study because, as outlined above, the measure of psychopathology used, the BSI, has been shown to have limited utility for measuring symptom groups (Benishek et.al., 1998).

There are a number of other limitations of the current study. The two groups of participants were not adequately matched in a number of areas, which may have made it more difficult to make meaningful comparisons between them. Despite the fact that the groups were not matched in age and gender, these variables did not appear on subsequent analyses to predict observed differences in the main variables under investigation. Given the large and expected differences between the groups in SES, it was not possible to control for this particular variable through matching of samples. A further limitation of the current study is the cross-sectional nature of the data. It would have been preferable to assess the mediator variables in advance of the criterion variable for a more accurate evaluation of the pathways leading to increased severity of psychiatric symptoms. There may also have been other confounding factors which explain the unexpected findings in the current study, particularly among the control sample, which were less easy to identify and therefore control for. Purposive sampling

may have resulted in a heterogeneous non-clinical sample, which may not have been sufficiently representative of the population under investigation, although for reasons which remain unclear. This would make it difficult to draw robust conclusions regarding the significance of findings relating to this group. It may also partly explain some of the study's more surprising findings, e.g. the very low proportion of participants who could be classified as 'secure'; the unexpectedly high scores among control participants for avoidant attachment and certainty in RF. These findings may partly be due to inadequate screening for personality dysfunction, but may also be due to shortcomings of the measurement tools in question. As previously explained, the unexpectedly high scores for 'too certain' RF among control participants may have been due to the observed inconsistency of certain key scale items. Another potential shortcoming of the scales may have been reduced sensitivity when applied to smaller samples. At the time of the writing of this report, the larger neuroimaging study, from which the data for this study was obtained, was still ongoing and additional data being collected. It is possible that a larger and more homogenous sample may mitigate the unexpected observations of the current study. It should also be noted that clinical participants in this study were drawn from a range of clinical and probation settings, each of which may have employed different diagnostic procedures, resulting in a more heterogeneous diagnostic characterisation of the PD group.

The reliability of this study's results may also have been adversely affected by issues relating to the testing process. All participants in this study completed a large battery of tests over two sessions lasting on average between eight and ten hours in total. Furthermore, each participant will have been administered the Adult Attachment Interview (AAI; George et al., 1987), with PD participants administered an additional semi-structured interview, the Structured Clinical Interview for DSM Disorders (SCID-II; First, Spitzer, Gibbon & Williams, 1997), both of which require participants to recount in detail past experiences which have been emotionally affecting and, in some cases, traumatising. The testing process thus had the potential to be experienced by the participants as very challenging and exhausting, both physically and emotionally, which may have played a part in influencing test responses depending on when during the testing process certain tests were completed. The OPD-SQ, for instance, was administered as the very first questionnaire in the first of two separate

questionnaire 'packs', usually given to participants to complete in the first session at the commencement of the assessment process. By contrast, the RFQ-54 and BSI were included in the second pack of questionnaires usually given to participants to complete in the second assessment session, which took place at least a few days after the first session or, in some cases, several weeks after. The OPD-SQ was therefore generally administered when participants were perhaps more likely to be feeling physically fresher and/or more engaged, and before they were administered the semi-structured interviews, either of which may have inadvertently led to certain participants subsequently providing more guarded or inaccurate responses if they had experienced the interview(s) as intrusive, exposing and/or emotionally overwhelming. The potential in these participants for guardedness or obfuscation, whether fully conscious or not, may offer one explanation for the excessive levels of certainty in control participants' responses to the RFQ-54. These participants are likely to have had less contact with psychological services than their PD counterparts and therefore less experience of talking openly about their emotional experience and attachment histories. The experience of a highly intensive assessment process focused on how they experience difficult emotions and relationships may therefore have led to certain control participants becoming uncomfortable with the process and/or warier of the study's motives. Different researchers may have been more or less well equipped to recognise when this might have happened and to manage the situation appropriately, e.g. by sufficiently preparing participants in advance for the interviews, explaining confidentiality thoroughly, etc. PD participants, sensing that they were involved in a study aimed at improving understanding personality disorders with possible implications for clinical intervention, may have been more highly motivated to participate and to provide more accurate responses.

In conclusion, the current study showed PD and non-PD samples to differ in their levels of RF and their attachment style, but that the conclusions which can be drawn from these differences are compromised by limitations of the self-report questionnaires used to measure these constructs. The current study also showed RF to explain a significant component of the common variance in the association between attachment style and psychopathology, but that this effect was restricted to the total and non-clinical samples only. The study needs to be replicated with a broader range of

measures (both self-report and interview-based), preferably using a longitudinal design and with less heterogeneous clinical and non-clinical samples.

References

Abu-Akel, A., & Bo, S. (2013). Superior mentalizing abilities of female patients with schizophrenia. *Psychiatry Research, 210*(3), 794-799.

Ainsworth, M. D., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child Development, 41*(1), 49-67.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision).Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).Washington, DC: American Psychiatric Association.

Bartholomew, K. & Horowitz, L. M. (1991). Attachment styles among young adults: A Test of a four-category model. *Journal of Personality and Social Psychology*, 61(2), 226-244.

Bateman, A., & Fonagy, P. (2008). Comorbid antisocial and borderline personality disorders: Mentalization-based treatment. *Journal of Clinical Psychology, 64*(2), 181-194.

Bender, D. S., Morey, L. C., & Skodol, A. E. (2011). Toward a model for assessing level of personality functioning in *DSM–5*, Part I: A review of theory and methods. *Journal of Personality Assessment*, *93*, 332–346.

Benishek, L.A., Hayes, C.M., Bieschke, K.J. & Stoffelmayr, B.E. (1998). Exploratory and confirmatory analyses of the Brief Symptom Inventory among substance abusers. *Journal of Substance Abuse, 10,* 103-114.

Bleiberg, E. (2013). Mentalizing-based treatment with adolescents and families. *Child and Adolescent Psychiatric Clinics of North America, 22*(2), 295-330.

Carlson, E. A., Egeland, B., & Sroufe, L. A. (2009). A prospective investigation of the development of borderline personality symptoms. *Development and Psychopathology*, 21, 1311–1334.

Cassidy, J., & Mohr, J.J. (2001). Unsolvable fear, trauma, and psychopathology: Theory, research, and clinical considerations related to disorganized attachment across the life span. *Clinical Psychology: Science and Practice*, 8, 275– 298.

Chan, M., Rogers, K. H., Parisotto, K. L., & Biesanz, J. C. (2011). Forming first impressions: The role of gender and normative accuracy in personality perception. *Journal of Research in Personality,* 45(1), 117-120.

Chiesa, M., & Fonagy, P. (2014). Reflective function as a mediator between childhood adversity, personality disorder and symptom distress. *Personality and Mental Health, 8*(1), 52-66.

Coid, J., Yang, M., Tyrer, P., Roberts, A., & Ullrich, S. (2006). Prevalence and correlates of personality disorder in Great Britain. *The British Journal of Psychiatry, 188*(5), 423-431.

Derogatis, L. R. (1975). *Brief Symptom Inventory*. Baltimore, MD: Clinical

Derogatis, N. R. & Melisaratos, N. (1983). The Brief Symptom Inventory: an introductory. *Psychological Medicine*, 13, 595-605.

Dinger, U., Schauenburg, H., Hörz, S., Rentrop, M., Komo-Lang, M., Klinkerfuß, M., Grande, T. & Ehrenthal, J. C. (in press). Concurrence of self-report and expert ratings concerning personality functioning: a study of the OPD system. *Journal of Research in Personality.*

Ehrenthal, J. C., Dinger, U., Horsch L., Komo-Lang, M., Klinkerfuß, M., Grande, T., & Schauenburg, H. (2012). The OPD structure questionnaire (OPD-SQ): First results on reliability and validity. *Psychother Psych*, 62, 25–32.

Field, A. P. (2007). *Discovering statistics using SPSS for Windows: Advanced techniques for the beginner.* London: Sage.

First, M.B., Spitzer, R.L., Gibbon, M., & Williams, J.B.W. (1997). *Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II)*. Washington, DC: American Psychiatric Press, Inc.

Fonagy, P. (2000). Attachment and borderline personality disorder. *Journal of the American Psychoanalytical Association*, 48,1129–1146.

Fonagy, P. (2004). *Attachment theory and psychoanalysis*. London: Karnac Books.

Fonagy, P., Gergely, G., Jurist, E., & Target, M. (2002). *Affect regulation, mentalization, and the development of the self*: Other Press, New York.

Fonagy, P. & Ghinai, R.A. (2008). *A self-report measure of mentalizing development and preliminary test of reliability and validity of the Reflective Function Questionnaire (RFQ).* Unpublished manuscript. London: University College.

Fonagy, P., Leigh, T., Steele, M., Steele, H., Kennedy, R., Mattoon, G., Target, M., & Gerber, A. (1996). The relation of attachment status, psychiatric classification, and response to psychotherapy. *Journal of Consulting and Clinical Psychology, 64*(1), 22-31.

Fonagy, P., Redfern, S., & Charman, A. (1997). The relationship between belief-desire reasoning and a projective measure of attachment security (SAT). *British Journal of Developmental Psychology, 15*, 51-61.

Fonagy, P., Steele, H., & Steele, M. (1991). Maternal representations of attachment during pregnancy predict the organization of infant-mother attachment at one year of age. *Child development, 62*(5), 891-905.

Fonagy, P., Steele, M., Steele, H., Leigh, T., Kennedy, R., Mattoon, G., & Target, M. (1995). Attachment, the reflective self, and borderline states: The predictive specificity of the Adult Attachment Interview and pathological emotional development. In S. Goldberg, R. Muir, & J. Kerr (Eds*.), Attachment theory: Social, developmental and clinical perspectives*. (pp. 223 – 279). Hillsdale, NJ: Analytic Press.

Fonagy, P., & Target, M. (1997). Attachment and reflective function: Their role in self-organization. *Development and Psychopathology, 9*(4), 679-700.

Fonagy, P., & Target, M. (2005). Bridging the transmission gap: an end to an important mystery of attachment research? *Attachment & Human Development, 7*(3), 333.

Fonagy, P., Target, M., Steele, H., & Steele, M. (1998). *Reflective functioning manual, version 5.0, for application to Adult Attachment Interviews*. London: University College London.

Fraley, R.C. (2012). *Information on the Experiences in Close Relationships-Revised (ECR-R) Adult Attachment Questionnaire*. Retrieved from http://internal.psychology.illinois.edu/~rcfraley/measures/ecrr.htm

Fraley, R., & Spieker, S. J. (2003a). Are infant attachment patterns continuously or categorically distributed? A taxometric analysis of strange situation behavior. *Developmental Psychology, 39*(3), 387-404.

Fraley, R., & Spieker, S. J. (2003b). What are the differences between dimensional and categorical models of individual differences in attachment? Reply to Cassidy (2003), Cummings (2003), Sroufe (2003), and Waters and Beauchaine (2003). *Developmental Psychology, 39*(3), 423-429.

Fraley, R. C., & Waller, N. G. (1998). Adult attachment patterns: A test of the typological model. *Attachment theory and close relationships* (pp. 77-114). New York, NY: Guilford Press; US.

Fraley, R. C., Waller, N. G. & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology, 78(2*), 350-365.

George, C., Kaplan, N., & Main, M. (1987). *The adult attachment interview.* Unpublished manuscript. University of California, Berkeley.

Germans, S., Van Heck, G. L., Moran, P., & Hodiamont, P. P. (2008). The Self-report Standardized Assessment of Personality-abbreviated Scale: Preliminary results of a brief screening test for personality disorders. *Personality and Mental Health, 2*(2), 70-76.

Grant, B.F., Chou, S.P., Goldstein, R.B., Huang, B., Stinson, F.S., Saha, T.D., Smith, S.M., Dawson,

D.A., Pulay, A.J., Pickering, R.P. & Ruan, W.J. (2008). Prevalence, correlates, disability, and

    comorbidity of DSM-IV borderline personality disorder: results from the Wave 2 National

    Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry*, 69,

    533–545.

Groh, A. M., Roisman, G. I., van Ijzendoorn, M. H., Bakermans-Kranenburg, M. J., & Fearon, R.

    (2012). The significance of insecure and disorganized attachment for children's internalizing

    symptoms: A meta-analytic study. *Child Development, 83*(2), 591-610.

Hayes, Andrew F. (2012). *PROCESS: A Versatile Computational Tool for Observed Variable*

    Mediation, Moderation, and Conditional Process Modeling. Retrieved from

    http://www.afhayes.com/public/process2012.pdf

Hesse, M., & Moran, P. (2010). Screening for personality disorder with the Standardised Assessment

    of Personality: Abbreviated Scale (SAPAS): Further evidence of concurrent validity. *BMC*

    Psychiatry Vol 10 Jan 2010, ArtID 10, 10.

Horowitz, L. M., Rosenberg, S. E., Baer, B. A., Ureño, G. & Villaseñor, V. S. (1988). Inventory of

    interpersonal problems: Psychometric properties and clinical applications. *Journal of*

    Consulting and Clinical Psychology, *56(6)*, 885-892.

Kernberg, O. F., & Caligor, E. (2005). A psychoanalytic theory of personality disorders. In M. F.

    Lenzenweger, & J. F. Clarkin (Eds.), *Major theories of personality disorder* (2nd ed.,

    pp. 114–156). New York: The Guilford Press.

Krach, S., Blumel, I., Marjoram, D., Lataster, T., Krabbendam, L., Weber, J., van Os, J., & Kircher,

    T. (2009). Are women better mindreaders? Sex differences in neural correlates of mentalizing

    detected with functional MRI. *BMC Neuroscience Vol 10 Feb 2009, ArtID 9, 10*.

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New

    York, NY: Guilford Press.

Lyons-Ruth, K., & Jacobvitz, D. (1999). Attachment disorganization: Unresolved loss, relational violence, and lapses in behavioral and attentional strategies *Handbook of attachment: Theory, research, and clinical applications* (pp. 520-554). New York, NY: Guilford Press; US.

Main, M., & Goldwyn, R. (1994). *Adult attachment rating and classification system: Manual in draft* (Version 6.0). Unpublished manuscript, University of California at Berkeley.

Mickelson, K. D., Kessler, R. C., & Shaver, P. R. (1997). Adult attachment in a nationally representative sample. *Journal of Personality and Social Psychology, 73*(5), 1092-1106.

Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. New York, NY: Guilford Press; US.

Moran, P., Leese, M., Lee, T., Walters, P., & Thornicroft, G. (2003). Standardised Assessment of Personality – Abbreviated Scale (SAPAS): preliminary validation of a brief screen for personality disorder. British Journal of Psychiatry, 183, 228–232.

Morey, L. C., Berghuis, H., Bender, D. S., Verheul, R., Krueger, R. F. & Skodol, A. E. (2011). Toward a model for assessing level of personality functioning in DSM-5, part II: Empirical articulation of a core dimension of personality pathology. *Journal of Personality Assessment*, *93*, 347-353.

Moss, E., Parent, S., & Gosselin, C. (1995). *Attachment and theory of mind: cognitive and metacognitive correlates of attachment during the preschool period.* Paper presented at the biennial meeting for the Society of Research in Child Development, Indianapolis, Indiana, March-April.

Moulton-Perkins, A., Rogoff, S., Fonagy, P., & Luyten, P. (2011, September). *Development and validation of a new self-report measure of mentalization: The 54-item Reflective Functioning Questionnaire.* Paper presented at the British Association of Clinical Psychologists/Society for Psychotherapy Research Conference.

Müller, C., Kaufhold, J., Overbeck, G., & Grabhorn, R. (2006). The importance of reflective functioning to the diagnosis of psychic structure. *Psychology and Psychotherapy: Theory, Research and Practice*, *79*, 485–494.

OPD Taskforce. (2001). *Operationalized Psychodynamic Diagnostics: Foundations and Practical Handbook*. Cambridge, MA: Hogrefe.

OPD Taskforce. (2008). *Operationalized Psychodynamic Diagnosis OPD-2: Manual of diagnosis and treatment planning.* Cambridge, MA: Hogrefe.

Perkins, A. (2009). *Feelings, faces and food: Mentalization in borderline personality disorder and eating disorders*. Unpublished doctoral thesis, University of Surrey.

Roisman, G. I., Fraley, R., & Belsky, J. (2007). A taxometric study of the Adult Attachment Interview. *Developmental Psychology, 43*(3), 675-686.

Rosenfield, S. & Mouzon, D. (2013). Gender and mental health. In C.S. Aneshensel, J.C. Phelan & E. Bierman (Eds.), *Handbook of the sociology of mental health* (pp. 277-296). Springer.

Sansone, R. A., & Sansone, L. A. (2011). Gender patterns in borderline personality disorder. *Innovations in Clinical Neuroscience, 8*(5), 16-20.

Schauenburg, H. & Grande, T. (2011). Interview measures of interpersonal functioning and quality of object relations: The Operationalized Psychodynamic Diagnosis. In L. M. Horowitz and & S. Strack (Eds.), *Handbook of interpersonal psychology: Theory, research, assessment and therapeutic interventions* (pp. 343-356). Hoboken, NJ: John Wiley & Sons.

Skeem, J. L., Schubert, C., Odgers, C., Mulvey, E. P., Gardner, W., & Lidz, C. (2006). Psychiatric symptoms and community violence among high-risk patients: A test of the relationship at the weekly level. *Journal of Consulting and Clinical Psychology, 74*(5), 967-979.

Sheehan, D. V. (1983). *The Anxiety Disease*. New York, NY: Charles Scribner and Sons.

Sibley, C. G., & Liu, J. H. (2004). Short-term temporal stability and factor structure of the revised experiences in close relationships (ECR-R) measure of adult attachment. *Personality and Individual Differences*, *36*, 969-975.

Sibley, C. G., Fischer, R. & Liu, J. H. (2005). Reliability and validity of the Revised Experiences in Close Relationships (ECR-R) self-report measure of adult romantic attachment. *Personality and Social Psychology Bulletin*, *31*, 1524-1536.

Siegel, D. J. (1999). *The developing mind: Toward a neurobiology of interpersonal experience*. New York, NY: Guilford Press; US.

Skogol, A. C., Clark, L. A., Bender, D. S., Krueger, R. F., Morey, L. C., et al. (2011). Proposed change in personality and personality disorder assessment and diagnosis for DSM-5 part I: Description and rationale. *Personality Disorders: Theory, Research, and Treatment, 2,* 4-22.

Slade, A. (2005). Parental reflective functioning: An introduction. *Attachment & Human Development, 7*(3), 269-281.

Sole, S. (2014). *Dissociative symptoms and the quality of structural integration in BPD* (doctoral thesis). University College London

Taubner, S., & Curth, C. (2013). Mentalization mediates the relation between early traumatic experiences and aggressive behaviour in adolescence. *Psihologija*, *46*(2), 177-192.

Tinsley, H. E. A., & Tinsley, D. J. (1987). Uses of factor analysis in counseling psychology research. *Journal of Counseling Psychology*, 34 (4), 414-424.

Tyrer, P., Crawford, M., Mulder, R., Blashfield, R., Farnam, A., Fossati, A. & Reed, G. M. (2011). The rationale for the reclassification of personality disorder in the 11th revision of the International Classification of Diseases (ICD–11). *Personality and Mental Health*, 5(4), 246–259.

Ullrich, S., Farrington, D. P., & Coid, J. W. (2007). Dimensions of DSM-IV personality disorders and

life-success. *Journal of Personality Disorders, 21*(6), 657-663.

Walsh, Z., Shea, M., Yen, S., Ansell, E. B., Grilo, C. M., McGlashan, T. H., Stout, R.L., Bender, D.S., Skodol, A.E., Sanislow, C.A., Morey, L.C., & Gunderson, J. G. (2013). Socioeconomic-status and mental health in a personality disorder sample: The importance of neighborhood factors. *Journal of Personality Disorders, 27*(6), 820-831.

World Health Organization. (1992). ICD–10: *The* ICD–10 *classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*. Geneva, Switzerland: Author.

Zimmermann, J., Ehrenthal, J. C., Cierpka, M., Schauenburg, H., Doering, S. & Benecke, C. (2012). Assessing the level of structural integration using Operationalized Psychodynamic Diagnosis (OPD): Implications for DSM–5. *Journal of Personality Assessment, 1–11.*

Part 3: Critical Appraisal

Introduction

This critical appraisal comprises reflection on the literature review and empirical paper. My motivation for conducting research in the area of attachment and mentalizing is discussed, followed by a consideration of my own personal views of the current state of research into the relationship between mentalizing and attachment. Methodological concerns relating specifically to the self-report measures used in the empirical study and possible areas of improvement are discussed, as well as ethical concerns relating to my experience of interviewing participants for this project, particularly those with complex attachment histories.

Background

I have a personal interest in how people struggle to make sense of their own and other people's thoughts and feelings. This stems from my own experiences growing up in an environment where overwhelming emotions – my own and other people's – often struggled to find containment, and my ongoing efforts as an adult, through my own analysis and clinical training, to understand how my early experiences have influenced, still influence and will continue to influence my personal and professional relationships.

For a long time it has felt intuitively obvious that the root cause of many (perhaps most) psychological problems which present themselves to clinicians lies in a diminished capacity to relate, whether this diminished capacity pertains to an individual's relationships with other people (neurotic/personality disorders) or to aspects of reality itself (psychosis). The degree to which an individual learns (or is facilitated to learn) that he/she is distinct from, but inextricably linked to, other people and objects is bound to exert a profound impact on this capacity. This has been documented anecdotally and theoretically by the likes of Melanie Klein, Donald Winnicott and Wilfred Bion, but empirical research has been slow to build on these foundations.

My own personal experience as a trainee clinical psychologist has led me to appreciate the centrality of addressing relationships – and facilitating awareness of relationships – in my clinical work. This might, at first glance, seem such an obvious comment to make that it verges on being a truism. I am nevertheless surprised by how little the profession (with honourable exceptions) uses the language of relationships when describing clinical work, something which I believe other professions (e.g. psychotherapists) are much better than us at doing. It's my contention that consideration of the relationship between client and therapist is treated as just another component of the clinical psychologist's toolkit (conveyed through buzzwords such as 'collaboration', 'empathic listening', etc.) – in other words means to an end, rather than *the* end of a successful therapy, and often subservient to consideration of other important factors, e.g. demonstrating diagnosis-specific 'evidence-based' interventions; a focus on symptom reduction. My experience of being alone in a room with people with difficult attachment histories and who struggle to understand their own and other people's thoughts and feelings (including my own as their therapist) is that their needs (and fears) in relationships demand expression and are often frustrated by their (and sometimes my own) failure to understand what these are. The fulfilment of these needs can only occur in and through the experiencing of relationships, and the therapeutic relationship is often the client's first opportunity to realise what these needs are. My motivations for choosing this area for my thesis were (1) to improve, through compiling and writing my literature review, my knowledge of the nature of the link between attachment and mentalizing, and (2) to contribute, through conducting my empirical study, to a greater understanding of how people's experiences in early relationships might influence the problems with which they present to clinicians many years down the line. I was therefore excited by the opportunity to investigate the reliability and validity of a particular self-report measure, the OPD structure questionnaire (OPD-SQ; Ehrenthal, Dinger, Horsch, Komo-Lang, Klinkerfuß, Grande et al., 2012), which aims to expand upon symptom-based, description-orientated classifications of mental disorders by representing a different, and perhaps controversial, concept of how to measure psychopathology, based on individuals' capacity to self-organise and self-regulate themselves in relationships.

Reflection on the Literature Review

My predominant personal response to conducting the literature review was one of frustration at the slowness with which research in this particular area has developed. Over two decades have passed since Fonagy and colleagues' (Fonagy, Steele, Steele, Moran, & Higgitt, 1991) finding of a link between attachment status and reflective functioning. Research since has built on and elaborated on these findings, which has resulted in improved methods for assessing attachment security and mentalizing as well as an improved understanding of the predictive value of parental mentalizing capacity on attachment relationships. It is difficult, however, to ignore the fact that research in this field remains very much governed by a debate about how to define and operationalise the mentalizing construct. Given the profound implications for clinical intervention of the robust link between mentalizing capacity and attachment security, this debate seems, at best, an irritating distraction, at worst, a frustratingly slow collective response of the research fraternity to those who stand to benefit clinically from research in this area. The proverbial Martian curious about the state of attachment research on planet Earth can be forgiven for scratching his or her tentacles in puzzlement at the paper-thin distinction between RF and mind-mindedness, which reflects little more than contrasting approaches to measurement – useful, perhaps, in justifying research funding but of no immediate relevance to a mother wracked by self-loathing because she feels little emotional response to her crying baby. I feel that researchers in this area need to be more explicit in communicating the clinical utility of their findings and be more conspicuous in promoting this as the primary function of their research.

Reflections on the Empirical Study

Methodological issues

In spite of my frustration at the slow progress of research in this area, I nevertheless have gained a solid appreciation of the difficulties entailed in validating and comparing measures. An irony presented by my empirical study, which, amongst other things, investigated the extent to which people's problems interpreting their own and others' mental states is related to their functioning in other areas, was the extent to which the study was complicated and inevitably compromised by the stubborn inscrutability of people's minds. The RFQ-54 (Fonagy & Ghinai, 2008; Perkins & Rogoff, 2011), a questionnaire still very much in development, which seeks to clarify how people think about their and other people's mental states, proved – in this instance at least – somewhat limited in fulfilling its purpose. The self-report measures used in my empirical study to measure both reflective functioning and attachment style had previously shown good construct validity, perhaps due to demographic and cultural factors affecting the samples in those studies, which may have differed markedly from the sample used in my empirical study. In the end, it was the unexpectedly high levels of certainty shown in the responses of healthy controls on the self-report measure of reflective functioning which prompted me to investigate the internal consistency of that particular scale. Had the difference between groups been less pronounced and more in line with expectations, the questionable reliability of certain items in the questionnaire may have remained unreported but still with the potential to exert an undue influence on participants' responses. It's one thing, however, pointing out the inadequacy of language in communicating human thought and feeling, it's another trying to find accurate means of expression for those thoughts and feelings, and the experience of conducting the study has made me much more aware of just how big a challenge this can be and how easy it can be to take for granted the validity and reliability of self-report measures.

The study highlighted how language, our most important tool as psychologists, is a fickle friend at the best of times, slippery and evasive in response to our attempts to tame it. I was surprised by how

certain items in the questionnaire were deemed eligible to be included in the first place, given their quite obvious (to me, at least) ambiguity: "I believe there's no point trying to guess what's on someone else's mind" ("Yes, because I can never know what that is exactly"/ "Yes, because it's usually obvious"); "I always know what I feel" ("Yes, I'm always aware of my feelings"/ "Yes, I can always name my feelings"); "I trust my feelings" ("Yes, my feelings are a helpful guide"/"Yes, my feelings are always right"). Perhaps an overemphasis on (or privileging of) supposedly more 'objective' quantitative methods when assessing a scale's reliability and validity might sometimes mean that ambiguous items, which might otherwise be identified as such by more 'subjective' qualitative methods (e.g. a simple consideration of face validity), are sometimes overlooked. The clinical psychologist's role as a scientist practitioner, and the emphasis which underpins this role on research meeting acceptable standards of scientific practice, may sometimes incline clinical psychologists to underestimate (or worse, disregard) the extent to which the human mind and human emotions do not behave as predictably as other natural phenomena that can be subjected to scientific research. Nevertheless, the pressure to produce evidence of clear scientific merit may mean that results obtained through self-report measures may often be presented and discussed as if they do represent the phenomena under investigation independent of the self-report measures themselves. Each individual's unique personal experiences, their understanding of language, their cultural expectancies, their psychological, emotional and physical state during testing, are all likely to influence how they respond to items on self-report measures. While these factors may also influence how individuals behave when being interviewed or observed, the very process of interviewing and observing may allow for a greater consideration of how personal, cultural and situational factors may have influenced participants' behaviour during testing and to interpret subsequent results accordingly. Interviews, in particular, may be able provide a more accurate picture of the range and complexity of individual's behaviour across different situations and their tendency to ascribe to certain experiences certain meanings (which may or may not be an accurate reflection of those experiences). By contrast, it can be much more difficult to discern from participants' responses to self-report questionnaire items the meaning they may attach to a certain experience from the experience itself. My experience of conducting the empirical study illustrated the question, highlighted in my literature review, of how

best to assess mentalizing capacity: via self-report, observation, or by recording individuals' representations of their mentalizing abilities. While these different methods all present with their relative advantages and disadvantages, I have a greater appreciation of how important it is for researchers to be as transparent as possible as to the reasons why they have chosen to use certain measures in their studies and what impact their choices might have on participants' responses and any subsequent inferences based on the resulting data. In the case of my empirical study, I was interested in investigating if previous findings concerning the mediating role of reflective function in the association between attachment style and psychopathology, which have tended to use interview-based measures, could be replicated using self-report measures. Self-report measures have obvious advantages over interviews and observational measures in terms of their practicality and therefore their potential application to larger samples, and for these reasons will always represent a tempting option to researchers. Nevertheless, the experience of conducting my empirical study has shown me that even with relatively large samples, such as the one used in my empirical study, it may not be possible to mitigate the potential for self-report measures insufficiently robust in terms of their reliability and validity to behave in unpredictable ways. I think it would be helpful if researchers into the phenomena of attachment and reflective functioning make greater use of a range of methods in order to understand the extent to which specific methods are more or less successful at operationalising these constructs, rather than privileging certain methods over others before we have a more complete understanding of how these methods actually vary. Despite the limitations of the self-report measures used in my empirical study, and the difficulties they presented in terms of making inferences based on their results, I nevertheless found something reassuring in the fact that the intricate complexity of human experience proved resistant to attempts to reduce it down to a set of statements.

Ethical issues

My empirical study presented my first opportunity to work on a well-funded, relatively large scale research project conducted across a number of sites. While this project represents a new and exciting

opportunity to conduct a wide range of tests on participants in order to expand the evidence base

relating to the impact of personality disorders, it raised in my mind certain ethical considerations

which may be of less relevance to other, smaller scale research projects.   Being in a position to

remunerate research participants for their intensive participation over a total period of eight to ten

hours may be seen as a luxury rarely afforded to researchers. While it was most certainly appropriate

to provide participants with remuneration in this particular study, given the requirements of

participation (e.g. intensive interviewing and administering of multiple tests for all participants and

fMRIs in the case of many of these participants), the extensive funds available to fund a large number

of tests and the time in which to administer them may have led to unreasonable expectations of what

participants would be able to achieve in the time available and an underestimation of the possible

adverse impact of such intensive participation on their part. In the Discussion section of the report for

my empirical study, I commented on how the intensive nature of the assessment process may have

been experienced by some participants as psychologically and physically exhausting with the

potential to influence how they responded during testing, as well as on how they may have

experienced the process of being interviewed about their difficult past experiences. I feel that my

experience as a clinical practitioner has equipped me with certain knowledge and skills that were of

use when conducting the research, e.g. being observant and mindful of the impact of testing on

participants and being responsive to their needs; explaining assessment tasks clearly and succinctly;

adopting an empathic stance when asking questions with the potential to be experienced by

participants as emotionally affecting and adapting my approach accordingly. Not all researchers

involved in the project would have had a similar level experience of working with clinical populations

and it remains difficult to know to what extent they may have utilised these skills when testing

participants. It is also possible, however, that such skills, however well applied, would not have been

sufficient to contain the emotional responses of certain participants, especially during and after being

administered either or both of the lengthy semi-structured interviews, the Adult Attachment Interview

(AAI; George, Kaplan, & Main, 1987) and the Structured Clinical Interview for DSM Disorders

(SCID-II; First, M.B., Spitzer, R.L., Gibbon, M., & Williams). Researchers were provided with a

protocol for intervening when participants began to show excessive anxiety during testing, which

involved employing appropriate relaxation techniques (e.g. muscle relaxation and mindfulness exercises). Instructions for these exercises were also provided to participants in their debrief sheet. Researchers were also encouraged to be generally mindful of the range of emotional responses with which participants may present and to respond accordingly, e.g. introduce breaks or allow participants to withdraw either temporarily or permanently. I am not sure, however, if such strategies and techniques were always the most appropriate for the nature of emotional distress most likely to be occasioned by these particular interviews. Anxiety, and especially anxiety which is made visibly manifest, is only one of a range of potential emotional responses and not one which I personally encountered during testing. Some of the participants who I tested became emotionally aroused in a number of ways when recounting past experiences of trauma and abuse, albeit not to an extent which necessarily compromised the assessment process. For example, they would usually seem motivated to continue with their participation at such times and may even have experienced some benefits from talking about their difficult histories and experiencing the accompanying emotions in a structured setting. Nevertheless, the disclosure of experiences of a very personal nature to a virtual stranger, often at the end of an assessment session, may have affected the individuals concerned in a panoply of ways, not all of which may have been apparent to researchers at the time and which, in some cases, may only have been experienced by individual participants once the assessment process had been completed, perhaps even hours or days later (and not necessarily in ways of which they were consciously aware). The debrief sheet advised participants who continued to experience concern to talk to a family member, a friend or their GP. Whilst certainly good advice (providing the participant reads that information), I am not sure if this would be enough in itself to contain any distress experienced by participants as a result of testing. My experience of both providing and receiving psychological therapies has shown me that disclosure of personal experience always carries the potential to be emotionally destabilising, but that this can be mitigated somewhat by the prospect of being able to attend the next therapy session. This, however, would not have been an option for most participants, especially the control participants with limited experience of contact with psychological services. I wonder if more could have been done by the research team to offer containment to these participants, perhaps by providing them with access to a clearly identified psychological liaison

officer from within the team, someone with clinical skills and a knowledge of the particular assessment process and its potential to affect participants in specific ways, who could be easily contacted both during or after testing. Another option might have been to reduce the overall number of tests administered to participants (e.g. as well as the SCID-II, which is a comprehensive testing tool for personality dysfunction, additional self-report measures of personality disorders were also administered). The interviews were sometimes conducted at the end of an intensive, task-heavy, four to five hour assessment session, often the second such session for participants, by which time they may have been feeling tired and de-motivated and leaving little time for subsequent reflection. I think that the larger research project in which my study was embedded may have attempted far too much in terms of the scope of its testing. I feel almost as if the coordinators of the project saw the potential for a large number of participants and a large number of tests to be administered and then set out to obtain as much data as was conceivably possible given the time and the funds available. I am not sure if this is an advisable route to take for any research project, for which both the welfare of its participants and the quality of its data should be paramount.

Conclusion

My experience of undertaking this thesis project has enhanced my appreciation of the following: the need for research in the area of attachment and mentalizing to become more explicit in demonstrating and promoting its potential value to clinicians; the difficulties in achieving this, given existing difference of opinion about how best to measure the constructs of attachment style and mentalizing, and the sizeable task of establishing the validity and reliability of tools measuring these; concerns relating to the validity of specific self-report measures used in my empirical study, which may be of limited value in measuring how people think and behave in relationships; and the need to be mindful not only about the immediate but also the longer term emotional impact of testing and interviewing on participants.

References

Ehrenthal, J. C., Dinger, U., Horsch L., Komo-Lang, M., Klinkerfuß, M., Grande, T., & Schauenburg, H. (2012). The OPD structure questionnaire (OPD-SQ): First results on reliability and validity. *Psychother Psych, 62, 25–32.*

First, M.B., Spitzer, R.L., Gibbon, M., & Williams, J.B.W. (1997). *Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II).* Washington, DC: American Psychiatric Press, Inc.

Fonagy, P. & Ghinai, R.A. (2008). *A self-report measure of mentalizing development and preliminary test of reliability and validity of the Reflective Function Questionnaire (RFQ).* Unpublished manuscript. London: University College.

Fonagy, P., Steele, M., Steele, H., Moran, G. S., & Higgitt, A. C. (1991b). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal, 12*(3), 201-218.

George, C., Kaplan, N., & Main, M. (1987). *The adult attachment interview.* Unpublished manuscript. University of California, Berkeley.

Moulton-Perkins, A., Rogoff, S., Fonagy, P., & Luyten, P. (2011, September). Development and validation of a new self-report measure of mentalization: The 54-item Reflective Functioning Questionnaire. Paper presented at the British Association of Clinical Psychologists/Society for Psychotherapy Research Conference.

Appendix I. Outline of contributions to joint thesis

This thesis is presented as part of a joint thesis with *Dissociative symptoms and the quality of structural integration in BPD* (2014) by Shirey Sole. Given the shared focus between our two projects on introducing and validating an English language version of the OPD-SQ, Shirey and I collaborated closely in the preparation of our individual projects. This was in order to familiarise ourselves with the OPD-LSIA system and to ensure that our empirical studies would be sufficiently independent of each other. Following the submission of our research proposals, we worked more or less independently, apart from the occasional discussion between us of project-related issues that were of shared relevance, e.g. how to address the two translations of the OPD-SQ. Our decisions regarding how to address such issues were taken entirely independently. We were both responsible for assessing participants in each other's samples, although this responsibility was also shared with other researchers at the Functional Imaging Laboratory and Anna Freud Centre.

Appendix II. List of abbreviations used in the text

A (attachment) *Anxious-avoidant* attachment, measured using the *Strange Situation Procedure*

AAI *Adult Attachment Interview*

AMBIANCE *Atypical Maternal Behavioural Instrument for Assessment and Classification*

AQS *Attachment Q-Set/Sort*

ASPD Anti-Social Personality Disorder

B (attachment) Securely attached, measured using the *Strange Situation Procedure*

BPD Borderline Personality Disorder

BSI *The Brief Symptom Inventory*

C (attachment) *Anxious-ambivalent/resistant* attachment, measured using the *Strange Situation Procedure*

D (attachment) *Dismissing* attachment, measured using the *Adult Attachment Interview*

Disorganised/Disorientated attachment, measured using the *Strange Situation Procedure*

DSM *Diagnostic and Statistical Manual of Mental Disorders*

E (attachment) *Preoccupied* attachment, measured using the *Adult Attachment Interview*

ECR-R *Experience in Close Relationships (Revised)* questionnaire

F (attachment) *Autonomous* attachment, measured using the *Adult Attachment Interview*

GSI *Global Severity Index*

LPFS *Levels of Personality Functioning Scale*

LSIA Levels of Structural Integration Axis

MM Mind-mindedness

OPD Operationalized Psychodynamic Diagnosis System

OPD-SQ *Operationalized Psychodynamic Diagnosis Structure Questionnaire*

PD Personality Disorder(s)

PDI *Parent Development Interview*

RF *Reflective functioning*

RFQ-54 *Reflective Functioning Questionnaire (54 item)*

SAPAS *Standardised Assessment of Personality – Abbreviated Scale*

U (attachment) *Unresolved* attachment, measured using the *Adult Attachment Interview*

Please note: names of tests, scales and classifications appear in italics.

Appendix III. Notification of Ethical Approval

NISCHR

Research Ethics Committee (REC) for Wales
Sixth Floor, Churchill House
17 Churchill Way
Cardiff CF10 2TW
Telephone : 029 2037 6829
Fax : 029 2037 6824

E-mail : corinne.scott@wales.nhs.uk

Website : www.nres.nhs.uk

Gwasanaeth
Moeseg
Ymchwil

RES
Research
Ethics
Service

09 October 2012

Professor Peter Fonagy
HoD, Department of Clinical, Educational and Health Psychology, UCL
UCL
Gower Street
London   WC1N 3BG

Dear Professor Fonagy

Study title:	**Probing Social Exchanges – A Computational Neuroscience Approach to the Understanding of Borderline and Anti-Social Personality Disorder**
REC reference:	**12/WA/0283**

Thank you for your letter of 25 September 2012, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered by a sub-committee of the REC at a meeting held on 05 October 2012.   A list of the sub-committee members is attached.

Confirmation of ethical opinion
On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites
NHS sites
The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study "Conditions of the favourable opinion" below).

Conditions of the favourable opinion
The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the

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Lywodraeth Cymru
Funded by
Welsh Government

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R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

- *The Clinical / Probation Service information sheet, page two paragraph one, has the phrase "which is a psychiatric interview" twice; one of these instances should be removed; The word "However" should be removed from the start of the first paragraph of page three under "What are the possible disadvantages and risks of taking part?";*
- *The second paragraph of the same section is the same sentence repeated twice, and one of these instances should be removed; The Healthy volunteers information page three, the word "However" should be removed from the start of the first paragraph of page three under "What are the possible disadvantages and risks of taking part?"*

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. Confirmation should also be provided to host organisations together with relevant documentation.

Approved documents
The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Advertisement	Letter of invitation = advertisement material as well; version 1.1	22 August 2012
Covering Letter	signed Tobias Nolte, Anna Freud Centre	22 August 2012
Evidence of insurance or indemnity	Arthur J Gallagher International certificate of insurance - University College London - expires 01 August 2013	30 July 2012
GP/Consultant Information Sheets	1	22 August 2012
Investigator CV	Professor Fonagy; version 1.1	22 August 2012
Investigator CV	Dr Feigenbaum; version 1.1	22 August 2012
Investigator CV	Tobias Nolte; version 1.1	22 August 2012
Investigator CV	P Read Montague; no version or date	
Letter from Sponsor	signed David Wilson, University College London	21 August 2012
Letter of invitation to participant		22 August 2012
Other: Risk and Safety Protocol	1.1	22 August 2012
Other: Data Protection Form	no version or date	
Other: Additional details regarding MRI data	1.1	22 August 2012
Other: Consent to contact form	1.1	22 August 2012
Participant Consent Form: Healthy volunteers	1.2	
Participant Consent Form: Clinical / Probation service	1.2	
Participant Information Sheet: Genetics	1.1	22 August 2012
Participant Information Sheet: Healthy volunteers	1.2	

Participant Information Sheet: Clinical / Probation Service	1.2	
REC application	signed electronically by Professor Fonagy, and electronically by Mr David Wilson, sponsor's representative	21 August 2012
Response to Request for Further Information	signed Dr Nolte	25 September 2012

Statement of compliance
The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements
The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
  Adding new sites and investigators
- Notification of serious breaches of the protocol
  Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback
You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

With the Committee's best wishes for the   of this project

Yours

Dr Gordon Taylor
Chairman

Email: corinne.scott@wales.nhs.uk

Enclosures: List of names and professions of members who were present at the meeting
                       and those who submitted written comments

                       "After ethical review – guidance for researchers"

                       David Wilson, University College London
                       Dr Janet Feigenbaum, North East London Foundation   rust

Appendix IV. Participant information sheet (Clinical/Probation)

Understanding the Social Brain in Healthy Volunteers and People with Psychological Difficulties – Part II.

This study has been approved by the Research Ethics Committee for Wales (Project ID Number): 12/WA/0283

We would like to invite you to participate in this research project.

You are being invited to take part in a research study. You should only participate if you want to. Before you decide whether to take part, this sheet will give you some more information about why the study is being carried out, what you would be asked to do if you decide to take part, and how the study will be conducted. Please take some time to read this sheet, and to discuss it with other people if you wish. You are also very welcome to ask any further questions about the study, or if you find anything on this sheet unclear.

Why is this study being done?

With the proposed project we plan to investigate how the social brain works of people suffering psychological difficulties (both in adults and adolescents) and compare them with healthy control participants. For instance, only little is known about the brain functioning in Borderline and Antisocial Personality Disorders. Our study design will address some of these open questions. This will hopefully allow us to gain a better understanding of the disorders and to develop more informed and effective treatments from which clients will benefit.

Why have you been invited to take part?

You have been invited to take part in the study because you previously took part in our study **Understanding to Social Brain in Healthy Volunteers and People with Psychological Difficulties** and stated you were happy to be contacted about further research studies being undertaken by the PD-CPA research group.

Do I have to take part?

No. Taking part in the study is entirely voluntary. It is your choice whether or not you would like to participate. If you do decide to participate, you will be given this information sheet to keep, and you will later be asked to sign a consent form stating that you wish to take part. If you do give consent to take part in the study, you are still free to leave the study at any point, without giving a reason. If you leave, any information that we have already collected from you will be destroyed.

What will happen if I decide to take part?

If you agree to participate in this study you will be asked to come to the Wellcome Trust Centre for Neuroimaging on one occasion. The experiment will consist of a computerised task (which you will do whilst lying in either a magnetic resonance imaging (MRI) brain scanner *only for fMRI part*). In the task you will have to perform some tasks such as responding to written cues using different buttons to estimate or compare different events or conditions. This phase will last for roughly 30 minutes (and in no case more than 60 minutes). Most people find the tests quite straightforward and interesting to do. After the scanning, we will ask you to answer some further questions regarding the same or similar events or conditions, fill out several questionnaires and you will be administered an interview regarding experiences in your childhood which usually takes another 45 minutes.

What is functional magnetic resonance (fMRI) and what are the potential risks?

An MRI scanner takes pictures of your brain and measures the activity of different parts of it. The MRI scan procedure is painless and safe – these procedures are done hundreds of times a day all over the world. However, the MRI scanner makes loud noises while it is operating; we will provide you with headphones or earplugs to reduce the noise to safe levels. Some people find being in an MRI scanner makes them feel anxious and/or claustrophobic, even if they have not experienced claustrophobia before. A member of staff will be in constant contact with you via the intercom, and if you feel uncomfortable in any way the scanning can be stopped. Before you get into the MRI scanner the person who operates the scanner will explain the procedure to you and answer your questions. There is no radiation involved. MRI scans work using very strong magnetic fields. Therefore it would be dangerous for anyone with any magnetic metal in their body to go near the scanner, since that metal might move towards the magnet. You will not be able to participate in the MRI scan if you do have such metal in your body. Examples include: pace-makers; piercings; certain tattoos (which are sometime made with metallic inks) and screws from surgery. Fillings are not magnetic and are therefore not a problem. **If you are not sure whether you are able to participate in the MRI scan due to the presence metal in your body, please ask a researcher.**

What are the possible disadvantages and risks of taking part?

We will support you if you become upset. A specific Risk and Safety protocol for this study has been developed. You will be given time at the end of the study to be fully debriefed with a member of the research team and provided with a handout on emotional regulation skills, and crisis phone numbers and details of clinical services to contact. Your personal therapist or probation officer will also be aware of your participation in the study and able to support you should you find discussing your experiences difficult. Should you feel overwhelmed or acutely distressed during or at the end of the assessments, we you will be appropriately looked after by an experienced clinician.

Some people find the experience of being in the brain scanner uncomfortable or distressing as it is very noisy in you will have to lie still for a long time in a narrow tube.

Should any abnormalities be found during the scan a qualified Neurologist will be asked to review the image and if necessary contact your GP regarding any concerns.

What are the possible benefits of taking part?

You may find it interesting to complete these tasks and the information gathered during this study will also help to inform our understanding of treatment for Personality Disorders, which will hopefully be a step towards helping improve interventions in the future.

Will I be paid for taking part in the study?

As an acknowledgement of your time, we will be offering you a flat rate of £10 per hour for your participation with additional compensation depending on your performance on some of the tasks. If you agree to give a saliva and blood sample, we will be offering you an additional £30.

Who will know you are taking part in the study?

We will inform your GP of your participation in this study, but information collected during all stages of the study will be kept strictly confidential. All information will only be viewed by members of the research teams at University College London and Virginia Tech University in the USA. However, if through the course of the study

it was found that you are at immediate risk of harm to yourself or others, this information will be shared with your GP and, if necessary, emergency services.

Your consent form will be kept in a separate location from all your other data, ensuring that this remains anonymous. All data will be stored in secure locations whereby a participant ID will be assigned to your data, non identifiable personal information and the results of your tasks will be recorded on computers or flash drives which are password protected. Any published data will also be entirely anonymous meaning individuals cannot be identified.

Some of the MRI data will be transferred for analysis to the Principal Investigator's second laboratory at Virginia Tech University in the US. This data will be anonymised and no identifiable personal information will be shared or transferred.

The data from this study will be stored in accordance with the UCL and NHS Data Protection and Records Management policies.

All data will be collected and stored in accordance with the Data Protection Act 1998.

What will happen to the results of the research study?

The results will be written up in the form of reports to be submitted to scientific journals or presented at conferences. As mentioned, you will not be identifiable from these results. On completion and if you request it you will be sent a report of the study.

What if there is a problem?

Every care will be taken in the course of this study. However, in the unlikely event that you are injured by taking part, compensation may be available.

If you suspect that the injury is the result of the Sponsor's (University College London) negligence then you may be able to claim compensation. After discussing with your research doctor, please make the claim in writing to Dr. Janet Feigenbaum or Dr Tobias Nolte on behalf of the Chief Investigators (Profs Read Montague and Read Fonagy) who are based at University College London. The Chief Investigator will then pass the claim to the Sponsor's Insurers, via the Sponsor's office. You may have to bear the costs of the legal action initially, and you should consult a lawyer about this.

If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated by members of staff you may have experienced due to your participation in the research, National Health Service or UCL complaints mechanisms are available to you. Please ask your research doctor if you would like more information on this. In the unlikely event that you are harmed by taking part in this study, compensation may be available to you. If you suspect that the harm is the result of the Sponsor's (University College London) or the hospital's negligence then you may be able to claim compensation. After discussing with your research doctor, please make the claim in writing to the Prof Fonagy who is the Chief Investigator for the research and is based at UCL, Research Department of Clinical, Educational and Health Psychology, 1-19 Torrington Place, London, WC1E 7HB. The Chief Investigator will then pass the claim to the Sponsor's Insurers, via the Sponsor's office. You may have to bear the costs of the legal action initially, and you should consult a lawyer about this

Who has reviewed this study?

This study has been reviewed by the **REC for Wales 12/WA/0283**..

Contact Details

If you wish to contact the research team to discuss any of the information further or any concerns you have about the study, then please do so by getting in touch with the members of the research team listed below:

If you feel that we have not addressed your questions adequately or if you have any concerns about the conduct of the research team, then please contact my supervisor Dr. Janet Feigenbaum (Strategic and Clinical Lead for Personality Disorder Services, North East London NHS Foundation Trust and Senior Lecturer, Research Department of Clinical, Educational and Health Psychology, UCL) on 07957 919 961or by email at janet.feigenbaum@nhs.net.

Janet Feigenbaum, PhD

Research Department of Clinical, Educational and Health Psychology

General Office, Room 436, 4th Floor
1-19 Torrington Place, London, WC1E 7HB

Tobias Nolte MD

Wellcome Trust Centre for Neuroimaging & Research Department of Clinical, Educational and Health Psychology

12 Queen Square

London

WC1N 3BG

Tobias.nolte@annafreud.org

Thank you very much for taking the time to read this information sheet.

Appendix V. Participant information sheet (Healthy Control)

Understanding the Social Brain in Healthy Volunteers and People with Psychological Difficulties – Part II.

This study has been approved by the Research Ethics Committee for Wales (Project ID Number): 12/WA/0283

We would like to invite you to participate in this research project.

You are being invited to take part in a research study. You should only participate if you want to. Before you decide whether to take part, this sheet will give you some more information about why the study is being carried out, what you would be asked to do if you decide to take part, and how the study will be conducted. Please take some time to read this sheet, and to discuss it with other people if you wish. You are also very welcome to ask any further questions about the study, or if you find anything on this sheet unclear.

Why is this study being done?

With the proposed project we plan to investigate how the social brain works of people suffering psychological difficulties (both in adults and adolescents) and compare them with healthy control participants. For instance, only little is known about the brain functioning in Borderline and Antisocial Personality Disorders. Our study design will address some of these open questions. This will hopefully allow us to gain a better understanding of the disorders and to develop more informed and effective treatments from which clients will benefit.

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You have been invited to take part in the study because you previously took part in our study **Understanding to Social Brain in Healthy Volunteers and People with Psychological Difficulties** and stated you were happy to be contacted about further research studies being undertaken by the PD-CPA research group.

Do I have to take part?

No. Taking part in the study is entirely voluntary. It is your choice whether or not you would like to participate. If you do decide to participate, you will be given this information sheet to keep, and you will later be asked to sign a consent form stating that you wish to take part. If you do give consent to take part in the study, you are still free to leave the study at any point, without giving a reason. If you leave, any information that we have already collected from you will be destroyed.

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Who will know you are taking part in the study?

We will inform your GP of your participation in this study, but information collected during all stages of the study will be kept strictly confidential. All information will only be viewed by members of the research teams at University College London and Virginia Tech University in the USA. However, if through the course of the study it was found that you are at immediate risk of harm to yourself or others, this information will be shared with your GP and, if necessary, emergency services.

Your consent form will be kept in a separate location from all your other data, ensuring that this remains anonymous. All data will be stored in secure locations whereby a participant ID will be assigned to your data, non identifiable personal information and the results of your tasks will be recorded on computers or flash drives which are password protected. Any published data will also be entirely anonymous meaning individuals cannot be identified.

Some of the MRI data will be transferred for analysis to the Principal Investigator's second laboratory at Virginia Tech University in the US. This data will be anonymised and no identifiable personal information will be shared or transferred.

The data from this study will be stored in accordance with the UCL and NHS Data Protection and Records Management policies.

All data will be collected and stored in accordance with the Data Protection Act 1998.

What will happen to the results of the research study?

The results will be written up in the form of reports to be submitted to scientific journals or presented at conferences. As mentioned, you will not be identifiable from these results. On completion and if you request it you will be sent a report of the study.

What if there is a problem?

Every care will be taken in the course of this study. However, in the unlikely event that you are injured by taking part, compensation may be available.

If you suspect that the injury is the result of the Sponsor's (University College London) negligence then you may be able to claim compensation. After discussing with your research doctor, please make the claim in writing to Dr. Janet Feigenbaum or Dr Tobias Nolte on behalf of the Chief Investigators (Profs Read Montague and Read Fonagy) who are based at University College London. The Chief Investigator will then pass the claim to the Sponsor's Insurers, via the Sponsor's office. You may have to bear the costs of the legal action initially, and you should consult a lawyer about this.

If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated by members of staff you may have experienced due to your participation in the research, National Health Service or UCL complaints mechanisms are available to you. Please ask your research doctor if you would like more information on this. In the unlikely event that you are harmed by taking part in this study, compensation may be available to you. If you suspect that the harm is the result of the Sponsor's (University College London) or the hospital's negligence then you may be able to claim compensation. After discussing with your research doctor,

please make the claim in writing to the Prof Fonagy who is the Chief Investigator for the research and is based at UCL, Research Department of Clinical, Educational and Health Psychology, 1-19 Torrington Place, London, WC1E 7HB. The Chief Investigator will then pass the claim to the Sponsor's Insurers, via the Sponsor's office. You may have to bear the costs of the legal action initially, and you should consult a lawyer about this

Who has reviewed this study?

This study has been reviewed by the **REC for Wales 12/WA/0283**..

Contact Details

If you wish to contact the research team to discuss any of the information further or any concerns you have about the study, then please do so by getting in touch with the members of the research team listed below:

If you feel that we have not addressed your questions adequately or if you have any concerns about the conduct of the research team, then please contact my supervisor Dr. Janet Feigenbaum (Strategic and Clinical Lead for Personality Disorder Services, North East London NHS Foundation Trust and Senior Lecturer, Research Department of Clinical, Educational and Health Psychology, UCL) on 07957 919 961or by email at janet.feigenbaum@nhs.net.

Janet Feigenbaum, PhD

Research Department of Clinical, Educational and Health Psychology

General Office, Room 436, 4th Floor
1-19 Torrington Place, London, WC1E 7HB

Tobias Nolte MD

Wellcome Trust Centre for Neuroimaging & Research Department of Clinical, Educational and Health Psychology

12 Queen Square

London

WC1N 3BG

Tobias.nolte@annafreud.org

Thank you very much for taking the time to read this information sheet.

Appendix VI. Participant Consent Form (Clinical/Probation)

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Project Title:
Understanding the Social Brain in Healthy Volunteers and People with Psychological Difficulties.

This study has been approved by the Research Ethics Committee for Wales (Project ID): 12/WA/0283.

Thank you for your interest in taking part in this research. Before you agree to take part, the person organising the research must explain the project to you.

If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you to decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

Participant's Statement

I

- have read the notes written above and the Information Sheet, and understand what the study involves. I am also aware that I can consent to certain aspects of the study in order to participate in them whereas I can withhold my consent for others parts.

- understand that if I decide at any time that I no longer wish to take part in this project, I can notify the researchers involved and withdraw immediately.

- consent to the processing of my personal information for the purposes of this research study.

- understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

- understand that some of the MRI data will be transferred for analysis to the Principal Investigator's second laboratory at Virginia Tech University in the USA and will therefore no longer be subject to EEA data protection laws but that this data will be anonymised and no identifiable personal information will be shared or transferred.

- agree that the research project named above has been explained to me to my satisfaction and I agree to take part in this study.

- I agree that my non-personal research data may be used by others for future research. I am assured that the confidentiality of my personal data will be upheld through the removal of identifiers.

- I understand that part of my participation will be audio-recorded (the interviews) and I consent to the anonymous use of this material as part of the project.

- I agree to be contacted in the future by UCL researchers who would like to invite me to participate in follow-up studies.

- I understand that the information I have submitted will be published as a report and that I can request a copy. Confidentiality and anonymity will be maintained and it will not be possible to identify me from any publications.

- I agree that the research team might re-contact me in case that additional data has to be obtained or for follow-up studies.

Please initial the statements below if you agree with them: **Initial here**

I agree to take part in the general part of the PD-CPA study as outlined in the information

Sheet and to all points listed above.

(a separate consent for the MRI, <mark>tattoo component,</mark> and genetics component follows below).

I agree to the audio recording of interviews and I consent to the anonymous use of this

material as part of the project.

I agree that some of the study data will be shared with the collaborating laboratory

at Virginia Tech University in the USA.

I understand that relevant sections of medical and or probation notes and data collected

during my clinical assessment and during the study from me, may be

looked at by individuals from the PD-CPA research team, my clinician or

from the NHS Trust, where it is relevant to our taking part in this research. I give

permission for these individuals to have access to my records.

I agree that the PD-CPA research team can contact me about coming in

for up to two follow-up sessions over the next three years.

I agree that I can be contacted after the end of this study about possible

future research and follow-up with PD-CPA and related groups.

I agree that my GP can be told that I am participating in this study.

GP's name: _____ Surgery: _____

Address: _____

MRI and Cognition:

I agree to have an MRI scan and I understand what will happen in the scan.

I have had an MRI safety check and I am confident that there is no reason

why I can't have a scan, such as a recent operation.

I agree that my test results can be held by the Wellcome Trust and shared

with other research groups, and I understand that this data will be anonymous

and not contain any personal information.

Genetics:

You do not have to agree to provide blood or saliva samples to take part in the research. You do not have to agree that any samples you do give can be stored for future testing.

By giving a sample, you consent to be contacted by BioResource about the possibility of joining their panel, but you are under no obligation to join BioResource.

I agree to give a sample of **blood and saliva** (delete as appropriate) for medical research

and for details about me and any samples I provide to be kept on a secure database. I agree

that BioResource, the study collaborator on genetics, can store my samples and can contact

me to invite me to join their panel.

I agree that the samples and information I provide can be stored for use in

future medical research, subject to ethical approval.

I understand that I will not benefit financially if my samples are used in

research leading to a new treatment or medical test being developed.

In the unlikely event that an abnormality is picked up from tests carried out

on my sample, I agree to be informed, and with my consent my GP can be told.

Thank you for your help.

By completing and returning this form, you are giving us your consent that the personal information you provide will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

Participant:

Signed: Date:

Researcher:

Signed: Date:

Appendix VII. Participant Consent Form (Healthy Control)

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Project Title:
Understanding the Social Brain in Healthy Volunteers and People with Psychological Difficulties – Part II

This study has been approved by Research Ethics Committee for Wales (Project ID): 12/WA/0283.

Thank you for your interest in taking part in this research. Before you agree to take part, the person organising the research must explain the project to you.

If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you to decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

Participant's Statement

I

- have read the notes written above and the Information Sheet, and understand what the study involves.

- understand that if I decide at any time that I no longer wish to take part in this project, I can notify the researchers involved and withdraw immediately.

- consent to the processing of my personal information for the purposes of this research study.

- understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

- understand that some of the MRI data will be transferred for analysis to the Principal Investigator's second laboratory at Virginia Tech University in the US and will therefore no longer be subject to EEA data protection laws but that this data will be anonymised and no identifiable personal information will be shared or transferred.

- agree that the research project named above has been explained to me to my satisfaction and I agree to take part in this study.

- I agree that my non-personal research data may be used by others for future research. I am assured that the confidentiality of my personal data will be upheld through the removal of identifiers.

- I agree to be contacted in the future by UCL researchers who would like to invite me to participate in follow-up studies.

- I understand that the information I have submitted will be published as a report and that I can request a copy. Confidentiality and anonymity will be maintained and it will not be possible to identify me from any publications.

- I agree that the research team might re-contact me in case that additional data has to be obtained or for follow-up studies.

Please initial the statements below if you agree with them: **Initial here**

I agree to take part in the general part of the PD-CPA Part II study as outlined in the informatic

Sheet and to all points listed above.

(a separate consent for the MRI, tattoo component).

I agree that some of the study data will be shared with the collaborating laboratory at Virginia Tech University in the USA.

☐

I agree that I can be contacted after the end of this study about possible future research and follow-up with PD-CPA and related groups.

☐

I agree that my GP can be told that I am participating in this study.

☐

GP's name: _____ Surgery: _____

Address: _____

MRI and Cognition:

I agree to have an MRI scan and I understand what will happen in the scan.

☐

I have had an MRI safety check and I am confident that there is no reason why I can't have a scan, such as a recent operation.

☐

I agree that my test results can be held by the Wellcome Trust and shared with other research groups, and I understand that this data will be anonymous and not contain any personal information.

☐

Thank you for your help.

Participant:

Signed: Date:

Researcher:

Signed: Date:

Appendix VIII. Participant Debrief Sheet

Understanding the Social Brain in Healthy Volunteers and People with Psychological Difficulties.

Thank you for taking part in our study, we appreciate that you gave up your time to take part and hope that you found it interesting.

Summary of the Research Project

The aim of our study is to understand how mind and brain work in order to better understand patients with psychological difficulties. We hope that this will have an impact on the development of specific treatment interventions.

Most of our tasks are designed to look at how we think about ourselves and others (called "mentalisation"), how we regulate our emotions, value co-operation or experience close relationships and how problems can sometimes develop in these relationships.

Getting a better sense of the different strategies that people apply in these areas can help us understand more about when people experience mental health problems that can lead them to find certain social interactions and situations challenging. We hope to use these findings so that treatments can be tailored to help improve the domains where a patient's difficulties may lie.

We are also interested in how someone's experiences in childhood and his or her parenting at that time impact on the performances in the tasks and the functioning of the brain areas that underpin them. For instance, the long interview can tell us more about the quality of your bonding with parents.

Some of the topics discussed in the course of the study may have brought about thoughts or feelings which you had not previously considered or may have made you recall memories which could be perceived as distressing or lead you to feel tense or ruminate on thoughts. Therefore, we have provided some exercises at the back of this sheet which may help you to cope with any such feelings which you may experience.

What to do if you continue to feel concerned

If you continue to feel concerned after taking part in the study it may be useful to talk to a family member, a friend or your GP. Your Lead Clinician (care co-ordinator) or Probation Worker will also be able to support you, if you have one.

In addition to this support there is also free and confidential advice provided by the Mental Health charity Mind which can be found on their website: http://www.mind.org.uk/ or by calling their advice line 0300 123 3393.

If you feel at immediate risk do not hesitate to contact Dr Janet Feigenbaum (details overleaf).

Contact Details

If you still have concerns or wish to contact the research team to discuss any of the information further or any concerns you have about the study, then please do so by getting in touch with the members of the research team listed below:

If you feel that we have not addressed your questions adequately or if you have any concerns about the conduct of the research team, then please contact my supervisor Dr. Janet Feigenbaum (Strategic and Clinical Lead for Personality Disorder Services, North East London NHS Foundation Trust and Senior Lecturer, Research Department of Clinical, Educational and Health Psychology, UCL) on 07957 919 961 or by email at janet.feigenbaum@nhs.net.

Janet Feigenbaum, PhD

Research Department of Clinical, Educational and Health Psychology

General Office, Room 436, 4th Floor
1-19 Torrington Place, London, WC1E 7HB

telephone: 07957 919 961

Tobias Nolte MD

Wellcome Trust Centre for Neuroimaging & Research Department of Clinical, Educational and Health Psychology

12 Queen Square

London

WC1N 3BG

Tobias.nolte@annafreud.org

Thank you very much for taking the time to read this information sheet

Appendix IX. The Experience in Close Relationships Questionnaire – Revised

ECR-R

Please circle to what extent you agree or disagree with each statement.

My romantic partner makes me doubt myself.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I find it easy to depend on romantic partners.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
It's easy for me to be affectionate with my partner.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
When my partner is out of sight, I worry that he or she might become interested in someone else.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I rarely worry about my partner leaving me.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I often wish that my partner's feelings for me were as strong as my feelings are for him or her.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I get uncomfortable when a romantic partner wants to be very close.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I prefer not to show a partner how I feel deep down.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I find it relatively easy to get close to my partner.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I often worry that my partner doesn't really love me.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I worry that I won't measure up to other people.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I worry that romantic partners won't care about me as much as I care about them.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree

My partner only seems to notice me when I'm angry.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I often worry that my partner will not want to stay with me.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I tell my partner just about everything.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I don't feel comfortable opening up to romantic partners.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I usually discuss my problems and concerns with my partner.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I'm afraid that I will lose my partner's love.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I prefer not to be too close to romantic partners.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
It helps to turn to my romantic partner in times of need.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I'm afraid that once a romantic partner gets to know me, he or she won't like who I really am.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I find it difficult to allow myself to depend on romantic partners.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
It's not difficult for me to get close to my partner.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
My desire to be very close sometimes scares people away.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
My partner really understands me and my needs.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree

Sometimes romantic partners change their feelings about me for no apparent reason.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I am nervous when partners get too close to me.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I feel comfortable sharing my private thoughts and feelings with my partner.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
When I show my feelings for romantic partners, I'm afraid they will not feel the same about me.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I worry a lot about my relationships.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I do not often worry about being abandoned.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I talk things over with my partner.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I find that my partner(s) don't want to get as close as I would like.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I am very comfortable being close to romantic partners.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
It makes me mad that I don't get the affection and support I need from my partner.	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree
I feel comfortable depending on romantic partners	Strongly disagree	Disagree	Disagree slightly	Neutral/mixed	Agree slightly	Agree	Strongly agree

Appendix X. The Reflective Function Questionnaire - 54 item

Please work through the next 54 statements. Choose the one response that you feel describes you most clearly. Choose any number between 1 and 7 to say how much you disagree or agree with the statement. Strongly disagree is 1. Strongly agree is 7. Neither agree nor disagree is 4.

Do not think too much about it - your initial responses are usually the best. Thank you.

	Strongly DISAGREE → Strongly AGREE						
1. People's thoughts are a mystery to me.	1	2	3	4	5	6	7
2. It's easy for me to figure out what someone else is thinking or feeling.	1	2	3	4	5	6	7
3. My picture of my parents changes as I change.	1	2	3	4	5	6	7
4. I worry a great deal about what people are thinking and feeling.	1	2	3	4	5	6	7
5. I pay attention to the impact of my actions on others' feelings.	1	2	3	4	5	6	7
6. It takes me a long time to understand other people's thoughts and feelings.	1	2	3	4	5	6	7
7. I know exactly what my close friends are thinking.	1	2	3	4	5	6	7
8. I always know what I feel.	1	2	3	4	5	6	7
9. How I feel can easily affect how I understand someone else's behaviour.	1	2	3	4	5	6	7
10. I can tell how someone is feeling by looking at their eyes.	1	2	3	4	5	6	7
11. I realise that I can sometimes misunderstand my best friends' reactions.	1	2	3	4	5	6	7
12. I often get confused about what I am feeling.	1	2	3	4	5	6	7
13. I wonder what my dreams mean.	1	2	3	4	5	6	7
14. Understanding what's on someone else's mind is never difficult for me.	1	2	3	4	5	6	7
15. I believe that my parents' behaviour towards me should not be explained by how they were brought up.	1	2	3	4	5	6	7
16. I don't always know why I do what I do.	1	2	3	4	5	6	7
17. I have noticed that people often give advice to others that they actually wish to follow themselves.	1	2	3	4	5	6	7
18. It's really hard for me to figure out what goes on in other people's heads.	1	2	3	4	5	6	7

	Strongly DISAGREE						Strongly AGREE
19. Other people tell me I'm a good listener.	1	2	3	4	5	6	7
20. When I get angry I say things without really knowing why I am saying them.	1	2	3	4	5	6	7
21. I'm often curious about the meaning behind others' actions.	1	2	3	4	5	6	7
22. I really struggle to make sense of other people's feelings.	1	2	3	4	5	6	7
23. I often have to force people to do what I want them to do.	1	2	3	4	5	6	7
24. Those close to me often seem to find it difficult to understand why I do things.	1	2	3	4	5	6	7
25. I feel that, if I am not careful, I could intrude into another person's life.	1	2	3	4	5	6	7
26. Other people's thoughts and feelings are confusing to me.	1	2	3	4	5	6	7
27. I can mostly predict what someone else will do.	1	2	3	4	5	6	7
28. Strong feelings often cloud my thinking.	1	2	3	4	5	6	7
29. In order to know exactly how someone is feeling, I have found that I need to ask them.	1	2	3	4	5	6	7
30. My intuition about a person is hardly ever wrong.	1	2	3	4	5	6	7
31. I believe that people can see a situation very differently based on their own beliefs and experiences.	1	2	3	4	5	6	7
32. Sometimes I find myself saying things and I have no idea why I said them.	1	2	3	4	5	6	7
33. I like to think about the reasons behind my actions.	1	2	3	4	5	6	7
34. I normally have a good idea of what is on other people's minds.	1	2	3	4	5	6	7
35. I trust my feelings.	1	2	3	4	5	6	7
36. When I get angry I say things that I later regret.	1	2	3	4	5	6	7
37. I get confused when people talk about their feelings.	1	2	3	4	5	6	7
38. I am a good mind reader.	1	2	3	4	5	6	7
39. I frequently feel that my mind is empty.	1	2	3	4	5	6	7

	Strongly DISAGREE						Strongly AGREE
40. If I feel insecure I can behave in ways that put others' backs up.	1	2	3	4	5	6	7
41. I find it difficult to see other people's points of view.	1	2	3	4	5	6	7
42. I usually know exactly what other people are thinking.	1	2	3	4	5	6	7
43. I anticipate that my feelings might change even about something I feel strongly about.	1	2	3	4	5	6	7
44. Sometimes I do things without really knowing why.	1	2	3	4	5	6	7
45. I pay attention to my feelings.	1	2	3	4	5	6	7
46. In an argument, I keep the other person's point of view in mind.	1	2	3	4	5	6	7
47. My gut feeling about what someone else is thinking is usually very accurate.	1	2	3	4	5	6	7
48. Understanding the reasons for people's actions helps me to forgive them.	1	2	3	4	5	6	7
49. I believe that there is no RIGHT way of seeing any situation.	1	2	3	4	5	6	7
50. I am better guided by reason than by my gut.	1	2	3	4	5	6	7
51. I can't remember much about when I was a child.	1	2	3	4	5	6	7
52. I believe there's no point trying to guess what's on someone else's mind.	1	2	3	4	5	6	7
53. For me actions speak louder than words.	1	2	3	4	5	6	7
54. I believe other people are too confusing to bother figuring out.	1	2	3	4	5	6	7

Appendix XI. Operationalized Psychodynamic Diagnosis Structure Questionnaire

Self-description Questionnaire   **OPD-SQ**

On the following pages you will find a number of statements that describe various characteristics of a person. Please indicate to what extent these statements apply to you. Please tick the answer which describes you the best in general. There are no right or wrong answers because people differ in the way they perceive themselves. Some statements apply to relationships. Please answer those questions according to how you usually see yourself in relationships. If you have not yet been in a romantic relationship, imagine how you would see yourself in one.

		fully disagree	partly disagree	neither agree nor disagree	partly agree	fully agree
1.	I find it very difficult to describe myself.	☐	☐	☐	☐	☐
2.	When I'm very upset, I often act without thinking.	☐	☐	☐	☐	☐
3.	I sometimes feel like a stranger to myself.	☐	☐	☐	☐	☐
4.	The images and ideas in my mind frighten me.	☐	☐	☐	☐	☐
5.	If I lose something that is special to me, I easily lose my footing.	☐	☐	☐	☐	☐
6.	I'm often accused of being selfish in relationships.	☐	☐	☐	☐	☐
7.	Others often experience my actions very differently from how they were meant.	☐	☐	☐	☐	☐
8.	I often have feelings that I can't understand.	☐	☐	☐	☐	☐
9.	I think losses are more painful for me than for other people.	☐	☐	☐	☐	☐
10.	I often get myself into difficult situations unintentionally.	☐	☐	☐	☐	☐

11.	When dealing with others, I'm more awkward than other people.	☐	☐	☐	☐	☐
12.	It's easy for me to accept help when people offer it.	☐	☐	☐	☐	☐
13.	If someone criticises me I find it hard to get over it.	☐	☐	☐	☐	☐
14.	I struggle with separations and goodbyes.	☐	☐	☐	☐	☐
15.	Other people are either very familiar or very alien to me.	☐	☐	☐	☐	☐
16.	I'm often uncertain as to what I'm feeling in that moment.	☐	☐	☐	☐	☐
17.	I am often unpleasantly surprised by others because I'm not a good judge of character.	☐	☐	☐	☐	☐
18.	Sometimes I feel like other people can look right through me and read my thoughts or feelings.	☐	☐	☐	☐	☐
19.	Sometimes I am so full of rage that I feel I might lose it.	☐	☐	☐	☐	☐
20.	If someone is having a bad time that usually troubles me very much.	☐	☐	☐	☐	☐
21.	Sometimes I'm not sure whether someone has particular thoughts about me, or whether it's just my imagination.	☐	☐	☐	☐	☐
22.	I find difficult to be aware of my feelings.	☐	☐	☐	☐	☐
23.	I frequently cause harm in relationships when I'm angry.	☐	☐	☐	☐	☐

24.	Ultimately, for me there are only friends or foes and not much in between.	☐	☐	☐	☐	☐
25.	My inner fantasies and ideas enliven and enrich me.	☐	☐	☐	☐	☐
26.	Misunderstandings often occur between myself and others.	☐	☐	☐	☐	☐
27.	If I think too much about myself, I tend to get confused.	☐	☐	☐	☐	☐
28.	I find it difficult to ask others for help.	☐	☐	☐	☐	☐
29.	If someone gets too close to me I get tense or even start to panic, even if it was meant in a friendly way.	☐	☐	☐	☐	☐
30.	I think I often neglect myself.	☐	☐	☐	☐	☐
31.	I've often been told that I don't show my feelings enough.	☐	☐	☐	☐	☐
32.	It can be dangerous to let others get too close to you.	☐	☐	☐	☐	☐
33.	It is often not clear to me what exactly I'm feeling in that moment.	☐	☐	☐	☐	☐
34.	I tend to relate others' remarks or actions to myself which may not really be connected to me at all.	☐	☐	☐	☐	☐
35.	When someone tells me about their problems it stays with me for a long time.	☐	☐	☐	☐	☐
36.	I've usually got a good grip on myself, even when I'm boiling with rage.	☐	☐	☐	☐	☐

No.	Statement					
37.	My body is basically alien to me.	☐	☐	☐	☐	☐
38.	All in all, I'm happy with the way I am.	☐	☐	☐	☐	☐
39.	Sometimes something arises in me that feels like it doesn't belong to me.	☐	☐	☐	☐	☐
40.	I don't have good self-esteem.	☐	☐	☐	☐	☐
41.	There is often such a chaos of feelings inside me that I couldn't even describe it.	☐	☐	☐	☐	☐
42.	Sometimes I explode.	☐	☐	☐	☐	☐
43.	In arguments I sometimes feel like: "It's either me or them".	☐	☐	☐	☐	☐
44.	Sometimes the only thing I feel is panic.	☐	☐	☐	☐	☐
45.	I haven't had many good experiences with others in my life.	☐	☐	☐	☐	☐
46.	I think it affects me more than others if someone around me is having problems.	☐	☐	☐	☐	☐
47.	If I can't cope on my own I ask others for help.	☐	☐	☐	☐	☐
48.	I prefer not to think about myself because all I would face is chaos.	☐	☐	☐	☐	☐
49.	I sometimes misjudge how my behaviour affects others.	☐	☐	☐	☐	☐
50.	If others know a lot about me I often feel somehow controlled or observed.	☐	☐	☐	☐	☐

51.	I often suffer from an unbearable inner tension without knowing the reason for it.	☐	☐	☐	☐	☐
52.	It frightens me that in different situations I feel like different persons.	☐	☐	☐	☐	☐
53.	I think I come across as cold and callous.	☐	☐	☐	☐	☐
54.	I've been told repeatedly that I'm not considerate enough of other people's needs.	☐	☐	☐	☐	☐
55.	Internal images and using my imagination help me to restore my inner balance.	☐	☐	☐	☐	☐
56.	I often get involved with others who only reveal their true character after a while.	☐	☐	☐	☐	☐
57.	I find it hard to do something good for myself.	☐	☐	☐	☐	☐
58.	I often can't feel my body properly.	☐	☐	☐	☐	☐
59.	I notice that events which are in fact important hardly evoke any feelings in me.	☐	☐	☐	☐	☐
60.	People either are on the same wavelength as me or I don't know what to make of them.	☐	☐	☐	☐	☐
61.	It is often the case that I completely misinterpret what other people say.	☐	☐	☐	☐	☐
62.	I enjoy letting my thoughts and fantasies drift from time to time.	☐	☐	☐	☐	☐
63.	I feel like I "put my foot in it" quite often.	☐	☐	☐	☐	☐
64.	I often perceive myself more like an object than a human being.	☐	☐	☐	☐	☐

65.	Others often react towards me in a rejecting way and I don't understand why.	☐	☐	☐	☐	☐
66.	I often have to think about certain people who might harm me.	☐	☐	☐	☐	☐
67.	Thinking about myself frightens me.	☐	☐	☐	☐	☐
68.	I would say that I'm often quite naive.	☐	☐	☐	☐	☐
69.	I hate my body.	☐	☐	☐	☐	☐
70.	I often have terrifying fantasies.	☐	☐	☐	☐	☐
71.	Sometimes I'm afraid that the boundary between me and others will disappear.	☐	☐	☐	☐	☐
72.	I find it easy to get in contact with other people.	☐	☐	☐	☐	☐
73.	Sometimes my feelings are so intense that I get scared.	☐	☐	☐	☐	☐
74.	I often feel like a house of cards that could collapse any minute.	☐	☐	☐	☐	☐
75.	With me, conversations often turn into arguments when something important is at stake.	☐	☐	☐	☐	☐
76.	No matter what I do I am never quite satisfied with it.	☐	☐	☐	☐	☐
77.	A lot has to happen before I ask other people for help.	☐	☐	☐	☐	☐
78.	I've been hurt badly because I misjudged someone.	☐	☐	☐	☐	☐

No.	Statement					
79.	I find it hard to get in contact with other people.	☐	☐	☐	☐	☐
80.	I often feel useless and dispensable.	☐	☐	☐	☐	☐
81.	I find it difficult to make others understand me.	☐	☐	☐	☐	☐
82.	After separations or losses I feel like the rug has been pulled from under me.	☐	☐	☐	☐	☐
83.	I wish I could keep other people's problems away from me more easily.	☐	☐	☐	☐	☐
84.	To me, people are either good or bad.	☐	☐	☐	☐	☐
85.	From time to time it is difficult for me to predict how others will react towards me.	☐	☐	☐	☐	☐
86.	I'd like to be able to have more access to my inner feelings.	☐	☐	☐	☐	☐
87.	During arguments I sometimes hurt people badly who are actually important to me.	☐	☐	☐	☐	☐
88.	I don't treat myself particularly well.	☐	☐	☐	☐	☐
89.	I often feel a strong aversion if a partner is very clingy.	☐	☐	☐	☐	☐
90.	My experience is: If you trust people too much you can get nasty surprises.	☐	☐	☐	☐	☐
91.	Others tell me that I keep choosing the wrong friends.	☐	☐	☐	☐	☐
92.	My feelings often are like a rollercoaster.	☐	☐	☐	☐	☐

93.	I feel uneasy if I have to approach a stranger.	☐	☐	☐	☐	☐
94.	It often takes a long time until I discover other people's dark sides.	☐	☐	☐	☐	☐
95.	I have really regretted some arguments later on because because they were damaging to the relationship.	☐	☐	☐	☐	☐

Appendix XII. Tracked changes made to the Operationalized Psychodynamic Diagnosis

Structure Questionnaire during testing