Exploring Empathy and Attachment in Borderline Personality Disorder

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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.

Signature: 

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OVERVIEW

The overall focus of the present thesis is on empathy, and consists of three parts.

Part one presents a systematic literature review, which explores whether empathy can be reliably and validly measured. It focuses on the strengths of two measures in particular, the Interpersonal Reactivity Index (IRI) and the Empathy Quotient (EQ). Both measures show evidence of good validity, reliability and ease of utility, however, the EQ shows more evidence for use in clinical populations with strong construct, discriminant and convergent validity.

Part two presents an empirical paper on empathy and attachment, and the links between them, in people with Borderline Personality Disorder (BPD). Results showed that a control group had higher cognitive empathy and social empathy skills than people with BPD, but there was no difference between the groups for affective empathy. Correlations indicated that higher rates of attachment insecurity were related to lower levels of empathy. The results are discussed in relation to the measures used, specifically the factor structure applied to the EQ during the analysis, and the clinical implications of the study.

Part three presents a critical appraisal of the empirical paper, which provides reflections on the benefits and limitations of joining a large established research project, issues that arose during the research process, the use of self-report measures, and further thoughts on the construct of empathy.

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Many thanks go to all my friends and family for engaging me in endless debates about empathy… Long may it continue.

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Part 1: Literature Review

Can Empathy be Reliably and Validly Measured?

1.1 ABSTRACT

Aim

The aim of the present literature review was to explore whether empathy can be reliably measured in adults. After a review of current empathy measures, the focus was on the strengths and weaknesses of two empathy measures in particular; the Interpersonal Reactivity Index (IRI) and the Empathy Quotient (EQ). They were analysed in regards to validity, reliability, and clinical administration.

Method

A literature search was conducted focusing on measures of empathy, specifically the use of the IRI and the EQ, within adult populations. Additional literature limitations included a focus on articles from the years 1980 to 2014, within peer-reviewed journals, and focusing on tests and measures.

Results

An initial 198 references were identified. After an abstract search, 29 references were considered possible candidates for review. After a quality appraisal of the articles, 14 references were finalised for review.

Conclusions

The analyses of the psychometrics of the EQ and IRI were explored, and both have evidence of good validity, reliability and ease of utility. The IRI has less evidence of validity within clinical populations, whereas the EQ was designed for this purpose and shows strong construct, discriminant and convergent validity, and strong test-retest reliability among various cultures and clinical populations.

1.2 INTRODUCTION

Empathy

Empathy is a personality trait that enables one to recognize and share feelings that are being experienced by another. Empathy enables us to interact effectively in the social world by enabling us to understand the intentions of others, predict others' behaviour and to experience an emotion triggered by others' emotion (Baron-Cohen & Wheelwright, 2004).

Despite the importance of empathy it is a difficult construct to define. The precise nature of empathy is not entirely clear, and researchers have defined and measured it in different ways. Four key dimensions of empathy have been suggested; cognitive, affective, moral and behavioural (Morse et al., 1992). The cognitive element encompasses the ability to identify others' emotions and perspectives; the affective component (also referred to as emotional empathy) is the ability to experience and share others' intrinsic feelings; the moral aspect describes an internal drive that motivates the practice of empathy; and the behavioural dimension relates to the ability to communicate empathetic behaviour.

Despite the description of the four empathy elements by Morse and colleagues only two of the elements have been explored and measured thoroughly; cognitive empathy and affective empathy (Baron-Cohen & Wheelwright, 2004; Smith, 2006). These components represent separate constructs, which are outlined in more detail below.

Cognitive Empathy

Cognitive empathy is the ability to comprehend another person's mental state, i.e. being able to recognize another's feelings. Cognitive empathy involves perspective

taking (Eslinger, 1998) and has been reported to be dependent upon cognitive capacities (Davis, 1994; Grattan, Bloomer, Archambault & Eslinger, 1994; Eslinger, 1998). More recently, developmental psychologists have referred to this aspect of empathy as 'mindreading' or 'theory of mind'. The focus of cognitive empathy is understanding another's feelings but is not related to feeling any emotion in response.

Affective Empathy

Affective empathy is the emotional response that is triggered by observing emotion in someone else. This view of affective empathy arose from writings on sympathy (Baron-Cohen & Wheelwright, 2004). This type of empathy is not concerned with understanding another's feelings, but rather sharing those feelings to some degree. Research has clarified that affective empathy involves an *appropriate* emotional response rather than *any* emotional response (Baron-Cohen & Wheelwright, 2004; Allison, Baron-Cohen, Wheelwright, Stone, & Muncer, 2011). For example, upon hearing of the death of somebody's loved one, feelings of relief and sadness are appropriate, rather than joy. It is fair to state that defining an 'appropriate' emotion is difficult, however, the emotional response has to be as a consequence of observing emotion in others and the observer's feeling must be one of concern or compassion to another's distress (Batson, 1991).

Terminology

The terms empathy, perspective taking, theory of mind, and mentalising all have a strong degree of synonymity (Staub, 1987; Whiten, 1991). Within psychological literature, sympathy involves the desire to take action to alleviate the observable's

distress or suffering (Davis, 1994). It involves having an emotional response but not necessarily a shared emotion, and involves an added drive to take action, regardless of whether or not action is eventually taken. As sympathy is a different concept it will not be discussed within the present review. The term empathy will be the main focus of the present literature review.

Measuring empathy

Studies employ a variety of methods to explore empathy; questionnaires (self-report, interviewer rating, peer rating), or behavioural tasks with pictorial, visual or verbal stimuli. There is a wide array of empathy measures, which focus on different elements (cognitive, affective, moral, behavioural). Test types have different demands for an individual and can present varying confounding variables, for example, IQ may be a confounding variable in verbal tests.

Deficits in empathy have been reported in various clinical populations, which could highlight difficulties in empathising within specific disorders or mental health problems, or findings may be reflecting the difficulty in measuring empathy as a construct or different methodology being adopted within studies. Clinical populations with empathy deficit findings include Antisocial Personality Disorders and psychopathy (Joliffe & Farrington, 2004), Borderline Personality Disorder (Harari, Shamay-Tsoory, Ravid, & Levkovitz, 2010), Autistic Spectrum Disorders (ASD) (Baron-Cohen & Wheelwright, 2004), Schizophrenia (Langdon, Coltheart & Ward, 2006; Montag, Heinz, Kunz, & Gallinat, 2007), and eating disorders (Guttman & Laporte, 2000). Although research has shown a lack of empathic abilities in the aforementioned clinical populations, reported levels of empathy vary. For example, research has shown both enhanced and impaired empathy in people with Borderline

Personality Disorder (Fertuck et al., 2009; Preiβler, Dziobek, Ritter, Heekeren, & Roepke, 2010; Franzen et al., 2011). Similarly, researchers have found a high level of self-reported empathy in nurses (Bailey, 1996; Watt-Watson, Garfinkel, Gallop, Stevens, & Streiner, 2000) but a low level of empathy has been reported by others (Daniels, Denny & Andrews, 1988; Reid-Ponte, 1992), illustrating that mixed findings on empathy extends to populations that are not clinical.

Given that the research into empathy within populations is often mixed and sometimes inconclusive, a more comprehensive exploration of empathy measures is needed. An initial literature search of empathy measures utilised since 1980 revealed nineteen different empathy measures. Table 1 lists general information on the shortlisted empathy measures from 198 studies, including the origin and population of the measure, the test type and the empathy domain measured. Test type defines the mode of delivery to the participant, for example; self-report questionnaire, peer rated questionnaire, or performance task (pictorial, visual, audio-visual).

Studies utilising empathy measures were looked up using Psychinfo, Embase, Medline and Ovid. Limits within the search were: (i) human; (ii) English language, (iii) 1980 - 2014, (iv) Adults 18+, (v) Peer Reviewed journal, (vi) Tests and measures, (vii) Clinical studies.

Table 1

Shortlisted Empathy Measures

Measure (in order of publication)	Origin Population	Test / task type	Empathy domain
Barrett-Lennard Relationship Inventory (BLRI) (Barrett-Lennard, 1962)	USA Therapists and clients	Self-rating and client-rating questionnaires	Behavioural
Hogan Empathy Scale (HES) (Hogan, 1969)	USA General population	Self-rating questionnaire	Cognitive / Affective / Moral
Emotional Empathy Tendency Scale (EETS) / Questionnaire measure of Emotional Empathy (QMEE) (Mehrabian & Epstein, 1972)	USA General population	Self-rating questionnaire	Affective
Layton Empathy Test (LET) (Layton, 1979)	USA Nursing students	Self-rating questionnaire	Cognitive / Behavioural
Interpersonal Reactivity Index (IRI) (Davis, 1980)	USA General population	Self-rating questionnaire	Cognitive / Affective
Empathy Construct Rating Scale (ECRS) (La Monica, 1981)	USA Medical field	Self-rating Peer-rating Patient-rating	Cognitive / Behavioural
Perception of Empathy Inventory (PEI) (Wheeler, 1990)	USA Patients	Self-rating	Behavioural
Impulsiveness – Venturesomeness – Empathy Scale (Eysenck & Eysenck, 1991)	UK General population	Self-report questionnaire	Affective

Measure (in order of publication)	Origin Population	Test / task type	Empathy domain
Reading of the Mind in the Eyes Test (Baron-Cohen, Wheelwright & Joliffe, 1997)	UK Autistic spectrum disorder / General population	Self-report / pictorial	Cognitive
Sarfati cartoon task (Sarfati, Hardy-Bayle, Besche, & Widlocher, 1997)	USA General population	Computer task	Unspecified
Emotional Intelligence Scale (Schutte et al., 1998)	USA General population	Self-report questionnaire	Affective
Reynolds Empathy Scale (RES) (Reynolds, 2000)	UK Medical field	Trained rater-rating	Empathic behaviour
Balanced Emotional Empathy Scale (BEES) (Mehrabian, 2000)	USA General population	Self-rating questionnaire	Affective
Jefferson Scale of Physician Empathy (Hojat, Spandorfer, Louis, & Gonnella, 2011)	USA Physicians / student physicians	Self-rating	Cognitive
Empathy Quotient (EQ) (Baron-Cohen & Wheelwright, 2004)	UK General population, ASD	Self-rating	Cognitive / Affective
Multifaceted Empathy Test (MET) (Dziobek et al., 2008)	USA General population	Pictorial, delivered by trained tester	Cognitive / Affective
Victim Empathy Response Assessment (VERA) (Young, Gudjonsson, Terry, & Bramham, 2008)	UK Forensic / General Population	Audio task / Self-rating	Cognitive / Affective

Measure (in order of publication)	Origin Population	Test / task type	Empathy domain
Toronto Empathy Questionnaire (Spreng, McKinnon, Mar & Levine, 2009)	Canada General population	Self-report questionnaire	Affective
Questionnaire of Cognitive and Affective Empathy (QCAE) (Reniers, Corcoran, Drake, Shryane & Vollms, 2011)	UK General population	Self-report questionnaire	Cognitive / Affective

The aim of the present paper was to review empathy measures that are applicable for the general population and clinical populations. However, a wide variety of available empathy measures were not applicable for various reasons. Firstly, a number of empathy measures have been developed but only a few of them are designed with the aim of validating the construct. Some measures have been criticised for measuring concepts outside of empathy, such as emotional arousability as measured by The Questionnaire Measure of Emotional Empathy (QMEE) (Mehrabian & Epstein, 1972); reactions to other peoples' mental states within the Balanced Emotional Empathy Scale (BEES) (Mehrabian, 2000); and sensitivity and social self-confidence as measured by an empathy scale designed by Hogan (1969). Therefore, these measures cannot be relied upon to reliably measure the construct of empathy.

Secondly, empathy measures that were designed for use within specific populations were excluded from the present literature review as they were not relevant to general or clinical populations; the Victim Empathy Response Assessment (Young, et al., 2008), the Jefferson Scale of Physician Empathy (Hojat et al., 2011), Reynolds Empathy Scale for the medical field (Reynolds, 2000), Perception of Empathy Inventory for medical patients (Wheeler, 1990), the Empathy Construct Rating Scale for the medical field (La Monica, 1981), the Layton Empathy Test for nurses and students (Layton, 1976), and the Barrett-Lennard Relationship Inventory for therapists and clients (Barrett-Lennard, 1962).

Thirdly, a number of empathy measures do not measure the construct as a whole but focus on specific empathy factors as can be seen in Table 1. For example, the Reading of the Mind in the Eyes Test (Baron-Cohen, et al., 1997) specifically measures cognitive empathy, and the Toronto Empathy Questionnaire (Spreng, et al., 2009) measures only affective empathy.

Therefore, many of the empathy measures available are not recommended for use within research exploring both cognitive and affective empathy in clinical populations. Given the limitations described above, the two most appropriate measures that are validated to measure affective and cognitive empathy in research are the Interpersonal Reactivity Index (IRI) (Davis, 1980), and the Empathy Quotient (EQ) (Baron-Cohen and Wheelwright, 2004). Therefore the present review will focus on comparing the IRI and EQ in their ability to reliably measure empathy.

The Empathy Quotient (EQ) and Interpersonal Reactivity Index (IRI) Measures

Interpersonal Reactivity Index (IRI)

The IRI is a 28-item self-report questionnaire containing four 7-item subscales; Perspective Taking (PT), Empathic Concern (EC), Personal Distress (PD) and Fantasy (FS). Each of the items are rated using a five-point Likert scale ranging from 0 (does not describe me well) to 4 (describes me very well) (See Appendix C for the full-scale and scoring).

PT was designed to represent a cognitive component of empathy and reflects a tendency to adopt the viewpoint of others. EC was designed to measure an affective component of empathy and reflects feelings of empathy towards others. PD is also measuring an affective component of empathy but specifically measures feelings of unease and anxiety oriented towards the self within interpersonal situations. Items within the FS subscale reflect respondents' tendencies to transpose themselves via their imagination into the feelings and actions of fictitious characters in movies, books and plays.

What types of empathy does the IRI measure?

The rationale underlying the development of the IRI is that empathy is best considered as a set of constructs, discriminable from one another but related in that they all concern responsivity to others (Davis, 1983). Hence the creation of four separate sub-scales measuring different constructs; Perspective Taking (PT), Empathic Concern (EC), Personal Distress (PD) and Fantasy (FS). However, there has not always been a clear consensus on what exactly is being measured and if it is strictly empathy, for example, a study in the mid-nineties described the IRI as a measure of both empathy and sympathy (Yarnold, et al., 1996). The paper by Yarnold and colleagues measured empathy and sympathy in physicians and undergraduates, and states that EC and PT measure empathy, whereas PD and FS measure sympathy, but it does not specify how that distinction was made (the original article by Davis (1980) does not state the distinction). There was no further literature evident that stated the IRI measures sympathy.

Exploratory and confirmatory analyses (EFA and CFA) have been conducted with the IRI. Exploratory factor analysis is a statistical method used to discover the underlying structure of a set of variables, and confirmatory factor analysis (CFA) is used to explore the appropriateness of a prior theoretical model of a factor solution of obtained data. One study carried out EFA and CFA and found a four-factor solution that fit perfectly to the four subscales of the original IRI, that explained 42% of the variance (Huang et al., 2012). Equally, another study carrying out EFA on two of the subscales, PT and EC, found a two-factor solution, which matched that of the subscales of the original IRI (Péloquin & Lafontaine, 2010). The model was found to be equal for men and women.

However, it appears from the literature that the questions included within the IRI do not always fit neatly into the separate factors that were intended. One study

using EFA and CFA failed to reproduce the original four subscales in a student and physician population (Yarnold et al., 1996). The researchers found that a fifth factor surfaced, which they labelled 'involvement', which they deemed to represent emotional detachment among physicians and emotional absorption among undergraduates (Yarnold et al., 1996). This was not corroborated by any other studies in the present review. It is possible that the fifth factor was specifically related to the demographic that were assessed; physicians may need to be more detached at times from the emotion of their work or may have acclimatised to very emotional environments. This could explain why it has not come up in other studies with different groups.

Despite many studies confirming the four-factor solution, there is a popular view within the literature that the IRI measures concepts broader than empathy (Cliffordson, 2001; Baron-Cohen & Wheelwright, 2004; Péloquin & Lafontaine, 2010), mainly within the FS subscale with items such as, "I daydream and fantasize, with some regularity, about things that might happen to me," and the PD subscale with items such as, "In emergency situations, I feel apprehensive and ill at ease."

It has been stated that a tendency to fantasize about fictitious situations has been shown to influence emotional reactions toward others and subsequent helping behaviour (Stotland, Matthews, Sherman, Hansson, & Richardson, 1978), hence the inclusion of the sub-category by Davis (1983). However, research has more often criticised than corroborated this notion (Cliffordson, 2001; Baron-Cohen & Wheelwright, 2004; Beven, et al., 2004). The FS and PD subscale appear to be more closely related to measuring imagination and personal emotional experience. These concepts may be correlated with empathy but they are not deemed by a large proportion of the literature to be empathy itself.

Empathy Quotient (EQ)

The EQ was designed to be short, easy to use and easy to score (Baron-Cohen and Wheelwright, 2004). The EQ is comprised of sixty questions; 40 tapping empathy and 20 filler items. The filler items were designed to divert the participant's attention away from a constant emphasis on empathy. Each of the empathy questions score one point if the participant indicates the empathic behaviour mildly and two points if they indicate the behaviour strongly. Approximately half of the items are reversed to avoid a response bias. There is no midpoint on the EQ scale; each item requires an 'agree' or 'disagree' response, either mildly or strongly.

In the initial study, a panel of six experimental psychologists rated all of the 40 empathy items as being related to empathy and all of the filler items as being unrelated to empathy. The probability of obtaining such agreement on each item by chance is $p < .003$ (Baron-Cohen & Wheelwright, 2004).

An initial attempt to separate items into cognitive and affective categories was aborted after the authors decided that there was an overlap in most cases (Baron-Cohen & Wheelwright, 2004). However, subsequent studies have since identified which items fall into the affective and cognitive categories (Lawrence et al., 2004; Muncer & Ling, 2006; Preti et al., 2011).

What types of empathy does the EQ measure?

In contrast to the IRI, which was developed to provide a multifaceted approach to empathy, the EQ was created specifically for use with clinical populations. Despite

Baron-Cohen and Wheelwright (2004) indicating that the EQ measures cognitive and affective components of empathy, they did not identify which items fall into which category. The dimensionality of the EQ has most commonly been explored with exploratory or confirmatory factor analyses, and studies have confirmed that the EQ is not unifactorial (Lawrence et al., 2004; Muncer & Ling, 2006; Preti et al., 2011).

An exploratory factorial analysis was carried out, which indicated that the EQ would be better suited as a 28-item scale which loads on to three factors; cognitive empathy, affective empathy (also known as emotional reactivity) and social skills (Lawrence et al., 2004). These findings were confirmed in a French sample (Berthoz et al., 2008) as well as within an Italian sample (Preti et al., 2011).

One study found that a few items appeared to overlap between factors, for example, item number 36, "Other people tell me I am good at understanding how they are feeling and what they are thinking" clearly falls into both the cognitive and affective components of empathy (Muncer & Ling, 2006). Therefore, they excluded these items from the factorial analysis and discovered that a 24-item model with three factors was a much better fit than previous models, however, still confirming the three popular factors; cognitive and affective empathy, and social skills.

The EQ has been adapted in some cases to just include questions that have been shown to fit a validated factor-structure (Lawrence et al., 2004; Muncer & Ling, 2006; Preti et al., 2011). A study explored whether changing the wording of the negative sounding items to positively connoted items would make it quicker for participants to complete (Wright & Skagerberg, 2012), and although their study showed that changing the items to be positively phrased resulted in quicker response times, the authors stated that it did not result in a more reliable scale (they did not provide the exact reliability score).

The literature did not provide any research into the function of the filler items. The filler items were designed to divert the participant's attention away from a constant emphasis on empathy (Baron-Cohen & Wheelwright, 2004). However, a shorter version of the EQ was created by a team of researchers that created the original EQ (Wakabayashi et al., 2006), which had 22-items without filler questions and correlated highly (r = 0.93) with the original and had good internal consistency (0.88).

Review Questions

The aim of the present literature review was to compare the IRI and EQ in their ability to reliably measure empathy. The questions being reviewed are;

1) *Can empathy be reliably measured in adults?*
2) *What are the strengths and weaknesses of the IRI and the EQ in measuring empathy in regards to validity, reliability and clinical administration?*

1.3 METHOD

In order to explore the review question a literature search was carried out using the following method.

Search Strategy

The search strategy identified relevant measures by title searches within electronic databases (Psychinfo; Embase; Medline; Ovid).

The basic search strings were;

empath AND EQ*

empath AND IRI*

empath AND measur* OR test* OR task* OR scale* OR valid* OR reliab**

The limits within the search were: (i) human; (ii) English language, (iii) 1980 – 2014, (iv) Adults 18+, (v) Peer Reviewed journal, and (vi) Tests and measures.

Further literature was accessed from looking at the references in studies identified from the above search. Measures eligible for inclusion were those that:

i. Employed or evaluated measures of empathy

ii. Were appropriate for adults, 18+

iii. Were written in English

iv. Were in peer-reviewed journals

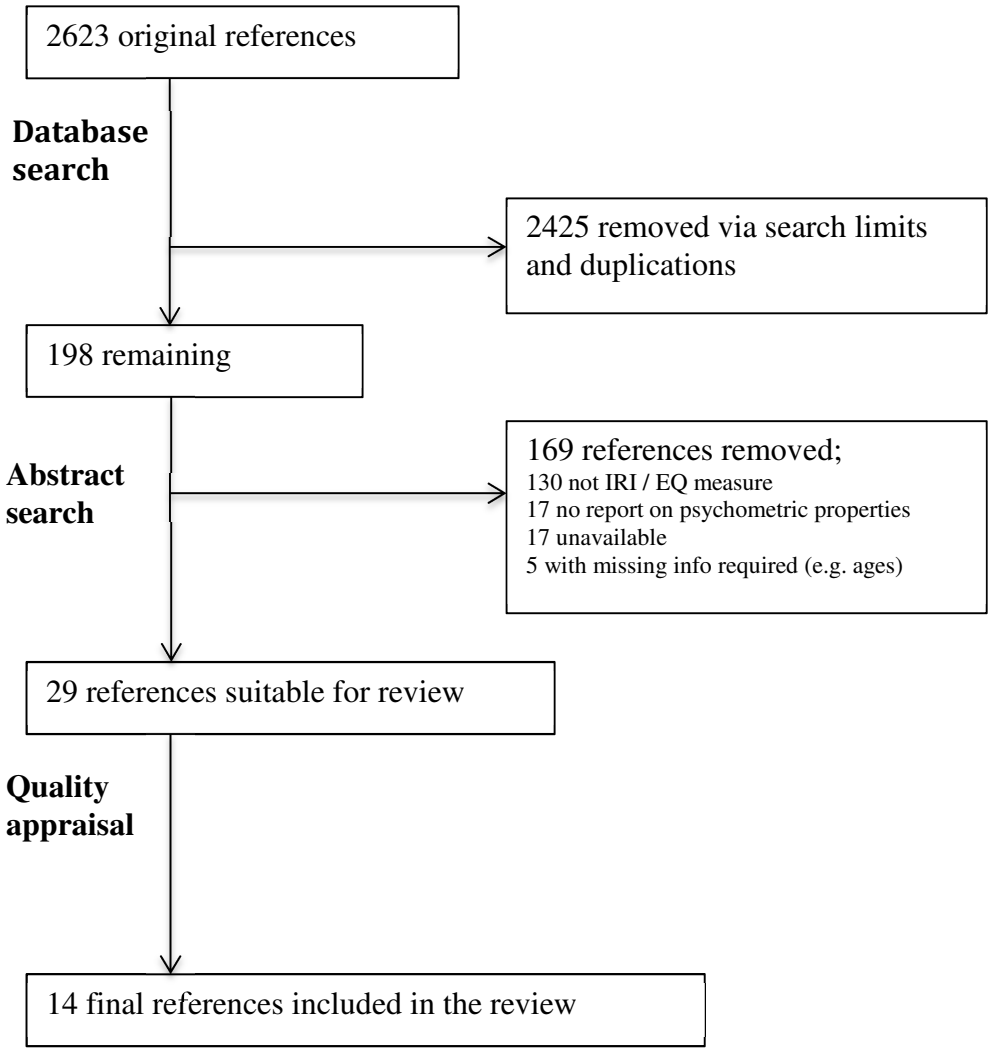
v. Provided sufficient description and relevant psychometrics

Prior to the limitations being imposed and duplications being removed the database search resulted in a total of 2623 references. Upon the limitations being imposed and the removal of duplications, the database search resulted in 198 references.

A review of the abstracts of the remaining 198 references resulted in a further 169 references being excluded from the review. Figure 1 illustrates a flow diagram of the paper selection process, and the reasons for exclusions from the abstract reviews.

Figure 1

Flow diagram of paper selection process



Quality Critical Appraisal Tool

It was important to screen the 29 remaining references shortlisted from the literature review for quality. 'Quality' refers to the internal validity of studies, or the extent to which the design, conduct and analyses minimised error and biases (Hennekens, & Buring, 1987). The shortlisted studies were of mixed design, and there were no randomised-controlled trials. The most widely used critical appraisal tools often review studies of one particular design. Therefore, the quality appraisal tool chosen to assess the studies was Qualsyst, (Kmet, Lee & Cook, 2004), as it provides a systematic and reproducible means of assessing the quality of research of mixed

designs. Qualsyst (Appendix A) provides a scoring system for quantitative studies and qualitative studies. The scoring system for quantitative studies was employed for the present literature review.

All 29 of the shortlisted studies were assessed using Qualsyst; each paper was scored on 14 criteria, either completely meeting an item (score=2), partially meeting an item (score=1) or not meeting an item (score=0). Items not applicable to a particular study were marked as n/a (not applicable) and were excluded from the calculation of the summary score. Four of the items were not relevant to any of the studies and were therefore excluded from the quality appraisals (Table 2).

Table 2
Items excluded from quality appraisal and reasons for exclusion

Item excluded from quality appraisals	Reason for exclusion
Item 5; If interventional and random allocation was possible, was it described?	None of the studies were interventional nor had random allocation.
Item 6; If interventional and blinding of investigators was possible, was it reported?	None of the studies were interventional nor required blind investigators.
Item 7; If interventional and blinding of subjects was possible, was it reported?	None of the studies were interventional nor required blinding of subjects.
Item 8; Outcome and exposure measures well defined and robust to measurement / misclassification bias?	As the purpose of the literature review is to assess validity and reliability of the empathy measures, the measures used were not judged as appropriate or inappropriate at this stage.

1.4 RESULTS

A quality appraisal summary score was calculated for each paper. The total scores for the analysis can be seen in Table 3, and a detailed item-by-item analysis can be seen in Appendix B.

From the table it can be seen that the studies utilising the EQ had a much higher average QualSyst rating (mean = 0.75) compared to the IRI (mean = 0.625), and the difference was found to be significant (t = 2.207, df = 28, p = .036). An independent rater (a psychologist) scored half of the above papers (n = 14) to verify that their quality ratings were not biased. Table 4 provides the overall scores assigned by the first and second rater on the selected papers, which were chosen

randomly. Both raters assigned the same overall score to seven studies. The additional seven studies had discrepancies, which ranged from 0.05 to 0.10. There was not a significant difference between the two raters scores (t = -.528, df = 26, p >.05). Items where disagreement occurred were discussed and the checklists and accompanying literature paper were reviewed to provide verification.

A relatively conservative cut-off point of 0.75 was introduced to decide which papers to include in the present literature review. This was done to ensure that only high quality papers were included in the review. The cut-off point of 0.75 resulted in a final fourteen papers being incorporated into the thorough and final phase of the literature review. The rating discrepancies did not make a difference to the cut-off point being 0.75, nor did it alter which papers were finalised to be included in the review.

Table 3

QualSyst appraisal of shortlisted references (n = 29)

Research Paper (in alphabetical order by author)	**Empathy Measure**	**Qualsyst Total Score**
1. Latent structure of the Davis Interpersonal Reactivity Index in methadone maintenance patients; (Alterman, McDermott, Cacciola, & Rutherford, 2003)	IRI	0.8
2. The empathy quotient: An investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences; (Baron-Cohen & Wheelwright, 2004)	EQ	0.85
3. Cross-cultural validation of the empathy quotient in a French-speaking sample; (Berthoz, Wessa, Kedia, Wicker, & Grèzes, 2008)	EQ	0.9
4. Using the Interpersonal Reactivity Index to assess empathy in violent offenders; (Beven, O'Brien-Malone, & Hall, 2004)	IRI	0.75
5. Empathizing with basic emotions: Common and discrete neural substrates; (Chakrabarti, Bullmore, & Baron-Cohen, 2007)	EQ	0.65
6. Altered self-report of empathic responding in patients with bipolar disorder; (Cusi, MacQueen, & McKinnon, 2010)	IRI	0.65
7. Measuring individual differences in Empathy: Evidence for a multidimensional approach; (Davis, 1983)	IRI	0.45

Research Paper (in alphabetical order by author)	**Empathy Measure**	**Qualsyst Total Score**
8. Measuring empathic tendencies: Reliability and validity of the Dutch version of the interpersonal reactivity index; (DeCorte et al., 2007)	IRI	0.6
9. Testing the psychometric properties of the interpersonal reactivity index (IRI) in Chile; (Fernandez, Dufey & Kramp, 2011)	IRI	0.55
10. Assessing dispositional empathy in adults: A French validation of the Interpersonal Reactivity Index (IRI); (Gilet, Mella, Studer, Gruhn, & Labouvie-Vief, 2013)	IRI	0.55
11. Brazilian-Portuguese empathy Quotient: Evidences of its construct validity and reliability; (Gouveia, Milfont, Gouveia, Neto, & Galvão, 2012)	EQ	0.45
12. Validation of the empathy quotient – short form among Chinese healthcare professionals; (Guan, Jin, & Qian, 2012)	EQ	0.7
13. Self-reported empathic abilities in schizophrenia: A longitudinal perspective; (Haker, Schimansky, Jann & Rössler, 2012)	IRI	0.45
14. Empathic and sympathetic orientations toward patient care: Conceptualisation, measurement, and psychometrics; (Hojat et al., 2011)	IRI	0.45
15. The validation of the Interpersonal Reactivity Index for Chinese teachers from primary and middle schools; (Huang, Li, Sun, Chen, & Davis, 2012)	IRI	0.85

Research Paper (in alphabetical order by author)	**Empathy Measure**	**Qualsyst Total Score**
16. Measuring empathy; reliability and validity of the Empathy Quotient; (Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004)	EQ and IRI	0.80
17. Validation of French-Canadian versions of the Empathy Quotient and Autism Spectrum Quotient; (Lepage, Lorite, Taschereau-Dumouchel, & Théoret, 2009)	EQ	0.60
18. Psychometric analysis of the empathy quotient (EQ); (Muncer & Ling, 2006)	EQ	0.8
19. Empathizing and systemizing: What are they, and what do they contribute to our understanding of psychological sex differences?; (Nettle, 2007)	EQ	0.8
20. Does the interpersonal reactivity index perspective-taking scale predict who will volunteer time to counsel adults entering college?; (Oswald, 2003)	IRI	0.25
21. Measuring empathy in couples: Validity and reliability of the interpersonal reactivity index for couples; (Péloquin & Lafontaine, 2010)	IRI	0.75
22. The Empathy Quotient: A cross-cultural comparison of the Italian version; (Preti, et al., 2011)	EQ	0.75
23. The hierarchical structure of the interpersonal reactivity index; (Pulos, Elison, & Lennon, 2004)	IRI	0.45
24. Short German versions of empathizing and systemizing self-assessment scales; (Samson,	EQ	0.7

Research Paper (in alphabetical order by author)	**Empathy Measure**	**Qualsyst Total Score**
& Huber, 2010)		
25. Self-reported empathy deficits are uniquely associated with poor functioning in schizophrenia; (Smith et al., 2012)	IRI	0.85
26. Development of short forms of the Empathy Quotient (EQ-Short) and the Systemizing Quotient (SQ-Short); (Wakabayashi, et al., 2006).	EQ	0.70
27. Predicting Autism Spectrum Quotient (AQ) from the Systemizing Quotient-Revised (SQ-R) and Empathy Quotient (EQ); (Wheelwright, et al., 2006)	EQ	0.95
28. Measuring empathizing and systemizing with a large US sample; (Wright & Skagerberg, 2012)	EQ	0.85
29. Assessing physician empathy using the Interpersonal Reactivity Index: a measurement model and cross-sectional analysis; (Yarnold, Bryant, Nightingale, & Martin, 1996)	IRI	0.75

Table 4
Inter-rater scores on random selection of review papers

Research paper (numbers from Table 3)	**Measurement**	**Overall QualSyst score**		**Difference in score**
		Rater 1 (author)	**Rater 2**	
2	EQ	0.85	0.90	0.05
5	EQ	0.65	0.75	0.10
6	IRI	0.65	0.65	0
9	IRI	0.55	0.60	0.05
12	EQ	0.70	0.80	0.10
14	IRI	0.45	0.50	0.05
15	IRI	0.85	0.85	0
16	EQ/IRI	0.80	0.85	0.05
18	EQ	0.80	0.80	0
21	IRI	0.75	0.75	0
22	IRI	0.75	0.75	0
25	IRI	0.85	0.80	0.05
27	EQ	0.95	0.95	0
29	IRI	0.75	0.75	0

Quality of Studies

Overall, the quality of the studies was high, with all included papers sufficiently describing their research question, having respectable sample sizes, and adopting appropriate methodological designs and analytic methods. All the necessary statistics were presented and showed evidence of a priori planning instead of 'data mining' (Field, 2009) or conducting analyses in a posteriori fashion irrespective of hypotheses.

A lack of reporting some estimate of variance in the results lowered the quality scores in eight of the studies (see Appendix B), however, the rest of the studies showed evidence of estimating variance for the main results upon which the conclusions were based. Fifteen of the included papers (see Appendix B) either did not control for confounding variables at all, did not consider dependencies between variables or did not sufficiently describe how they controlled for confounding variables, which also lowered their quality scores. A more general limitation amongst the studies was that some of the sampling methods produced results that were not generalizable. For example, empathy was tested in specific populations that may not be representative of the general population or a specific clinical population, such as teachers (e.g. Huang et al., 2012), students (e.g. Muncer & Ling, 2006), or methadone patients (Alterman et al., 2003). The lack of generalizability raises the question of how the results can be extended out of those very specific populations.

To illustrate how papers were rated for the present literature review, the quality analysis will be elaborated on for the highest rated paper, the lowest rated paper and a medium rated paper.

The highest rated paper was exploring the relationship between the EQ, the Autism Spectrum Quotient (ASQ) and the Systemizing Quotient (SQ) (Wheelwright

et al., 2006), and scored 0.95. The paper scored highly because it sufficiently described the research objective and aims of the study, and had an appropriate study design to fulfil those aims. People with and without Autism Spectrum Conditions completed the EQ, ASQ and SQ questionnaires online and the researchers included other demographic questionnaires to measure extraneous variables and in order to exclude confounding variables. The subject and comparison groups were sufficiently described and the sample size was very large (n=1761). The analytic methods, and the results were reported in ample detail and some estimate of variance was reported. The conclusions provided were supported by the results. The paper had a matched rating from Rater 1 and Rater 2 (0.95).

An example of a medium-rated paper was one that investigated empathic responding in patients with Bipolar Disorder (Cusi et al., 2010), which scored 0.65. The paper was very thorough in describing the research question, which had been informed by previous literature and research findings. The authors had an appropriate study design and described participant characteristics in detail. However, the sample size was small (n = 40) and the analytic methods and results were not described sufficiently. There was no reporting on estimate of variance and there was little controlling for confounding variables.

The lowest rated paper was a study exploring whether the IRI is predictive of helping behaviour (Oswald, 2003), which scored 0.25. The paper was extremely short and the authors had not sufficiently described the objective, study design or method of group selection. The sample size was reasonably good (n = 162) and analytic methods were justified and described, however, there was no controlling for confounding variables and therefore the conclusions could not be well supported by the results.

Overall the 29 papers initially identified were of very high standard. Only six papers scored under 0.50 (Davis, 1983; Gouveia et al., 2012; Haker et al., 2012; Hojat et al., 2011; Oswald, 2003; Pulos, et al., 2004). All further discussion on studies will be based on papers that were rated as high quality.

Critical Analysis of Validity, Reliability and Utility of Empathy Measures

This section will focus on the analysis of the IRI and EQ in regards to reliability, validity, utility and clinical administration. Table 5 summarises the methodological characteristics and psychometrics of the studies and consolidates the validity and reliability information. The studies are then elaborated on in the text below.

Table 5

Shortlisted Studies with Summary of Methodological Characteristics and Psychometrics (n=14)

Details			**Reliability**		**Validity**	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
1. Alterman et al., 2003	IRI	Methadone maintenance patients, 241, Controlled = addiction Severity Index	n/a	● Empathic concern = .82 ● Fantasy = .72 ● Personal distress = .69	n/a	● r = .34 Fantasy and Empathic Concern items, ● Canonical R^c = .60, F (60, 347) = 2.19, p < .0001 Personal Distress and neuroticism, irritability, suspiciousness ● Canonical R^c = .52, F (38, 234) = 1.77, p < .01 high empathy and decreased psychoticism, tough-mindedness, suspiciousness, Machiavellianism ● Canonical Rc = .42, p <.0001 Personal Distress and SCID lifetime

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
						diagnoses
2. Baron-Cohen & Wheelwright, 2004	EQ	ASD, gen-pop, 90 / 197 Controlled = age, SES	r = 0.97 ($p < .001$)	0.92	● $t = -13.07$, df = 178, $p < .001$ AS/HFA < controls ● $t = 3.4$, df = 196, $p < .0001$ Ms < Fs	● $r = -0.56$, $p < .001$ inversely correlated with Autism Quotient ● $r = 0.59$, $p < .001$ directly correlated with Friendship Quotient (FQ)
3. Berthoz, et al., 2008	EQ	Students, ASD, 410 / 16,	r = 0.93 ($p < .001$)	0.81	$t = 4.24$, df = 408, $p < .001$ Ms < Fs	● $r = -0.13$, $p = 0.01$ EQ+BDI ● $r = -0.11$, $p = 0.03$ EQ+ Trait STAI
4. Beven, et al., 2004	IRI	Violent offenders, Gen pop 88 / unknown Controlled = gender, education	n/a	Not reported	n/a	● $r = -.41$, $p = <.05$ PT + impulsivity, ● $r = .40$, $p = <.05$ PT + socialisation, ● $r = .59$, $p = <.01$ EC + Law Courts and Police cognitions ● $r = -.49$, $p = <.05$ EC + Tolerance of Law Violations,

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
						● r = -.50, p = <.01 EC + Identification with Criminal others.
15. Huang et al., 2012	IRI	Teachers, 930,	r = 0.70 to 0.78	Not reported	● F (1, 899) = 8.79, p < .01 FS Fs > Ms, ● F (1, 899) = 27.89, p < .001 EC Fs > Ms, ● F (1, 899) = 85.12, p < .001 PD Fs > Ms, ● F (1, 899) = 56.56, p < .01 FS in primary school > middle school teachers,	n/a
16. Lawrence et al., 2004	EQ & IRI	Gen pop, 53 / Gen pop + DPD, 110	r = 0.835, p = 0.0001	Not reported	● t = -3.5, df = 51, p = 0.001 Fs > Ms ● t = -5.34, df = 147.38, p =	● r = -0.346, p = 0.012 social skills factor & depression ● r = 0.313, p = 0.024 emotional

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
		Controlled IQ / Gen pop, 29, Controlled = age, gender			0.001 Fs > Ms ● r = 0.294, p = 0.033, EQ and Mind in the Eyes test ● t = 1.496, df = 90, p > 0.054 & t = 1.208, df = 77, p > 0.05 no sig diffs DPD and gen pop	reactivity & anxiety ● r = 0.423, p = 0.025 EC & EQ ● r = 0.485, p = 0.009, PT & EQ
18. Muncer & Ling, 2006	EQ	Students and parents, 362,	n/a	0.85	● t = 2.89, df = 346, p = .004 Fs > Ms affective E, ● t = 8.57, df = 346, p < .0005 Fs > Ms cognitive E	n/a
19. Nettle, 2007	EQ	Gen pop, 277 / Staff and students, 195 Controlled = age,	n/a	0.88 / 0.89	Cohen's d = .63 Fs > Ms /	● r = .37, df = 270, p < .01 EQ + extraversion ● r = .75, df = 270, p < .01 EQ + agreeableness

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
		gender, interests				● r = 0.33, p <.05 PT + BEES in males ● r = 0.25, p <.05 PT + BEES in females ● r = 0.47, p <.05 EC + BEES in males ● r = 0.24, p <.05 EC + BEES in females ● r = 0.31, p <.05 PT + Relationship satisfaction in heterosexual males ● r = 0.25, p <.05 PT + Relationship satisfaction in heterosexual females ● r = 0.48, p <.05 PT + Relationship satisfaction in female couples
21. Péloquin & Lafontaine, 2010	IRI	Students + gen pop couples / 895, 126,	r = .61 and .59 for males	● IRI = .79 and .77 ● IRIC = .84 and .74	r < .16 empathy and demographics (weakly	n/a

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
		384	*r* = .51 and .47		associated)	
	IRIC	Controlled = age, gender, relationship length, income	for females			
22. Preti et al., 2011	EQ	Students, 256,	*r* = .85, *p* <.001	.79	● *t* = 3.11, *df* = 254, *p* = .002 Fs > Ms, ● *r* = -.38, *p* <.001 EQ + alexithymia in Fs, ● *r* = -.25, *p* <.01 EQ + alexithymia in Ms	n/a
25. Smith et al., 2012	IRI	Individuals with schizophrenia n = 46,	n/a	Not reported	● *t* = 2.2, *df* = 81, *p* = *.033* schiz < controls empathic concern,	● *r* = .33, *p* ≤.05 SLOF (Specific levels of functioning) + Empathic Concern.

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
		Controls n = 37, Controlled = gender, parental socioeconomic status, race, age			● t = 2.9, df = 81, p = .004 schiz < controls perspective taking, ● t = -3.9, df = 81, p <.001 schiz > controls personal distress	● r = .43, $p \leq .01$ SLOF + Perspective Taking ● r = .034, $p \leq .05$ functional capacity (UPSA-B) and PT
27. Wheelwright et al. 2006	EQ	Students n = 1761 ASC group n = 125	n/a	Not reported	● F (1, 1753) = 177.8, p < .0001 Fs > Ms ● F (3, 1753) = 16.9, p < 0.0001 physical science degree < humanities and social science degrees	r = -.50, p < 0.01 EQ + AQ

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
28. Wright & Skagerberg, 2012	EQ	General pop, 5186	n/a	● 0.83 for original and altered EQ noncritical items, ● 0.17 for original EQ phrasing critical items, -0.4 for changed EQ phrasing critical items	*t* (5070) = 22.35, *p* < .001 Fs > Ms EQ	● *r* = .591 self-assessed empathy and self-report EQ, ● Nonsignificant finding for differences in response times for positively and negatively worded items (numbers not reported), ● *r* = -.58 EQ and AQ
29. Yarnold, et al., 1996	IRI	Physicians n = 114 College undergraduates n = 95	Ranged from moderately low (*r* = 0.47) to relatively high (*r* =	Ranged from borderline (0.58) to relatively high (0.86) with 81% greater than 0.7	● *F* (1,93) = 11.6, *p* <0.001 EC positively predictive of androgyny for undergraduates ● *F* (3, 108) = 17.0, *p* <0.001 EC, PT, positively predictive of	● r^2 = 0.11 EC and androgyny in undergraduates ● r^2 = 0.16 EC and androgyny in physicians ● r^2 = 0.03 PT and androgyny in

Details			Reliability		Validity	
Study number	**Measure**	**Sample, N, controlled for;**	**Test-retest**	**Cronbach's alpha**	**Discriminant (between group)**	**Convergent (within group)**
			0.86), with 60% greater than $r = 0.7$		androgyny and PD negatively weighted predictor for androgyny in physicians	physicians ● $r^2 = 0.12$ PD and androgyny in physicians (negative predictor)

1.5 DISCUSSION

The discussion section will aim to answer whether empathy can be reliably measured in adults. The first part of the discussion will explore this question by analysing the validity and reliability of the IRI and EQ in turn as evidenced by the studies included in the literature review. The second part of the discussion will explore the clinical administration of the IRI and EQ and the findings from the different adult populations in which the measures have been employed.

Part 1: Analysis of Validity and Reliability

Validity of the IRI and EQ

Validity of the Interpersonal Reactivity Index

The initial IRI study (Davis, 1980) showed evidence for a four-factor structure of empathy, and with all four subscales showing good internal consistency (0.70 – 0.78). A follow-up study using the IRI showed a correlation between the PT component and the Hogan empathy scale (r = 0.42 for males, 0.37 for females, p <.05) (Hogan, 1969), which focuses on cognitive empathy; and the EC was correlated with the Questionnaire Measure of Emotional Empathy (r = 0.63 for males, 0.56 for females, p <.05) (Mehrabian & Epstein, 1972), which measures affective empathy.

The IRI shows a good level of internal consistency (0.81) and convergent validity with measures such as the Beck Depression Inventory, French version (Beck

& Beamesderfer, 1974; Collet & Cottraux, 1986) (r = -0.13, p =0.01) and the State Trait Anxiety Inventory, French version (Bruchon-Schweitzer & Paulhan, 1993; Spielberger, 1983) (r =-0.11, p =0.03) (Berthoz, et al., 2008). Another example of this is from a study exploring the structure of the IRI and its correlation with other measures with patients on methadone maintenance; the researchers found that the affective factors of the IRI (the EC and PT subscales) were associated with less aggressiveness and low suspiciousness (R^c = .60, p <.0001) Buss-Durkee Hostility Inventory; Buss & Durkee, 1957), and low psychoticism (R^c = 0.52, p <.01) (Eysenck Personality Questionnaire-Revised; Eysenck, 1988) (Alterman, et al., 2003).

Furthermore, the same study showed associations between the PD subscale and more lifetime Structured Clinical Interview for DSM-III-R (SCID) (Spitzer & Williams, 1987) diagnoses (R^c = .42, p <.0001), and greater irritability (R^c = .60, p < .0001) (Alterman et al., 2003). These findings suggest that personal distress may not be a central construct of empathy (Alterman, et al., 2003), or at least not as strong a construct as EC and PT.

The research indicates that the IRI shows convergent validity with a range of other measures, however, a limitation of this particular study was that it consisted of only 18% females, and the sample was limited to methadone maintenance patients. A wider sample would be necessary to corroborate the findings.

The methadone study is not the first to criticise the subscales within the IRI; the FS subscale of the IRI has been criticised for not measuring empathy and being more closely related to measuring imagination (Cliffordson, 2001; Baron-Cohen & Wheelwright, 2004; Beven, et al., 2004; Lawrence et al., 2004; Péloquin & Lafontaine, 2010). Equally, the PD subscale has been discarded from studies or

criticised for also not tapping into empathy and instead being more self-focused (Baron-Cohen & Wheelwright, 2004; Cliffordson, 2001; Péloquin & Lafontaine, 2010). The PD subscale is more related to how people respond in emergency situations.

One study focusing on an offender population found that PT was positively associated with higher levels of socialisation (r = .40, p = <.05) and pro-social attitudes (r = .53, p = <.01), and negatively associated with higher levels of anti-social attitudes (r = -.53, p = <.01) (Beven, et al., 2001). However, the same study was highly critical of the IRI being used for offender populations, suggesting that the results should be interpreted with caution as there were no controls put in place to consider confounding variables. The results are therefore deemed unreliable for that particular study.

Conversely, the IRI has been validated as a useful measure of empathy within populations consisting of couples in romantic relationships (Péloquin & Lafontaine, 2010). From a relational perspective empathy is considered a factor for maintaining personal relationships (Busby & Gardner, 2008; Waldinger, Hauser, Schulz, Allen & Crowell, 2004). The study exploring empathy in couples used the IRI with heterosexual and homosexual couples and demonstrated good convergent (for example, r = 0.33, p <.05, correlation between BEES measure and PT for males) and concurrent validity (for example, r = 0.25, p =<.05, correlation between relationship satisfaction and PT in heterosexual women) (Péloquin & Lafontaine, 2010). The relationship satisfaction questionnaire, the DAS-4 (Sabourin, Valois, & Lussier, 2005) is a 32-item questionnaire measuring satisfaction on a Likert scale with questions, such as, “How often do you think that things between you and your

partner are going well?" It does not appear that the EQ has been used in similar studies with romantic couples as found in the present literature review.

From the studies included, it appears that the IRI has mixed results in its links to other factors and measures. There is evidence that the IRI can be correlated to brain activity patterns when observing a loved one receiving pain; exposure to somebody in pain prompts increased activity in the anterior cingulate and fronto-insular cortices, structures that are thought to encode the affective component of pain (Singer et al., 2004). The study provides evidence for utility of the IRI within studies exploring neuropsychology, however, the study only employed the EC subscale, and did not report on psychometrics.

Another example of convergent validity is a study that explored how scales of the IRI correlated with a trait-like orientation in which people exhibit high levels of both technological and interpersonal behaviours, and are optimally adaptable in complex, dynamic contingencies (the authors termed this androgyny) (Yarnold et al., 1996). They found that high scores of androgyny, according to the Bem Sex-Role Inventory (Bem, 1974), was positively related to EC and PT in physicians. Their paper does not distinguish the affective and cognitive aspects of empathy, which makes it difficult to compare to literature, which has since categorised empathy in this way. The authors conclude that future research should continue to improve the definition and measurement of empathy. The EQ was developed eight years after that particular study.

In summary of the validity of the IRI, it appears that two of the main criticisms of the measure are firstly the failure of several studies to confirm the proposed four-factor model (Cliffordson, 2001; Fabrigar, Wegener, MacCallum, & Strahan, 1999; Wood, Tataryn & Gorsuch, 1996) and secondly the mixed findings

regarding convergent validity. Despite a lack of agreement on the reliability of the four-factor structure, it appears that the IRI is a valid tool to measure empathy, and many studies continued to use the IRI because it was the most comprehensive self-report measure of empathy available at that time.

Validity of the Empathy Quotient

All of the research studies included in the present review consistently showed that the EQ has reasonable construct and external validity in having a high alpha coefficient (0.79-0.92) and is correlated with independent measures. For example, Nettle (2007) found that the EQ positively correlates with measures of agreeableness (r = .75, p <.01) and extraversion (r = .37, p <.01), two of the Big Five framework personality components, using the 50-item IPIP five-factor personality scales (Costa & McCrae, 1992; Saucier & Goldberg, 1998; Goldberg, 1999; De Raad & Perugini, 2002). The correlation between agreeableness and the EQ was so strong in Nettle's (2007) study that he stated the two components should be considered the same trait. This is confirmed by a study, which found much higher rates of agreeableness in women compared to men (Costa, Terraciano, & McCrae, 2001), which mirrors EQ results.

A significant relationship was found between the EQ and a self-report measure of social desirability, the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960; Preti et al., 2011). This could be related to peoples' desire to be seen by others in a certain way, and therefore, people may be completing the EQ in a way that they would like to be seen rather than a true representation of their empathic ability. However, Preti and colleagues (2011) hypothesise that in

order to be compliant with the expectation of others you need to have an intact empathising ability in the first place.

The original version of the EQ shows excellent internal consistency (0.92), and convergent validity with the Autism Quotient (AQ) (r = -0.56, p <.001) and the Friendship Quotient (FQ) (r = 0.59, p <.001) (Baron-Cohen & Wheelwright, 2004). The FQ (Baron-Cohen & Wheelwright, 2003) measures reciprocity and intimacy in relationships, whereas the AQ (Baron-Cohen, Wheelwright, Skinner, Martin, Clubley, 2001; Wright & Skagerberg, 2012) measures autism related behaviours.

One study carried out a series of experiments, which further established the EQ as being a reliable and valid self-report measure of empathy (Lawrence et al., 2004). Four studies were carried out which examined how valid and reliable the EQ is over time and with other measures. There was evidence to concur that the EQ has concurrent validity, for example, as shown by moderate correlations with the PT (r =0.485, p = 0.009) and EC (r = 0.423, p = 0.025) subscales of the IRI.

The EQ has also shown convergent validity with other measures of empathy, including a modest correlation with the 'Reading the Mind in the Eyes' test (r = 0.294, p = 0.033) (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The 'Reading the Mind in the Eyes' test measures how well a person can read emotions in others; the participant is presented with a series of twenty-five photographs of peoples' eyes and asked to choose which of four emotions the person is feeling. It is a measure of cognitive empathy; how well a person can understand or read the emotions in others.

The EQ has also shown cross-cultural validation in a variety of different speaking populations; French (Berthoz et al., 2008;), Japanese (Wakabayashi et al., 2007), Italian (Preti et al., 2011). All of the aforementioned studies showed

comparable values to the original EQ study (Baron-Cohen & Wheelwright, 2004). The high level of validity and reliability across different countries represents the EQ as a valid measure of empathy across not just western cultures but eastern cultures too.

Reliability

Reliability of the Interpersonal Reactivity Index

The initial IRI study (Davis, 1980) showed evidence for a four-factor structure of empathy, and with all four subscales showing excellent test-retest reliability (r = range between 0.61 - 0.81) over a sixty to seventy-five day period. The IRI shows good test-retest reliability in some studies (Huang et al., 2012), but not all. For example, in one study the IRI had moderate to high internal consistency (.69 for PD, .72 for FS, .82 for EC) (Alterman et al., 2003), but in another only moderate test-retest was found (r = .61 and .59 for males, r = .51 and .47 for females) (Péloquin & Lafontaine, 2010). Another study measuring empathy in physicians described moderately low (0.47) to relatively high (0.86) test-retest reliability, making it hard to conclude whether it was reliable or not (Yarnold et al., 1996).

There was a lack of test-retest measures being conducted in the studies that employed the IRI in the present literature review (n = 4), which makes it difficult to evaluate reliability confidently. It is also evident that some of the subscales provided lower Cronbach alphas, which adds to the growing evidence that some of the subscales are not tapping empathy, for example in one study the PD subscale had a Cronbach alpha of 0.69, whereas the EC subscale had a Cronbach alpha of 0.82 (Alterman et al., 2003). Equally, another study found that Cronbach alphas ranged

from borderline (0.58) to relatively high (0.86) (Yarnold et al., 1996). In conclusion there appears to be mixed findings for the reliability of the IRI as a measure of empathy, with a lack of consistently high reliability.

Reliability of the Empathy Quotient

The original version of the EQ provides excellent test-retest reliability (r = 0.97, p <.001) (Baron-Cohen & Wheelwright, 2004). This has been confirmed by later studies (Lawrence et al., 2004; Berthoz et al., 2008; Preti et al., 2011), the latter of which yielded three subscales within it (cognitive, affective and social skills) with high internal (0.79) and test-retest reliability (r = 0.85, p <.001).

Cronbach's alpha was examined as a marker of internal consistency within all of the included studies. The EQ had very high internal consistency, with the highest Cronbach alpha recorded in the present studies as 0.92 (Baron-Cohen & Wheelwright, 2004). The high internal consistency was stable whether the EQ was employed within a clinical (0.92) or general population (0.89) (Muncer & Ling, 2006; Nettle, 2007; Berthoz et al., 2008; Preti et al., 2011; Wright & Skagerberg, 2012). The results indicate that the EQ has very strong internal consistency and is a reliable psychometric test. In conclusion there appears to be consistently high reliability across studies for the EQ as a measure of empathy.

Part 2: Clinical Administration

The first part of the discussion confirmed that the IRI and EQ are valid and reliable measures of empathy in general. This part of the discussion will aim to explore how

useful the IRI and EQ are as empathy measures across different populations, specifically focusing on clinical adult populations where possible.

Clinical Administration of the Interpersonal Reactivity Index

It appears that the IRI has been used more frequently with healthy populations rather than clinical populations. Only one study in the present review explored empathic abilities in a clinical population, and found that individuals with schizophrenia had significantly lower scores on the PT and EC subscales than healthy controls (t = 2.9, p = .004 for PT, t = 2.2, p = .033 for EC), but significantly higher scores on the PD subscale (t = -3.9, p <.001) (Smith et al., 2012). There was no difference on the FS subscale, which adds to the evidence-base of it being less related to trait empathy (Cliffordson, 2001; Baron-Cohen & Wheelwright, 2004; Péloquin & Lafontaine, 2010).

The aforementioned study was reported as the first study to examine whether impairments in self-reported empathy are associated with poorer functional outcomes in schizophrenia (Smith et al., 2012). They found that amongst individuals with schizophrenia, lower PT correlated with functional capacity (r = .034, $p \leq$.05), which was measured using the brief version of the USCD Performance Skills Assessment (UPSA-B) (Mausbach, Harvey, Goldman, Jeste & Patterson, 2007). The questionnaire relates to how well people can complete everyday tasks related to finance and communication. They also found a correlation between specific levels of functioning and EC (r =0.33, $p \leq$.05) and PT (r = 0.43, $p \leq$.05) in individuals with schizophrenia; those with low scores had poorer functional outcomes, as measured using the Specific Levels of Functioning questionnaire (SLOF) (Schneider & Streuning, 1983). This particular questionnaire assesses community functioning

across the domains of interpersonal relationships, social acceptability, activities of daily living and work skills.

There is evidence of the IRI being adapted to more closely meet the needs of studies, for example, Péloquin and Lafontaine (2010) adapted and validated the IRI for use in measuring empathy in couples and found concurrent validity between relationship satisfaction and empathy, except for males in same-sex relationships. The authors hypothesised that empathy is valued by female partners and therefore shown more by males in heterosexual relationships compared to males in same-sex relationships. In adapting the measure for the purposes of their study, they changed words to better suit their participants and focus, for example, the word 'people' in items was changed to 'partner'. The full IRI scale was administered but two of the subscales were discarded from statistical analyses for not measuring dyadic empathy (PD and FS). The adapted IRI became the IRIC (Interpersonal Reactivity Index for Couples) (Péloquin & Lafontaine, 2010). Whilst results support the use of the IRIC for people within romantic relationships, it had only a moderate test-retest reliability (r = .61 and .59 for males, r = .51 and .47 for females) and was tested within a limited sample, and shows no evidence of utility for clinical populations.

There was a distinct lack of clinical application of the IRI within the present literature review. The IRI was the most widely used self-report measure of empathy (Beven, et al., 2004) until the development of the EQ. For example, the IRI was recommended as the measure of choice for investigation into empathic ability in offenders (Polaschek & Reynolds, 2001), despite the IRI not being validated for use with that population at that time (Gudjonsson, 2001). One study aimed to validate the use of the IRI with offenders in 2004 (Beven, et al., 2004) and although they recommend it as an assessment tool, they suggest that the scale should be used with

caution. The internal consistency for the PD subscale in that particular study is reported to be far below acceptable (the exact values are not provided). The study concurs that the IRI in its entirety is not a measure of empathy and has not been validated for use with clinical populations.

The same study also queries whether measuring empathy via self-report relies on greater verbal skill and insight of adults as suggested by Davis (1994). The researchers comment that psychometric properties of self-report measures of empathy may be dependent upon the verbal skills and the insight of the population in which they are being used (Beven, et al., 2001), further stating that 20% of the offender population have literacy deficits (Caddick & Webster, 1998). However, their study did not measure or control for literacy skills or verbal ability, which would have been a useful way of ruling out any such suggestions. Rather than assume that a range of variables may hinder results within a particular population, it is better to measure those variables and take them into consideration in a study.

In regards to practical administration, the IRI is short (28 items) and easy to use and would therefore be a desirable research tool. Although it appears from the literature that the IRI has been used clinically in the past, there was only one study that concluded the measure is validated for use within clinical populations (Smith et al., 2012).

Clinical Administration of the EQ

The EQ was initially created to explore empathy as a feature of psychopathology and to be used within a clinical context (Berthoz et al., 2008), which therefore fills the gap that is provided by the IRI not being validated as a clinical measure. The initial study by Baron-Cohen and Wheelwright (2004) indicated an empathizing deficit in

people with high-functioning autism or Asperger Syndrome. A follow up study found that AQ scores (Autism Spectrum Quotient) could be reliably predicted from EQ and Systemizing Quotient (SQ) scores, indicating that empathizing plays a significant role in the autism spectrum condition (Wheelwright et al., 2006). As predicted, there was a strong negative correlation between the EQ and AQ in the typical control group (Wheelwright et al., 2006).

Autism spectrum disorders (ASDs) are much more prevalent in males than females, and evidence suggests that autism is the high-systemising and low-empathising extreme of the population distribution for the two traits. All of the papers included in the present literature review evidenced an effect of gender, with females consistently attaining higher EQ scores than males confirming Baron-Cohen's (2002; 2003) extreme male brain theory of autism. The theory proposes that empathising and systemising are the two major dimensions of the human mind, with empathising relating to the way in which we understand the social world and systemising relating to the understanding of how things work and developing rules to explain the way they work (Baron-Cohen, 2002; 2003). The researchers suggest that differences are biological; empathising is more characteristic of the female brain and systemising is more characteristic of the male brain (Baron-Cohen, 2002; Baron-Cohen, 2003; Nettle, 2007).

As stated, the EQ has commonly been evaluated to fit onto a three-factor model of empathy. In exploring the reliability and validity of the EQ, Lawrence and colleagues (2004) discovered that gender differences were found in the cognitive and affective factors (females scoring higher on both) but not on the social skills factor. The affective empathy items illustrate a bigger difference between genders (Lawrence et al., 2004; Muncer & Ling, 2006). However, the aforementioned studies

have not explored what may contribute to this notable difference. The literature would benefit from further investigation using brain imaging to explore the differences between male and female brains whilst empathising.

According to the Empathising-Systemising theory (E-S theory) (Baron-Cohen, 2003), there are five major cognitive styles on these two dimensions. Baron-Cohen refers to them as 'brain types'. Individuals who have a higher level of empathizing than systemizing are termed as having a 'type E' brain. Individuals who have a higher level of systemizing than empathizing are termed as having a 'type S' brain. People with an equal level of empathizing and systemizing are termed as having a balanced brain; 'type B'. According to the extreme male brain (EMB) theory, an individual with an Autism Spectrum Condition (ASC) or High Functioning Autism (HFA) tends to show a profile of hyper-systemizing and hypo-empathizing, which is termed as 'extreme S' type. Lastly, the opposite of that are individuals who demonstrate hyper-empathising and hypo-systemizing, making them 'extreme E' type brains. This has been corroborated within different cultures (Wakabayashi et al., 2007).

Results suggest that females tend to have a superior ability for tasks that involve high empathising skills and males are superior on tasks that require a high degree of systemizing (Lummis & Stevenson, 1990; Halpern, 1992; Masters & Sanders, 1993). The concept that females have higher empathising skills is not a new finding (Barron, Limmon, & Falbo, 1981). A very large study of the general population (non-students) found 5% of the males in their sample were empathizers (type E or extreme E) in comparison to 23% of females in their sample (Wright & Skagerberg, 2012). The authors of one study suggested that the empathising-systemising model is sufficient to explain all psychological sex differences (Baron-

Cohen, Richler, Bisarya, Gurunathan, & Wheelwright, 2003). There was no evidence in the included literature to support this extreme claim.

A study exploring correlations between the EQ and systemising quotient (SQ) found that people with more aesthetic interests (visual arts, poetry, novels, theatre, plants) had higher scores on the EQ, and people with technological interests (technology, computers, science) had higher SQ scores (Nettle, 2007). These results are not particularly unexpected but they do provide a validation of sorts for the EQ; if the EQ did not predict an interest in activities that involved a focus on feelings and socialisation it would doubt cast on what was being measured to a degree.

In regards to correlations with other clinical measures, the EQ has been found to be negatively correlated with depression and anxiety using the Beck Depression Inventory and State Trait Anxiety Inventory (Beck & Beamesderfer, 1974; Spielberger, 1983; Lawrence et al., 2004; Berthoz et al., 2008), highlighting the importance of measuring and controlling for these conditions when assessing empathy. Conversely the EQ was not found to be related to measures of psychopathology in another study (Preti et al., 2011) but this was within a sample of the general population rather than a clinical population.

In the included studies, there was very little discussion in regards to environmental input into empathy levels. There were a number of findings in relation to how well empathy correlates with other personality and trait measures, and there were several findings for females having higher empathy levels than males, with the hypothesis that it could be related to different brain structures or activity as is the case in autism spectrum conditions. However, there appeared to be a lack of measurement in relation to life experiences that could affect a person's level of

empathy. The current research appears to indicate that empathy is a trait somebody develops and keeps rather than a state, which could change over time.

In summary of the administration of the EQ, the papers exploring factor analysis within the EQ have successfully identified and replicated a three-factor solution; cognitive, affective and social skills. However, there was little evidence of exploration into which groups of people have higher or lower scores in any of these sub-areas. There was a distinct lack of identification of the differences within clinical populations in regards to the three sub-areas of empathy.

Direct Comparison of the EQ and IRI

The IRI has shown cross-cultural validation in different speaking populations; Chinese (Huang et al., 2012) and French (Gilet et al., 2013). This is also the case for the EQ, which has shown cross-cultural validation of the measure in a French sample (Berthoz et al., 2008;), a Japanese sample (Wakabayashi et al., 2007), and an Italian sample (Preti et al., 2011). The reproducibility of the IRI and EQ in varying countries puts the measures on par with one another for cross-cultural validation.

The confusion over what exactly is being measured by the PD and FS subscales of the IRI has led to those elements being criticised or discarded from studies (Yarnold et al., 1996; Cliffordson, 2001; Baron-Cohen & Wheelwright, 2004; Péloquin & Lafontaine, 2010). The literature provides evidence to suggest that these particular subscales may not be tapping into the construct of empathy, whereas the EQ has been consistently validated as a useful measure of empathy in its entirety or in shorter versions of the measure.

On a practical level, the EQ is a reasonably long measure (sixty items), making it a less desirable measure for research as participants may get bored or

distracted. However, the results of studies using the EQ with clinical populations indicates its use as a useful and reliable measure for screening empathy within clinical settings, and in summary, more so than the IRI. In summary of the IRI and the EQ, the literature review results were lacking in Cronbach alphas being reported, but the results indicate that the EQ had consistently higher internal consistency than the IRI (see Table 5).

Limitations of the review

A limitation of the present review is the heterogeneous nature of the studies included for analysis in terms of study design. There was a lack of control groups within the reviewed papers with only seven out of the fourteen studies having a control and clinical group comparison, whereas the other seven studies either used one population type or compared general population groups (e.g. students vs. teachers). Having control groups allows for comparison along the dimension of a variable. It would have been useful to observe empathy differences across more clinical groups compared to control groups.

It is worth noting that a number of the included studies (n = 7) used student populations, although this does not appear to be a strong limitation as studies have not found a difference between the general population and student populations on the EQ (Baron-Cohen et al., 2001; 2003; Baron-Cohen & Wheelwright, 2004). Given the disparity in scores between males and females on the EQ, the included papers demonstrate that empathy is a social skills concept in which non-clinical populations differ, as well as clinical populations.

Despite the lack of control groups, the final papers focused on in the present review were of very good quality and therefore the results of the review are

considered reliable. The aim of the present literature review was to explore if empathy can be reliably measured and to analyse the strengths and weaknesses of the IRI and the EQ. The literature review succeeded in that aim as the papers included confirmed that empathy can be reliably measured in adults, and covered the inclusion of different cultures, different clinical populations, various age-groups, and a neuropsychological focus.

Conclusions

Of the fourteen papers included for the literature review, six employed the IRI, seven used the EQ and one study employed both measures. With the use of the QualSyst appraisal tool, the papers were identified to be of very high quality. The breadth of the construct of empathy makes it difficult to choose one valid empathy measure for use with all research purposes. However, a number of tentative conclusions can be drawn from this review.

Overall there was strong evidence that the EQ, as well as the EC and PT subscales of the IRI, are valid and reliable measures of empathy. There was more evidence for the EQ being a valid measure for use within clinical populations. The IRI has been used more so in research with healthy controls and less frequently within clinical populations. Given that two subscales of the IRI have been criticised repeatedly for not tapping into empathy (PD and FS), it is recommended that the whole measure is not used for measuring empathy. It appears that this reasoning has been replicated by researchers in other studies who have chosen the EQ over the IRI within clinical studies (Preti et al., 2011).

It appears that the IRI was the best developed measure for assessing empathy until the introduction of the EQ (Muncer & Ling, 2006), and that the EQ was

developed because of shortfalls in alternative empathy measures, and that specifically includes the IRI (Allison et al., 2011). The original EQ shows good internal consistency, convergent and concurrent validity, and good test-retest reliability (Baron-Cohen & Wheelwright, 2004; Lawrence et al., 2004). The studies included in the present literature review support the use of the EQ as a reliable and valid measure of empathy across different cultures and clinical populations. The EQ is also reliable at detecting subtle differences in empathy within the general population, especially in regards to differences between genders (Baron-Cohen & Wheelwright, 2004; Lawrence et al., 2004), making it a reliable measure of clinical and general population use.

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Part 2: Empirical Paper

Exploring Empathy and Attachment in Borderline Personality Disorder

2.1 ABSTRACT

Aims

Research has shown mixed findings regarding empathy in people with borderline personality disorder (BPD). The aim of the study was to better understand empathy within people with BPD, and to explore the links between empathy and attachment.

Method

The method of investigation involved exploring scores on three factors of empathy using the Empathy Quotient (EQ), and attachment related anxiety and avoidance using the Experience in Close Relationships Questionnaire - Revised (ECR-R), in a sample of 86 participants with BPD and a control group of 96 participants.

Results

Analyses showed that the control sample had significantly higher overall empathy levels than the BPD sample, as well as higher cognitive empathy and social skills, but there was no difference between the groups for affective empathy. Correlations indicated that higher rates of attachment insecurity were related to lower levels of empathy.

Conclusions

Impaired cognitive empathy may be triggered by insecure attachment styles, and could contribute towards interpersonal dysfunction in BPD. People with BPD show difficulties in understanding the emotions of others, but do not have difficulty in feeling emotions in response to others.

2.2 INTRODUCTION

Social cognition is a vital feature in human interaction (Adolphs, 2009; Gallese, Rochat, Cossu, & Sinigaglia, 2009) and plays a key role in psychopathology (Baron-Cohen, 2003; Wheelwright & Baron-Cohen, 2006). Social cognition is a multifaceted component that incorporates a set of cognitive processes involved in understanding and responding to the cues, intentions and actions of those around us (Green, Olivier, Crawley, Penn & Silverstein, 2005).

The understanding of the foundations of prosocial behaviour within social interactions has become an increasingly popular topic of study within psychopathology research and neuroscience (Chakrabarti & Baron-Cohen, 2006; Montanes-Rada, Ramirez & De Lucas Taracena, 2006). Empathy is a core component of prosocial behaviour, and one of several key components that contribute to emotion perception, relationship skills and social competence (Petrides & Furnham, 2001).

Empathy

Empathy is a core factor in social cognition that allows us to interact successfully in the social world; it allows us to tune into how someone else is feeling or what he or she is thinking. The word empathy comes from the Greek word 'empatheia', which means 'in suffering', and modern definitions have undergone a series of metamorphoses. A comprehensive definition of empathy encompasses one's ability to *understand* and *share* in the emotions of others (Cohen & Strayer, 1996). Most research agrees that there are both cognitive and emotional processes involved in empathy, and this has been substantiated by distinct neural substrates (Decety & Jackson, 2004; Shamay-Tsoory, 2011). Two components of empathy have been

explored and measured thoroughly; cognitive empathy and affective empathy (Baron-Cohen & Wheelwright, 2004; Smith, 2006). Cognitive empathy is the ability to comprehend another person's mental state, i.e. being able to recognize another's feelings, whereas, affective empathy is the emotional response that is triggered by observing emotion in someone else.

Research has highlighted empathy as a component of social cognition that requires exploration (Baron-Cohen & Wheelwright, 2004; Lawrence, Shaw, Baker, Baron-Cohen & David, 2004). It has been stated that empathizing is a dimension along which individuals differ (Baron-Cohen & Wheelwright, 2004), and that there are particular factors which may contribute to where an individual lies on that spectrum, such as genetic and hormonal factors. Additionally, people with Autism Spectrum Disorders (ASD) have been found to have specific empathy impairments (Golan & Baron-Cohen, 2006; Wheelwright & Baron-Cohen, 2006).

Neuroimaging studies have indicated a specific set of brain regions which are used when empathizing, specifically the orbito-frontal and medial-frontal cortex (Brothers, 1990; Baron-Cohen et al., 1999). Neuroscientists extended this research by identifying core brain regions specifically associated with cognitive empathy; the right temporo-parietal junction and the posterior cingulate / precuneus (Jackson, Brunet, Meltzoff & Decety, 2006).

Empathy impairments have been reported in a variety of conditions including: Antisocial Personality Disorder and psychopathy (Joliffe & Farrington, 2004), Borderline Personality Disorder (BPD) (Harari, Shamay-Tsoory, & Levkovitz, 2010), ASD (Baron-Cohen & Wheelwright, 2004), Schizophrenia (Langdon, Coltheart & Ward, 2006; Montag, Heinz, Kunz, & Gallinat, 2007; Smith et al., 2012), and eating disorders (Guttman & Laporte, 2000). One or more of the

core empathy components, cognitive or affective, may be impaired in the aforementioned conditions (Lawrence et al., 2004; Decety & Moriguchi, 2007).

Borderline Personality Disorder (BPD)

BPD is characterised by a complex set of symptoms including; a pervasive pattern of instability of affect, interpersonal relationships, self-image and behaviour, characterised by marked impulsivity, which remains persistent over a range of contexts (DSM-5; American Psychiatric Association, 2013). A hallmark symptom of BPD is identified as moving from idealisation to devaluation rapidly; the people they love can be perceived as perfect to being perceived as evil a moment later. Consequently people with BPD can fluctuate between an unhealthy alternating sequence of pushing others away and desperately clinging to them (Baron-Cohen, 2011).

Prevalence of BPD is approximately 0.7-2% of the general population (Swartz, Blazer, George & Winfield, 1990; Torgersen, Kringlen & Cramer, 2001; Coid, Yang, Tyrer, Roberts & Ullrich, 2006; Baron-Cohen, 2011). BPD is of serious social concern as 60-70% attempt suicide at some point over the course of their life (Oldham, 2006). A prominent component of BPD is disrupted social interactions, yet there is limited empirical research focused on this area (Gunderson, 2007; New, Triebwasser & Charney, 2008).

Prior to the publication of the DSM-5 (American Psychiatric Association, 2013) there was discussion that the categorical approach to personality disorders would be replaced with a dimensional approach (Krueger, Skodol, Livesley, Shrout, & Huang, 2007). Despite this, the DSM-5 retained the categorical approach to personality disorders, and the diagnostic criteria for BPD have remained the same to

that in the DSM-IV. However, an alternative DSM-5 model for personality disorders is proposed and housed within the Emerging Measures and Models part of the DSM-5. The alternative model proposes the following criteria;

1. Personality Functioning

   Impairment in personality functioning (identity, self-direction, *empathy*, intimacy) is rated along a continuum from little or no impairment to extreme impairment.

2. Pathological personality traits (one or more)

   Including the following five broad domains; negative affectivity, detachment, antagonism, disinhibition and psychoticism.

The proposed dimensional method allows for personality and function to be assessed by focusing on the number of personality symptoms a person has and the impact of them, without requiring a diagnosis of a personality disorder. It also specifically indicates that empathy is a core factor that is often impaired within personality disorders.

Emotional Dysregulation in BPD

Prior to the publication of the Diagnostic and Statistical Manual of Mental Disorders 5 (DSM-5; American Psychiatric Association) in 2013 the Treatment and Research Advancements National Association for Personality Disorders (TARA-APD) lobbied to change the label BPD, reporting that it is "Confusing, imparts no relevant or descriptive information and reinforces stigma," (Porr, 2001). They suggested that the disorder be named 'emotional regulation disorder' instead as this is one of the benchmark symptoms of the disorder. Emotional regulation is the process of

regulating emotions as well as interactions, behaviours and physiological states connected to emotions using specific strategies (Petermann & Kullik, 2011).

Studies have investigated the relationship between emotional dysregulation and empathy (Konstantareas & Stewart, 2006; Samson, Huber & Goss, 2012), and several of them have hypothesised that empathy deficits trigger emotional dysregulation (Decety, 2010; Schipper & Petermann, 2013). Their studies suggest that intact empathic skills create the foundation for effective and healthy emotional regulation, and therefore, highlights the potential consequences of empathy deficits.

Empathy in BPD

Research has found that different psychopathological profiles have diverse empathy profiles (Baron-Cohen, 2011), but the research has mixed findings. Early research indicated that people with BPD had an enhanced ability to resonate with the feelings of others (Hoffman & Frank, 1987). However, more recently, in comparing and contrasting empathy profiles across different disorders, Baron-Cohen (2011) indicated that individuals with BPD are lacking in both cognitive and affective empathy skills. Other recent studies add to the conflicting results, reporting both enhanced and impaired empathy in BPD (Fertuck et al., 2009; Preiβler, Dziobek, Ritter, Heekeren, & Roepke, 2010; Franzen et al., 2011; New et al., 2012).

Neuroimaging studies have shown abnormalities in the empathy circuit in the brain of people with BPD, specifically, under-activity in the orbital frontal cortex, the ventromedial prefrontal cortex and the temporal cortex. Some studies have shown increased activity in the amygdala of people with BPD when looking at emotionally aversive stimuli, whereas other studies have shown the opposite (Herpertz et al., 2001; Donegan et al., 2003; Juengling et al., 2003).

Given that the research into empathy within BPD is mixed and inconclusive, a more comprehensive exploration is needed. Empathy is a complex construct, but the current literature suggests that further studies need to be conducted to consider empathic abilities in BPD.

Attachment

Attachment is defined as a strong enduring bond between a child and their primary caregiver, commencing in infancy but expanding to include adult interpersonal relationships. Early parent-child interactions are believed by theorists to impact interpersonal functioning throughout the lifespan (Bowlby, 1973; 1980). It has been proposed that children are more likely to develop secure attachments if their primary caregivers are able to think about the contents of their own minds as well as that of others (Fonagy et al., 1996).

Research has found that predicting an emotional response in another involves using internal affective representations and that greater use of these affective representations is related to having higher levels of empathy (Hooker, Verosky, Germine, Knight, & D'Esposito, 2008). Children's experiences of early attachment form their internal working model of the self and others. From Bowlby's perspective (1973), the internal working model of the self is related to how acceptable or lovable one is in the eyes of their primary attachment figure/s, and an individual's model of the other is linked to how available and responsive attachment figures are expected to be.

The empirical assessment of attachment patterns and categories was pioneered by Ainsworth and colleagues (1978) and extended by Main and Solomon

(1990). Table 1 outlines the main attachment patterns that have been extensively researched and replicated (Cassidy & Shaver, 1999).

Table 1

Description of Attachment Types in Childhood

Attachment Pattern	Description of behaviour
Secure (Autonomous)	Open communication of positive and negative affects with caregiver, and easily comforted by caregiver.
Insecure Avoidant (Dismissing)	Restricted communication of vulnerable affects and treats strangers similarly to caregiver. Rebels against attachment.
Insecure Anxious (Preoccupied)	Unable to cope with absence of caregiver; constantly seeks reassurance.
Insecure Ambivalent / Resistant (Preoccupied)	Exaggerated communication of vulnerable affect / seeks proximity but resists it when received.
Disorganised / Disorientated (Unresolved)	Contradictory, conflicted and disorientated behaviour.

As seen in Table 1, a secure attachment is defined by openly being able to communicate emotions and respond to comfort. A secure attachment should engender a consistently positive sense of being worthy of love and an expectation that others will be generally responsive and accepting. The portrait of secure attachment differs significantly from the dependent and tumultuous relationships and experiences that are renowned in people with BPD.

Attachment in BPD

A review of thirteen studies exploring attachment in BPD concluded that all studies involved demonstrated a strong association between BPD and insecure attachment (Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004). The review provided a strong conclusion that people with BPD most often have unresolved, fearful and preoccupied attachment styles, despite the included studies being of differing methodologies. In those attachment types individuals often demonstrate a longing for intimacy yet a concern about rejection and dependency at the same time (Agrawal, et al., 2004). The high prevalence of insecure attachments found in many studies provides support for the theoretical underpinning of BPD which suggests that the disorder's core psychopathology arises within the domain of interpersonal relationships (Sperling, Sharp & Fishler, 1991; West, Links & Patrick, 1993; Dutton, Saunders, & Starzomski, 1994; Patrick, Hobson, Castle & Maughan, 1994; Fonagy et al., 1996; Sack, Sperling, Fagen, & Foelsch, 1996).

It has been suggested that an insecure attachment in infancy could pave the way for a maladaptive developmental pattern that creates a risk factor for development of BPD (Lyons-Ruth; 1991; Lyons-Ruth & Jacobvitz, 1999).

Empathy and Attachment

A developmental psychopathology (DPP) approach to the understanding of personality disorders incorporates a complex interaction between neurological, genetic and environmental factors. A DPP understanding of BPD has suggested a link with early stressful life environments (Fonagy & Bateman, 2008; McGauley, Yakeley, Williams, & Bateman, 2011), and it has been suggested that experiencing

emotional neglect early in life may be a crucial predisposing risk factor for an individual going on to develop BPD (Fonagy & Luten, 2009). Disruption in the development of empathic abilities and the ability to "perceive and interpret human behavior" are interpreted as fundamental elements in the development of BPD (Fonagy & Luten, 2009).

The aforementioned research corresponds with Linehan's (1993) biosocial theory of the development of BPD, which hypothesizes that growing up in an invalidating environment, in which a child does not learn how to understand, regulate or tolerate their emotions or that of others, leads to emotional dysregulation, a hallmark symptom of BPD.

Bateman and Fonagy (2008) propose that when disorganised attachment processes are activated, people with BPD experience a temporary shift to a 'prementalistic' way of experiencing the world with the consequence of chaotic relationships and fragmented self-experience. In this state, the ability to understand another's separate mind and their possible mental pain is diminished.

It is also worth noting that the term empathizing will be used to infer something different from mentalizing in the present project. Although empathizing and mentalising are overlapping constructs, they are different social skills; mentalising is more akin to cognitive empathy, whereas affective empathy requires a shared emotional experience (Decety & Jackson, 2004; Singer, 2006).

Present Study

The current study will take place as part of a larger over-arching study (Montague, Fonagy et al. – Wellcome fMRI study of neurocomputational models of BPD and ASPD), which aims to investigate shared and differential neural signatures of BPD

and Anti-Social Personality Disorder (ASPD). The larger overarching study gives a unique opportunity to investigate a group of people with BPD and to explore their empathic abilities and attachment. However, the aims and hypotheses of the present study are independent from the overarching study, and are elaborated on below.

Aims

Little is known about the underpinnings of empathy in BPD populations, and therefore, one aim of the present study is to build a more comprehensive profile of affective and cognitive processing biases associated with BPD symptoms. Learning more will help develop interventions that draw on strengths and avoid weaknesses of the aforementioned personality disorders.

It is unlikely that the development of empathic abilities is not affected by other personality and cognitive constructs, and therefore a second aim is to correlate empathic abilities with attachment related anxiety and avoidance. Difficulties in understanding the views of others have been suggested to link to a diminished view of the self in relation to others (Bateman & Fonagy, 2010). A high level of attachment related anxiety results in a variety of complications, such as an inherent lack of trust, avoidant behaviours, ambivalence regarding commitment, and an overall dysfunctional approach to interpersonal relationships. Literature has not commonly compared attachment directly between large samples of people with BPD and matched comparison groups (Agrawal et al., 2004), and the present study provides a unique opportunity to do so. Correlating empathy with developmental concepts such as attachment will allow for more thorough empathy profiles to be developed.

Previous research has shown associations between empathy and Structured Clinical Interview for DSM-III-R (SCID) (Spitzer & Williams, 1987) diagnoses (Alterman, McDermott, Cacciola & Rutherford, 2003). Therefore, a third aim is to investigate number of BPD symptoms, as well as number of personality disorder symptoms from across all ten disorders in the SCID-II to examine the correlation with empathy and attachment profiles.

Hypotheses

Based on the literature discussed, the following hypotheses were generated;

1. It is hypothesised that the current study will replicate the three main empathy factors arising from the Empathy Quotient (EQ) as seen repeatedly in previous literature; cognitive, affect and social (Lawrence et al., 2004; Berthoz, Wessa, Kedia, Wicker, & Grèzes, 2008; Preti, et al., 2011). It is hypothesised that these factors will be evident in both the control and BPD groups.

2. It is hypothesised that people with BPD will have lower cognitive, affective and social empathy scores than people within the control group.

3. It is hypothesised that there will be a correlational relationship between empathy and personality disorder symptoms. It is hypothesised that the higher the number of overall personality disorder symptoms a person has according to the SCID-II (Pfohl, Blum, & Zimmerman, 1997), the lower their

empathic abilities will be according to the EQ.

4. It is hypothesised that participants with higher attachment related anxiety and avoidance will have lower cognitive, affective and social empathic abilities.

5. It is hypothesised that in a regression analysis gender, attachment related anxiety, attachment related avoidance, personality disorder symptoms and diagnosis of BPD will contribute to empathy profiles in differing weights.

2.2 METHOD

Participants

Participants for the present study were taken from a larger overarching project (Montague, Fonagy et al. – Wellcome fMRI study of neurocomputational model of BPD and ASPD) which was testing adolescents and adults with emerging and manifest personality disorders, as well as control participants, on a range of self-report measures, behavioural tests and clinical interviews.

Sample size

A power analysis for this study was carried out using G-Power (Faul, Erdfelder, Lang & Buchner, 2007) based on prior work by Nettle (2007) who explored the relationship between empathy and personality dimensions in healthy adults. Nettle used the Empathy Quotient (the proposed study's measure of empathy) and found a correlation between empathy and extraversion ($r = 0.37$, $p<.01$). A power calculation based on Nettle's findings, specifying alpha = 5% and desired power = 80%

indicated that the required sample size was estimated at 41 individuals. In order to allow for incomplete data sets and attrition the recruitment target was set at 60 participants in total.

Inclusion and Exclusion Criteria

Eligibility criteria included the following; all participants must be over 18 years of age, be fluent in writing and understanding English, be able to attend two assessment sessions, and have normal corrected vision. Clinical participants must have a Diagnostic and Statistical Manual (DSM-5) (American Psychiatric Association, 2013) diagnosis of BPD. Control participants must have negative screening results for personality disorders as identified on the Standardised Assessment of Personality – Abbreviated Scale (SAPAS) (see measures) (Moran et al., 2003).

All participants recruited from clinical sites received a diagnosis of Borderline Personality Disorder (BPD) when given the Structured Clinical Interview for DSM-IV (SCID-II) (see measures), confirming their suitability for the clinical group in the study. Five control participants scored 4+ on the SAPAS, which has been indicated as a clinical cut-off point (Moran et al., 2003), and therefore had a SCID-II (Pfohl, Blum, & Zimmerman, 1997) interview. None of the five participants received a diagnosis of a personality disorder or a high number of symptoms from the SCID-II, and therefore, were retained as control participants.

Recruitment

Clinical participants were recruited for the overarching study from a large number of clinical services for adults with personality disorders across London at either their

clinical assessment, whilst on a waiting list, or in the first two months of treatment (to avoid confounding effects of treatment).

Clinicians in NHS sites introduced their clients who met criteria to the study and with verbal consent forwarded their names and contact details to the research staff to discuss the study and its various components in more detail. Clients were consenting at that stage just to receive a phone call to discuss the project. Once the study has been discussed with the research staff on the phone and the client agreed, potential participants underwent a telephone screening. If they met the eligibility criteria and were willing to participate, appointment times were made with them. At that point all participants received a unique ID number.

Control participants were recruited via posters displayed in academic institutions and local coffee shops. All participants received £10 per hour for their time, and could also earn money for the computer tasks that were part of the wider assessment. Participants took part in four computer tasks in which they were playing with or against an imaginary opponent. Participants could earn up to a maximum of £125 for the computer tasks alone.

Setting

Participants were assessed at their clinical service from which they were recruited. Services from several boroughs within London were included. They will not be mentioned here for confidentiality reasons.

Basic Demographics

Participants for the present study included 96 controls (47 females and 49 males), with a mean age of 29.17 years (SD = 10.11, range = 18 to 54), and 86 people with

BPD (69 females and 17 males) with a mean age of 31.44 years (SD = 10.09, range = 18 to 58).

Control participants had a mean score of 50 (SD = 6.89) on the Ravens Progressive Matrices (RPM) IQ test (see measures section), and the mean score for BPD participants was 47 (SD = 8.16). Independent *t*-tests illustrated that there was a significant difference between the groups for their RPM score, with control participants having significantly higher IQ scores. This was accounted for in the analyses.

Chi-square tests were used to explore any differences between the two groups in regards to ethnicity and highest level of education achieved. As can be seen in Table 2, there were no differences in regards to ethnicity or education. An independent *t*-test illustrated that there were no significant differences between the groups for age (see Table 2).

Table 2

Demographic characteristics of full sample (n = 181)

		Control n (% within group)	BPD	Test of independence (sig. level)
Gender	Female	47 (49%)	69 (80.2%)	
	Male	49 (51%)	17 (19.8%)	
				***p* = .000**
Age	18-25	46 (47.9%)	27 (31.4%)	
	26-35	29 (30.2%)	29 (33.7%)	
	36-45	8 (8.3%)	19 (22.1%)	
	46-58	13 (13.5%)	9 (10.5%)	
	Not stated	0	2 (2.3%)	
				p = .103
Ethnicity	White*	62 (64.6%)	62 (72.1%)	
	Black*	9 (9.4%)	8 (9.3%)	
	Mixed*	12 (12.5%)	5 (5.8%)	
	Asian*	7 (7.3%)	4 (4.7%)	
	Chinese*	2 (2.1%)	0	
	Any other	3 (3.1%)	4 (4.7%)	
	Not stated	1 (1%)	2 (2.3%)	
	Missing	0	1 (1.2%)	
				p = .483
Education [1]	No qualifications	4 (4.2)	5 (6%)	
	Vocational level [2]	9 (9.4%)	8 (9.5%)	
	GCSEs [3]	24 (25%)	19 (22.6%)	
	A levels [4]	31 (32.3%)	21 (25%)	
	Higher education equivalent [5]	15 (15.6%)	20 (23.8%)	
	Postgrad education [6]	9 (9.4%)	1 (1.2%)	
	Other not listed	4 (4.2%)	5 (6%)	
				p = .215

[1] Five people in the BPD group (6% of group) did not provide information for highest level of education
[2] NVQ (1), GCSE (less than 5 A*-C) or equivalent
[3] GCSE (5 or more A*-C grade), NVQ (2) or equivalent
[4] A level, vocational level 3 or equivalent
[5] Higher education or professional / vocational equivalent
[6] Postgraduate education or professional equivalent (e.g. Masters, PhD, MD)

Ethics

Ethical approval was granted by the National Institute for Social Care and Health Research (see Appendix D for the ethical approval confirmation letter). Multi-site ethical permission to recruit across multiple sites was obtained and local R&D procedures were completed by the research staff. Completion of questionnaires and computational tests of cognitive and emotional processes were deemed not to be associated with any significant risk.

It is possible that participants could become emotionally upset by questions that triggered emotional memories or distressing feelings, such as the structured interviews for diagnosis (see measures) or the Adult Attachment Interview (George, Kaplan, & Main, 1985), which was used in the wider study. A Risk and Safety Protocol was created by the wider research team, which outlined the protocol for researchers to follow in the scenario that a participant became distressed (See Appendix E for the Risk and Safety Protocol). To counteract any participant distress, researchers were provided with a separate worksheet containing relaxation and mindfulness techniques to carry out with participants if necessary.

All participants were given an information sheet outlining all details of the study and what participation involved, and written informed consent was obtained (see Appendix F for the Information Sheet, but note that the information sheet is for

the wider study; see Appendix I for the consent form). All participants were informed that they could pull out of the study at any time.

Measures

The larger overarching study (Montague, Fonagy et al. – Wellcome fMRI study of neurocomputational model of BPD and ASPD) was collecting an array of self-report questionnaire data, behavioural data, psychiatric diagnostic assessment data, and fMRI data from participants. Only those measures relevant to this sub-project will be described here.

Empathy

Empathy Quotient (EQ)

Empathic abilities were measured in all participants using the Empathy Quotient (EQ), (Baron-Cohen and Wheelwright, 2004), which is the most well validated and reliable measure of empathy to date for clinical populations and is sensitive to a lack of empathy as a feature of psychopathology (Lawrence et al., 2004).

The EQ has questions relating to the two main components of empathy (cognitive and affective), as well as items related to social behaviour. It has been found to have high reliability and high test-retest reliability over a period of 12 months (r = 0.835, p =0.0001) (Baron-Cohen et al. 2003; Lawrence et al., 2004), as well as concurrent validity (r = -0.346, p = 0.012, r = 0.485, p = 0.009) (Lawrence et al., 2004).

Participation in the overarching study required participants to fill in a multitude of questionnaires, and therefore the EQ was presented minus the twenty

filler items, making it a forty-item questionnaire rather than a sixty-item questionnaire. The filler items were included in the original EQ study to take the focus away from empathy (Baron-Cohen & Wheelwright, 2004), however, the inclusion of so many other questionnaires in the present overarching study meant that questionnaires needed to be kept as short as possible to prevent burnout, whilst still remaining valid and reliable. Shorter versions of the EQ have been utilised previously whilst maintaining equally high levels of validity and reliability to the full scale with filler items (Lawrence et al., 2004; Muncer & Ling, 2006; Preti et al., 2010).

As the version of the EQ given in the present study did not have the filler items, the questionnaire numbers are different from the original and forty-item version and can be seen in Appendix G.

Attachment

Experience in Close Relationships Questionnaire - Revised (ECR-R)

All participants completed the Experiences in Close Relationships-Revised (ECR-R) questionnaire (Fraley, Waller, & Brennan, 2000), which is a revised version of Brennan, Clark, and Shaver's (1998) Experiences in Close Relationships (ECR) questionnaire. Both the ECR and the ECR-R are designed to assess individual differences with respect to attachment-related anxiety (i.e. the extent to which people are secure vs. insecure about the availability and responsiveness of romantic partners) and attachment-related avoidance (i.e. the degree to which people feel confident depending on others vs. feeling insecure depending on others). The ECR-R

avoidance and anxiety subscales provide an indication of attachment security; security is represented as the low ends of the two dimensions.

The ECR-R is a 36-item questionnaire. The first 18 items listed comprise the attachment-related anxiety scale. Items 19 – 36 comprise the attachment-related avoidance scale. Each item is rated on a 7-point scale where 1 = strongly disagree and 7 = strongly agree. See Appendix H for a copy of the ECR-R as presented in the present study.

The ECR-R was chosen over other attachment instruments as it is a self-report measure that is easy to fill out, and provides subscales of attachment; anxiety and avoidance. The ECR-R has been found to have high rates of reliability (0.95 / 0.93) and validity (r = .51, p <.001) (Sibley, Fischer & Liu, 2005).

Psychopathology

Standardised Assessment of Personality – Abbreviated Scale (SAPAS)

The Standardised Assessment of Personality, Abbreviated Scale (SAPAS; Moran et al., 2003), is a brief self-report questionnaire that can be completed in less than two minutes, with reported good sensitivity (0.94) and specificity (0.85) in a sample of psychiatric patients with a range of different disorders. All control and clinical participants completed the SAPAS.

Structured Clinical Interview for Diagnostic and Statistical Manual (DSM-IV) Personality Disorders (SCID-II)

The Structured Clinical Interview for DSM-IV (SCID-II) (Pfohl, Blum, & Zimmerman, 1997) is a diagnostic interview used to measure symptoms of

personality disorders. The term *symptoms* will be used throughout the rest of the paper to decribe clinical features of personality disorders.

All clinical participants were interviewed using the SCID-II, which covers all ten of the DSM-5 personality disorders. As the criteria for diagnoses of personality disorders in DSM-5 are not different from DSM-IV, the SCID-II, which has not yet been updated, remains a valid tool for the purposes of this study.

A SCID-II assessment usually takes between one and two hours depending on the complexity of the past psychiatric history and the participant's ability to clearly describe episodes of current and past symptoms. The SCID-II has been found to have high levels of validity (0.45 – 0.95) and reliability (Cronbach's alpha = 0.91 / 0.95) (Skodol, Rosnick, Kellman, Oldham, & Hyler, 1988; Maffei et al., 1997; Shear, et al., 2000; Lobbestael, Leurgans & Arntz, 2010).

Participants were administered the whole SCID-II interview, and total number of symptoms across all personality disorders were measured. In the present study one category was focused on in particular in the analysis; Borderline Personality Disorder (BPD). The clinical interview clarified how many BPD symptoms a clinical participant had, as well as how many personality disorder symptoms across the ten personality disorders included in the SCID-II.

Control participants were not given the SCID-II interview during their testing sessions (except for the five participants scoring 4+ on the SAPAS described in the Participants section). The interview was administered by trained clinical research assistants and trainee clinical psychologists, all of whom received thorough training from a Clinical Psychologist specialising in personality disorders. Researchers in the project regularly participated in peer-supervision for reliability sessions.

Ravens Progressive Matrices Test

The Ravens Progressive Matrices test (RPM) (Raven, Raven & Court, 2003) is a widely used standardised measure of general intelligence. The test consists of sixty visual problem-solving tasks, in which participants are presented with a matrix of geometric figures and have to select the correct missing entry from a set of choices. All participants completed the RPM as part of their assessment tasks.

The RPM has been found to have high levels of validity (0.88 – 0.93) and reliability (Cronbach's alpha = 0.69 – 0.85) (Abdel-Khalek, 2005).

Procedure

Participants were administered an eight hour battery of tests and questionnaires over two sessions as part of the wider study. All measures were completed in a quiet room.

All participants were provided with a detailed information sheet on the study (see Appendix F) and provided consent (see Appendix I). Participants then completed a sociodemographic questionnaire. Sociodemographic data included questions on ethnicity, age, gender and employment status. Ethnic origin of the participant was recorded according to ONS (2011) categories.

The sociodemographic questionnaire also included enquiring about the health of the participant by asking about any current and past psychological or physical problems that require treatment or affect daily life (age of onset, diagnosis, treatment); medication (name, dose and duration); and if s/he had seen a psychiatrist or psychologist (and, if so, why). This was recorded in order to gauge information on any treatment clinical participants were receiving, but also to ensure that control participants did not have any psychological or psychiatric history.

Each participant had two assessments whereby the order of completing questionnaires was always the same. Within each of the assessment blocks participants were allowed to take small breaks upon request. The order of delivery of the self-report questionnaires, clinical interview measures, and computerised testing tasks for the overarching study is provided within the information sheet in Appendix F. Assessments were carried out by trainee clinical psychologists or psychology assistants, and all clinical interviews were recorded.

Research Design

The study employed a between-subjects, correlational design to compare cognitive, affective and social empathy abilities across control participants and adults with BPD. The study employed correlations of empathy abilities with personality disorder symptoms and measures of attachment-related anxiety and avoidance.

Data Analysis

Data were analysed using SPSS 21.0 (IBM, 2012). In addition to the correlational analyses, an exploratory factor analysis was employed using a principal components analysis (PCA) to ensure the factor structure previously found (Lawrence et al., 2004) was present in the study populations. Exploratory factor analysis (EFA) is a type of PCA, which is designed for use in situations where links between the observed and latent variables are unknown. In this case, an EFA was conducted to gauge how questions within the EQ cluster together and form different subscales, such as the cognitive, affective and social clusters, which are most commonly found (Lawrence et al., 2004).

Empathy scores were correlated with questionnaire data from the study, specifically focusing on attachment-related anxiety and avoidance, as well as number of personality disorder symptoms according to the SCID-II, and diagnosis of BPD.

A standard multiple regression was utilised to explore which variables contributed the most to empathy profiles, and this included gender, diagnosis of BPD, overall number of symptoms for all personality disorders according to the SCID-II, attachment related anxiety, and attachment related avoidance.

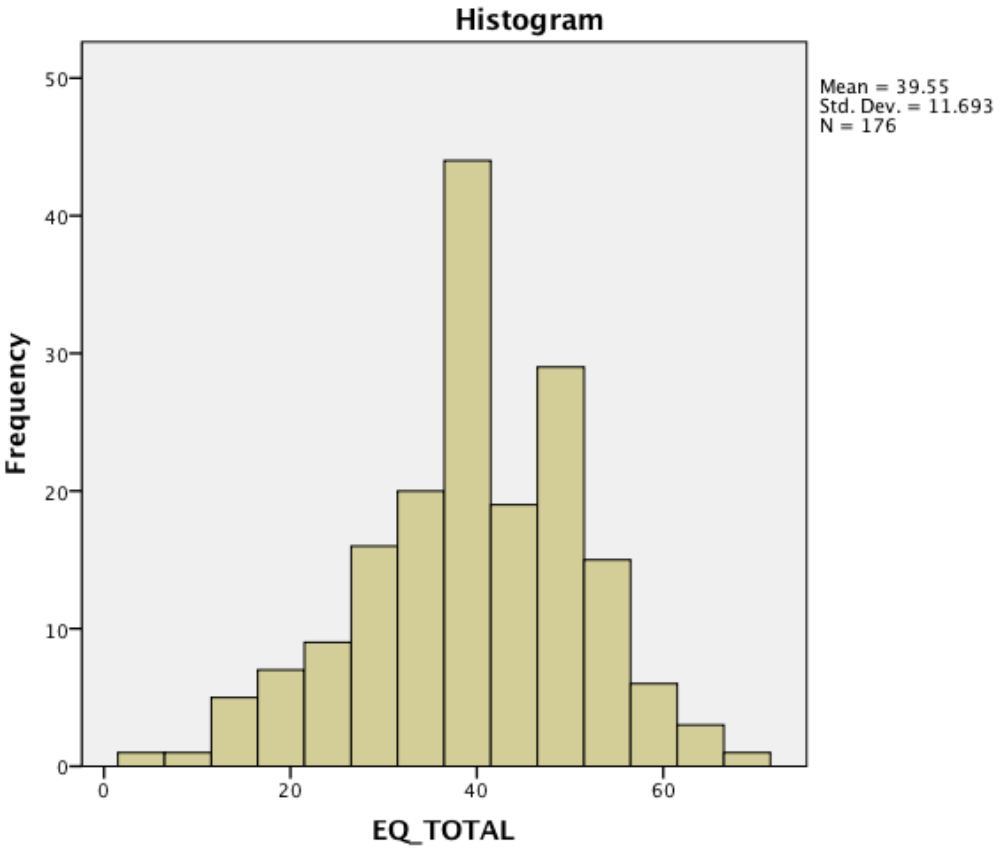
2.3 RESULTS

Assumptions of Normality

The Kolmogorov-Smirnov test of normal distribution indicated that the distribution of the Empathy Quotient (EQ) scores for the whole sample was not normal ($Z = .079$, $p = .010$), however, violation of the assumption of normality is common with even remotely big sample sizes (Pallant, 2007), therefore, scores of skewness, kurtosis and the histogram were relied upon for more reliable measures of normality. The distribution of EQ scores was slightly negatively skewed (-.340) and kurtosis was minimal (.208). The histogram indicated a normal distribution, with a high peak of scores in the mid-range. See Figure 1 for the histogram of EQ scores.

Figure 1

Histogram of Total EQ scores for whole sample



A boxplot was obtained to explore the distribution for the EQ. The EQ contained three outliers, two at the lower end of the scale (a score of 4 in the control group, and a score of nine in the BPD group), and one at the high end of the scale (a score of 71 in the control group). After the removal of the identified outliers, the distribution for empathy was examined again and appeared more normalised based on the histogram, the Kolmogorov-Smirnov test (Z = .072, p = .30) and the lower skewness and kurtosis values (skewness = -.285, kurtosis = -.192).

To determine whether the outliers influenced empathy results, a *t*-test was conducted with and without the outliers. The results were nearly identical. Both analyses concluded there was a significant difference between empathy scores for the BPD and control groups (with outliers t = 3.623, df = 175, p = .000, d = 0.548;

without outliers $t = 3.685$, df = 172, $p = .000$, $d = 0.557$), and it therefore appears that the removal of the outliers has normalised the distribution without affecting the validity of the findings.

The Kolmogorov-Smirnov test indicated that the distribution of the ECR-R anxiety scores and ECR-R avoidance scores were similarly not normal in distribution (ECR-R anxiety: $Z = .081$, $p = .009$; ECR-R avoidance scores: $Z = .089$, $p = .002$). Again, scores of skewness and kurtosis were obtained and histograms were created to explore normality of the distributions.

The attachment-related anxiety scores for the whole sample had almost no skewness (-.015) but had negative kurtosis (-1.109). The histogram showed little 'peakedness' of the distribution with participants scoring at high rates across the spectrum rather than clustering in the mid-score range. According to the boxplots there were not identifiable outliers for the ECR-R scores of attachment related anxiety and avoidance.

The attachment related avoidance scores for the whole sample also had slightly positive skewness (.200) but a high negative score for kurtosis (-.860). The histogram showed a slightly higher cluster of scores on the low-end of the scale, but the distribution was not skewed enough to alter its assumptions of normality to a degree which would affect the reliability of the results. The 5% trimmed mean was almost identical to the sample mean for attachment related avoidance (5% mean = 62, mean = 62.39), and for attachment-related anxiety (5% mean = 70.52, mean = 70.63), indicating that there were no extreme scores in the distribution influencing the normality of the sample. Therefore, no outliers were removed and there was no transformation of the ECR-R data.

Summary of Data Distributions

In summary, three outliers were removed from the data set based on very high or low scores on the EQ. Based on the descriptive data, plots and graphs, there were no transformations carried out on the rest of the data set.

The EQ, ECR-R and Ravens Progressive Matrices (RPM) did not have any missing data. However, there were some missing values for participant demographics. There were four missing values for highest level of education achieved in the BPD group. The option to exclude cases pairwise was chosen when testing for independence between groups for the demographic variables, which resulted in participants with missing values being excluded from specific analyses requiring that missing data. They were included for all other analyses.

Hypothesis 1 - EQ Factors Analysis

A factor analysis was performed to validate the factor structure of the EQ and to gauge whether the factors that arose within the present groups fit with those found in previous literature. It was hypothesised that the current study would replicate the three main empathy factors arising from the EQ; cognitive, affect and social skills (Lawrence et al., 2004). It was hypothesised that these factors would arise in both the control and BPD groups.

An exploratory factor analysis was chosen over a confirmatory factor analysis because it has been suggested that it avoids some of the potential problems with factor indeterminacy associated with factor analysis (Stevens, 1996).

Exploratory Factor Analyses

The 40 items of the Empathy Quotient (EQ) were subjected to PCA using SPSS version 21.0 (IBM, 2012). Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above when the groups were analysed separately and together.

A separate analysis was conducted for each of the control and BPD groups to examine the similarity of the factor structure. The analysis was done by first exploring the eigenvalues. Literature has suggested that eigenvalues can give rise to many un-interpretable factors (Lawrence et al., 2004), and therefore the screeplots were also examined. The screeplots for both groups supported a three-factor solution. A salient loading profile was performed using 0.35 as a cut-off point (Abdel-Khalek et al., 2002). Table 3 illustrates the frequency of common loadings between the control and BPD groups in relation to the three clear factors that came out of the analyses.

Table 3

Frequency of common factor loadings across groups

	No. of salient loadings		Common loadings*	
	Control Group	BPD Group	n	%
Factor 1	13	12	11	85
Factor 2	9	11	9	100
Factor 3	6	7	5	83

* The percentages were calculated in proportion to the salient loadings of the control group

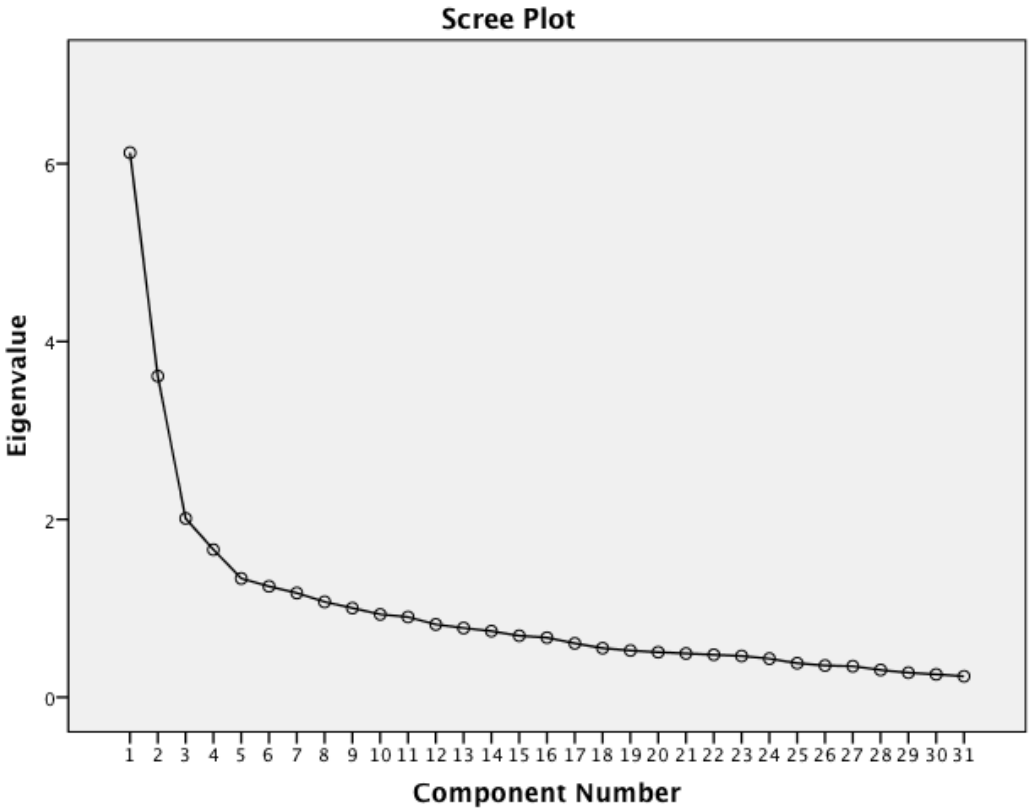
A Pearson's correlation matrix was generated and all EQ items that failed to correlate with any other items at 0.2 (Hutcheson & Sofroniou, 1999) were removed from the final model, and this was the case for the following questions; Q2, Q4, Q6, Q10, Q17, Q21, Q23, Q25 and Q37.

Final Analysis

As the figures and the salient loading were so similar for both groups, the decision was made to carry out a factor analysis for the groups combined. There were 31 EQ questions remaining in the analysis. A PCA with a varimax rotation was conducted. A Kaiser-Meyer-Olkin of Sampling Adequacy for the groups combined had a score of .80, exceeding the recommended value of .6 (Kaiser, 1970; 1974) and Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance ($p < .000$), supporting the factorability of the correlation matrix.

The scree plot illustrated that three or four factors appeared to be separate from the remaining factors. Three factors were retained as it was apparent from both the scree plot and eigenvalues that they were the strongest, accounting for 40% of the variance. See Figure 2 for the screeplot.

Figure 2
Screeplot for EQ factor loadings



Based on the content of the items that fell within each factor, and comparison with previous literature, Factor 1 was labelled 'cognitive empathy', Factor 2 was labelled 'affective empathy', and Factor 3 was labelled 'social skills'. The interpretation of the three factors is consistent with previous research on the EQ (Lawrence et al., 2004; Berthoz et al., 2008; Preti et al., 2011). See Appendix J for a list of the questions that came under each of the three factors. The item loading for the three factors can be seen in Table 4.

Table 4

Item loading for three EQ factors

	Factors		
Item number	**1**	**2**	**3**
EQ1	.576		
EQ8	.338		
EQ11	.476		
EQ13	.411		
EQ14	.651		
EQ15	.624		
EQ22	.526		
EQ26	.603		
EQ29	.560		
EQ34	.672		
EQ35	.633		
EQ36	.700		
EQ38	.624		
EQ3		.540	
EQ16		.528	
EQ19		.726	
EQ24		.353	
EQ27		.641	
EQ28		.458	
EQ33		.395	
EQ39		.635	
EQ5			.592
EQ7			.550
EQ9			.492
EQ12			.646
EQ18			.565
EQ20			.495
EQ30			.407
EQ31			.523
EQ32			.436
EQ40			.435

The relationship between the three factors was explored; cognitive empathy significantly correlated with affective empathy ($r = 0.420$, $p = 0.01$), and social skills ($r = 0.211$, $p = 0.01$). Affective empathy and social skills were also significantly correlated ($r = 0.415$, $p = 0.01$). The associations between the separate factors are to be expected, however, the coefficients are not so high as to preclude discriminant validity.

Hypothesis 2 - Empathy Scores across Groups

It was hypothesised that people with BPD would have lower cognitive, affective and social empathy scores than people within the control group.

The total EQ scores for the whole sample, split by groups and gender, can be seen in Table 5. The mean scores for the control group were very similar to that found in the original EQ study (Baron-Cohen & Wheelwright, 2004), in which males had a score of 41.8 (SD 11.2) and females had a score of 47.2 (SD 10.2). Females in the control group had significantly higher total EQ scores than males in the control group ($t = 2.347$, df = 92, $p = 0.017$, $d = 0.051$), as well as significantly higher affective empathy scores ($t = 2.534$, df = 92, $p = 0.013$, $d = 0.139$). There were no significant differences between genders for cognitive empathy ($t = .957$, df = 92, $p = 0.341$, $d = 0.198$) and social skills ($t = 1.375$, df = 92, $p = .173$, $d = 0.081$). Gender differences were not found in the BPD group, however, this could be related to the imbalance between males and females in the personality disorder sub-sample.

Table 5

Total scores on the EQ within control and BPD Groups

	Control Group					BPD Group				
	n	Mean	SD	Min	Max	*n*	Mean	SD	Min	Max
Female	46	44.80	9.86	25	66	66	36.91	11.57	13	59
Male	48	40.23	9.04	15	62	17	35.47	12.13	18	54
Total	94	42.52	9.45	15	66	83	36.19	11.85	13	59

Independent-samples *t*-tests were conducted to compare the scores on the total EQ score and the three different empathy factors. An a priori planned t-test showed there was no significant difference between the groups for affective empathy (t = .824, df = 172, p = .411, d = 0.113).

However the a priori planned *t*-tests revealed significant differences between the control and BPD groups for total EQ score (t = 3.655, df = 172, p = .000, d = 0.528), cognitive empathy (t = 2.172, df = 172, p = .031, d = 0.319), and social skills (t = 2.962, df = 172, p = .003, d = 0.437), with the control group having significantly higher scores than people in the BPD group.

Hypothesis 3 - Correlating Empathy and Personality Symptoms

It was hypothesised that there would be a correlational relationship between empathy and personality disorder symptoms across the ten personality disorders in the SCID-II. It was hypothesised that the higher the number of overall personality disorder symptoms a person has according to the SCID-II, the lower their empathic abilities would be according to the EQ. However, the correlation between overall numbers of

personality disorder symptoms a person had according to the SCID-II and empathy was insignificant (r = -.048, p = .711).

The relationship between number of Borderline Personality Disorder (BPD) symptoms and total EQ score was investigated using a Pearson's correlation. Preliminary analyses were performed to ensure no violation of the assumptions of normality, homoscedasticity and linearity. There was a medium negative correlation (Cohen, 1988) between the two variables, r = -.327, p = .011, with higher numbers of BPD symptoms associated with lower overall empathy scores.

The relationship between individual empathy factors were not significantly correlated with higher levels of personality disorder symptoms (cognitive: r = .037, p = .774; affective: r = .027, p = .837; social skills: r = -.038, p = .773) or a higher number of BPD symptoms (cognitive: r = -.199, p = .131; affective: r = -.159, p = .232; social skills: r = -.238, p = .072).

Hypothesis 4 – Correlating attachment and empathy

In a theoretical model that organises the ECR-R (Bartholomew, 1990), security is represented as the low end of the anxiety and avoidance dimensions. Independent-samples t-tests were conducted to compare the scores on attachment related avoidance and anxiety. The t-tests revealed significant differences between the control and BPD groups for attachment related anxiety (t = -11.447, df = 172, p = .000, d = 0.666) and attachment related avoidance (t = -8.109, df = 172, p = .001, d = 0.529). As hypothesised, the control group had significantly lower levels of anxiety and avoidance and clustered around levels considered to be representative of secure attachment types, whereas participants in the BPD group tended to score highly on

the anxiety and avoidance scales, and therefore fell within what is categorised as the more insecure attachment types.

It was hypothesised that participants with higher attachment related anxiety and avoidance would have lower empathy scores. The ECR-R scores for the control and BPD groups can be seen in Table 6 and 7. The control group scores for avoidance were not dissimilar to the general population norm (2.92) (Fraley, 2012), however, the anxiety scores appear to be lower than the norm (3.56) in the present control group. The BPD scores appear to be higher for anxiety and avoidance in comparison to the general population norms.

Table 6
Attachment Anxiety Scores for Control and BPD Groups

	Control Group					BPD Group				
	n	Mean	SD	Min	Max	*n*	Mean	SD	Min	Max
Female	47	3.07	1.25	1	5.78	62	5.09	1.10	2.28	6.94
Male	47	2.82	1.23	1.11	5.22	17	5.09	1.28	2.61	6.94
Total	94	2.95	1.24	1	5.78	79	5.09	1.19	2.28	6.94

Table 7
Attachment Avoidance Scores for Control and BPD Groups

	Control Group					BPD Group				
	n	Mean	SD	Min	Max	*n*	Mean	SD	Min	Max
Female	47	2.87	1.2	1.11	6	62	4.41	1.24	1.39	7
Male	47	2.66	1.05	1	5.39	17	3.91	1.39	1.61	6.17
Total	94	2.77	1.13	1	6	79	4.16	1.32	1.39	7

Correlations were explored for the control and BPD groups combined to account for the wide array of attachment scores across groups. The relationship between attachment-related anxiety and total EQ score was investigated using a Pearson's correlation. Preliminary analyses were performed to ensure no violation of the assumptions of normality, homoscedasticity and linearity. After controlling for IQ score, there was a small negative correlation (Cohen, 1988) between the two variables (r = -.203, p = .009), with higher attachment-related anxiety scores leading to lower empathy scores. The relationship between attachment-related avoidance and total EQ score showed a very similar correlation (r = -.170, p = .013) after controlling for IQ scores, with higher attachment-related avoidance scores leading to lower empathy scores.

Relationships between the separate empathy factors (cognitive, affective and social) and attachment were explored. There were not any significant correlations between the cognitive and affective factors and anxiety attachment scores (cognitive: r = -.069, p = .383; affective: r = .038, p = .632) or avoidance attachment scores (cognitive: r = -.075, p = .344; affective: r = -.041, p = .607).

However, after controlling for IQ score, there was a small negative correlation between the social skills empathy factor and attachment related anxiety for the whole sample (r = -.276, p = .000), with higher anxiety being linked to lower social skills empathy scores. There was not a significant correlation between social skills and avoidance attachment scores (r = -.081, p = .308).

Hypothesis 5 – Regression Analysis

It was hypothesised that the variables included in the present study would contribute to empathy profiles in differing weights. Attachment, personality disorder symptoms

and empathy have not been compared directly in one study and it was unknown which would be the most predictive factor for empathy profiles. Therefore a multiple regression was employed to predict empathy using the following variables; gender, attachment related anxiety and avoidance scores, total number of personality disorder symptoms on the SCID-II, and diagnosis of BPD. Preliminary analyses were carried out to ensure there was not a violation of the assumptions of normality, linearity and multicollinearity and homoscedasticity.

A standard multiple regression was carried out to explore the relationships between the variables. The prediction model was statistically significant, F (5, 141) = 7.125, p = .000, and accounted for 20% of the variance of empathy (R^2 = .233, Adjusted R^2 = .200).

Empathy was primarily predicted by a diagnosis of BPD and gender. Meeting criteria for BPD received the strongest weight in the model followed by gender, and no other factors were significant (see Table 8). Attachment related anxiety and avoidance did not contribute to the prediction of empathy scores in the model as they were shown to be insignificant. The overall contribution of BPD diagnosis and gender to the prediction of empathy accounted for a small amount of variance but was nevertheless significant. Table 8 lists the raw and standardised regression coefficients of the predictors alongside their correlations with empathy, their t-score, their significance levels and their effect sizes.

Table 8

Multiple Regression Results

Model	Unstandardised coefficients		Standardised coefficients			
	b	***SE-b***	**Beta**	***t***	***p***	**Effect size *d***
Constant	46.609	3.319		14.848	.000	
Number of SCID items[1]	.300	.192	.282	1.560	.121	0.234
Diagnosis of BPD	**23.385**	**6.507**	**.973**	**3.594**	**.000**	**0.826**
Attach anxiety[2]	.339	.685	.049	.495	.621	0.362
Attach avoid[3]	-.942	.734	-.114	-1.284	.201	0.216
Gender	**-5.793**	**1.930**	**-.239**	**-3.002**	**.003**	**0.775**

[1] Total number of psychopathology symptoms according to the SCID-II
[2] Attachment related anxiety
[3] Attachment related avoidance

2.4 DISCUSSION

The empathy scores collected for the control sample mirrored normative data (Baron-Cohen & Wheelwright, 2004; Lawrence et al., 2004), indicating that the results are a reliable representation for the general public domain.

The EQ was successfully reduced to three factors to match the factor structure in previous literature as hypothesised; cognitive, affective and social empathy (Lawrence et al., 2004; Berthoz et al, 2008; Preti et al., 2011), and the final factor solution accounted for a moderate amount of the total variance. This implies that the three-factor solution is robust across different groups, including clinical groups.

As previously stated, literature surrounding empathy in BPD has been very mixed. It has been suggested that people with BPD have higher levels of cognitive empathy than healthy controls (Fertuck et al., 2009), whereas others have stated that there is no difference in cognitive empathy (Preiβler, et al., 2010), and more recent findings suggested that people with BPD lack cognitive and affective empathy skills (Baron-Cohen, 2011). Comparing the empathy scores for the BPD and control group in the present study yielded interesting and diverse findings.

As predicted, the control sample had significantly higher overall empathy levels than the BPD sample, as well as higher cognitive empathy and social skills, but there was no difference between the groups for affective empathy. The findings suggest that people with BPD have lower cognitive empathy skills and social skills than the general population, which indicates that they find it difficult to understand other peoples' emotional states and know how to respond in social situations, but it appears that they have intact affective empathy skills, implying that they feel emotions in response to others' emotion in the same way as anyone else. The

findings fit with previous suggestions that impaired cognitive empathy may account for interpersonal dysfunction in BPD, whereas intact affective empathy may contribute to over-reactivity in people with BPD (Harari, Shamay-Tsoory, & Levkovitz, 2010). The results provide evidence for the notion that empathy is a multifaceted construct, in which people can perform well in some aspects but not in others (Lawrence et al., 2004; Decety & Moriguchi, 2007).

As expected, based on previous literature (Fonagy et al., 1996; Agrawal et al., 2004), the participants with BPD had significantly higher levels of attachment related anxiety and avoidance than the control group. As hypothesised, a correlation indicated that higher rates of attachment insecurity were related to lower levels of empathy. Results showed that higher levels of attachment-related anxiety specifically correlated with low levels of social skills, which is to be expected given that anxiety may directly impact how somebody performs in a social situation, or how somebody engages in learning social skills. The findings fit with research which has shown that dysfunctions in understanding the minds of others in BPD is related to lack of modelling emotions in parents during childhood (Ghiassi, Dimaggio & Brüne, 2010), which relates to the internal working model that a child creates regarding relationships and interpersonal behaviour.

Comparatively, a study by Gelb (2002) found that within an adolescent population only the affective aspect of empathy was correlated with attachment style, which was not the case in the present study. It was hypothesised in the adolescent study that early attachment relationships influence peoples' internal views of the world, which is strongly associated with their ability to relate to and empathise with others.

The results from the present study corroborate that hypothesis and the finding that there is a relationship between low levels of empathy and insecure attachments, and fits with previous research which states that predicting an emotional response in another involves using internal affective representations (Hooker et al., 2008). However, it is unclear how exactly these two constructs contribute to one another. The role of disruptions in attachment in the aetiology of empathy deficits requires further research.

Given that empathy deficits have been found in a number of different psychological disorders (Joliffe & Farrington, 2004; Langdon, Coltheart & Ward, 2006; Montag, et al., 2007; Harari et al., 2010; Smith et al., 2012), it is unlikely that the development of empathic abilities is not affected by personality and cognitive constructs other than BPD, which has been the focus of the present study. This was corroborated by a study that found an association between empathy and SCID-II diagnoses (Alterman et al., 2003). Therefore it was hypothesised that there may be a correlational relationship between empathy and number of personality disorder symptoms in the present study.

Results showed that symptoms of psychopathology from across all the personality disorders in the SCID-II (Pfohl, Blum, & Zimmerman, 1997) did not predict empathy profiles; having a high number of personality disorder symptoms does not have an indication for empathy.

Personality disorder symptoms are not indicative of lower empathy. However, having a diagnosis of BPD alone does predict empathy levels, implying that a core component of the disorder is impairment in empathy, which appears from the present study to be specifically the cognitive and social skills components.

Although the linear regression resulted in only a small amount of variance in empathy being accounted for by BPD diagnosis and gender, it was still significant.

Despite the correlation between empathy and attachment, the findings indicate that insecure attachment alone is not predictive of empathy levels. Interestingly, it appears from the literature that insecure attachment is a risk factor for BPD (Fonagy et al., 1996), which is a risk factor for lower empathy (Harari, et al., 2010), however, attachment is not directly linked to empathy. It is most likely that a multitude of factors are interacting with one another, of which troubled attachment and lower levels of cognitive empathy are just two parts.

Summary of Findings

People with BPD have difficulty perceiving and understanding other people's emotional states and knowing how to respond appropriately to emotional social situations, but they do feel emotional responses to others' emotion. People with BPD tend to have more attachment related anxiety and avoidance, which correlates with lower levels of empathy. Having BPD is a mild predictor of lower empathy, but there are clearly many other factors that play a part in both the aetiology of BPD, and also the experience of empathising.

It is important to note at this point that low levels of empathy does not equate to thinking negatively about others; it represents a difficulty in understanding, anticipating another person's feelings or thoughts, or feeling an emotion in response to them.

Limitations of the research

Self-report limitations

Researching empathy using only self-report methods provides inevitable limitations. A self-report measure such as the EQ, which is found to be high in reliability and validity (Baron-Cohen, 2004; Lawrence et al., 2004; Preti et al., 2011), is a useful research tool that can cut research costs and time considerably. However, despite any reliability that a measure may evidence, self-report questionnaires have been criticised for being unreliable (Austin, Gibson, Deary, McGregor & Dent, 1998). It is possible that people complete questionnaires based on their own beliefs about certain abilities rather than a true reflection of their ability, and it is equally possible that people complete questionnaires based on how they would like to be seen or thought about. Previous studies have found a relationship between self-reported empathy and social desirability (Cialdini et al., 1987; Eisenberg et al., 1994).

An alternative possibility for future research would be to use multiple empathy tests to validate the findings. The literature review indicated that the Interpersonal Reactivity Index (IRI) (Davis, 1980) is a well-validated and reliable measure of empathy, despite not often being used in clinical groups. Two subscales of the IRI have shown convergent validity with the EQ; the perspective taking and empathic concern subscales (Péloquin & Lafontaine, 2010), and could therefore be used in conjunction with the EQ to validate findings. Alternatively, a non-verbal task could be used to mask any bias from participants who are affected by knowing they are being questioned on empathy, for example, the Reading the Mind in the Eyes test (Baron-Cohen, Wheelwright & Joliffe, 1997), which measures how well a person can read emotions in others. In the task participants are presented with a series of twenty-

five photographs of peoples' eyes and asked to choose which of four emotions the person is feeling.

Alternatively, peer-report questionnaires could be collected as well as self-report. This would allow for an exploration of how people with BPD perceive their empathic abilities compared with that of their peers' perception. Comparison of self and peer report has been carried out in other research domains; a study found that employing both self and peer report assessments are necessary to provide a more complete understanding of a phenomenon (Bouman et al., 2012).

Self-report and peer-report of empathy have not been compared within people with personality disorders, and this could provide insight into how people with personality disorders perceive their interactions with others and their contribution to social situations involving emotional experiences.

Removal of EQ items

Removing the filler items from the EQ may have made participants more alert to the fact that the questionnaire was related to empathy. This could have potentially created bias in the way participants completed the questionnaire. Although previous research has shown that the filler items are not pivotal to the validity and reliability of the EQ (Lawrence et al., 2004; Muncer & Ling, 2006; Preti et al., 2011) it would be useful to explore how true this remains when testing a population that might be particularly sensitive to the way they are perceived by others, such as people with BPD.

Similarly, the factor analysis in the present study resulted in nine questions being removed from the EQ. This procedure is very similar to that of other studies who have aimed to explore different facets of empathy in differing groups. A factor

analysis in a study exploring empathy in a control and clinical group resulted in the removal of eleven items from the EQ (Lawrence et al., 2004), a study exploring empathy in people with ASD also resulted in the removal of eleven items (Preti et al., 2011), whereas a study exploring empathy in students resulted in the removal of six items (Berthoz et al., 2008). All of the aforementioned studies corroborate the three-factor structure found in the present study.

However, it is possible that removal of the items affected the overall results. Future studies could explore whether results differ if measuring unifactorial empathy with the EQ or measuring the three factors after the removal of less fitting items across clinical groups.

Measures

The questionnaire used to measure attachment in the present study was the Experience in Close Relationships Questionnaire – Revised (ECR-R) (Fraley, Waller, & Brennan, 2000). The questions in the ECR-R ask about peoples' feelings, thoughts and worries about being in romantic relationships. From the perspective of romantic relationships, partners rely on one another for support, compassion and emotional validation, and therefore the questionnaire provided useful attachment information.

However, people who were not in a romantic relationship were encouraged to answer the questions in relation to their last relationship or to imagine how they would feel if they were in a relationship, which may result in less authentic responses. It would have been more appropriate to use a measure that did not focus on one type of relationship but various relationship types instead. An alternative measure produced by the same authors could have been used; the Experiences in

Close Relationships, Relationships Structures (ECR-RS) (Fraley, Niedenthal, Marks, Brumbaugh, & Vicary, 2006; Fraley, Heffernan, Vicary, & Brumbaugh, 2011), which is a self-report instrument designed to assess attachment patterns in a variety of close relationships.

The Adult Attachment Interview (AAI) (George, Kaplan & Main, 1984) was also part of the battery of tests that participants underwent for the larger study. The AAI interview involves asking about general and specifics recollections from childhood, and does not rely on conscious perceptions of attachment, which makes it a very useful research measure. The interview is coded based on quality of discourse, mainly focusing on coherence, as well as content. Unfortunately, it was not possible to use the AAI for the present study due to the available time-frame; the AAI takes a considerably long time to code and has to be coded by a qualified AAI coder.

In regards to the measure of general intelligence in the present study, the Ravens Progressive Matrices test (RPM) (Raven, Raven & Court, 2003) has been found to have a high level of correlation with other multi-domain intelligence tests (Snow, Kyllonen, & Marshalek, 1984). However, the test only consists of problems to solve in a single format, making it much less broad in comparison to more modern tests such as Wechsler scales (Wechsler, 1997; Wechsler, 1999; Wechsler & Naglieri, 2006), which consist of subtests across several verbal and nonverbal domains. However, the EQ appears to be robust to such demographic factors as there were clear empathy differences after controlling for IQ.

Confounding Factors

The present study did not control for depression or other problems comorbid with BPD that the participants might have been experiencing at the time of assessment.

Research has shown that people with depression have significantly reduced levels of empathy in comparison to matched controls (Cusi, MacQueen, Spreng, & McKinnon, 2011), and anxiety has been linked to reduced ability to empathise (Negd, Mallan & Lipp, 2011). Axis I comorbidities (American Psychiatric Association, 2013) in people with BPD are frequent (Gremaud-Heitz et al., 2014). Comorbidities were not measured in the present study, and it is therefore not possible to state whether or not this affected peoples' empathy scores.

Future studies

Empathy is a multidimensional concept, and may not be a static ability; empathy can reflect both state and trait components. Some individuals will have higher levels of empathy for trait reasons, which could reflect both early experiential or genetic factors (Fonagy, Steele, Steele, & Holder, 1997). Equally, somebody's empathic abilities may be affected by their transient state, for example, someone's social emotional ability may be clouded if they are anxious or depressed as stated above (Cusi et al., 2011; Negd et al., 2011). It is improbable that self-report questionnaires measuring empathy are sensitive to any changes in state, and therefore, future research should take transient states into consideration when measuring empathy by measuring anxiety, depression or other measures related to mood.

Further research can help clarify the scope of empathic deficits in people with BPD and their relationship to other social cognitive processes. It would be worth exploring empathy in longitudinal studies to provide insights as to whether empathic abilities change over time, and what factors appear to mediate any possible changes. This would also contribute to the discussion as to whether empathy should be measured as a state or a trait.

Clinical Implications

The present study provides evidence that people with BPD exhibit decreased cognitive empathy skills and typical affective empathy skills, and that lower empathy is correlated with insecure attachment styles.

Enhanced knowledge of empathy profiles and their associations with other constructs, such as attachment, help improve understanding of clinical and behavioural correlates of social cognition and may allow us to reduce the impact of BPD on daily functioning. The empathy imbalance may be part of the pathology of BPD, and therefore may need to be taken into account in treatments, with the aim of achieving greater improvements in social cognition in BPD.

Summary

Studies suggest that intact empathic skills create the foundation for effective and healthy emotional regulation, and therefore, highlights the potential consequences of empathy deficits. The present study suggests that people with BPD have difficulty with cognitive empathy, and therefore, future research should investigate how clinical interventions can create a safe foundation to effectively work on developing cognitive empathy skills.

In order to continue hypothesizing about empathy, it is critical to carry out longitudinal research and to measure other transient factors that may effect the measurement of empathy.

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Part 3: Critical Appraisal

The intention of the present critical appraisal is to reflect on key issues and reflections that arose during the implementation of the research project, and to provide recommendations for future research. Key issues that will be discussed are the benefits and limitations of joining a larger research project, the use of self-report measures, and a discussion on the concept and measurement of empathy. The aim is that the reflections will be beneficial for future researchers conducting research in the area of empathy and personality disorders.

Joining a Large Research Project

I joined a large research project that had already been designed and was in the early stages of recruitment and testing. My role was to test participants on a battery of assessments, which ran for eight hours, over a two-day period.

There were clear benefits to joining a large project, including a strong investment in the research setting and process, which resulted in receiving training in specific assessments, for example, the Adult Attachment Interview (George, Kaplan, & Main, 1985). Resources were also made widely available, for example, researchers were given their own research laptops and all the paper materials required, and recruitment was organised by the project administrator rather than the researchers. As there were several people collecting data for the project, there were a large number of participants available in the database, which was a strong benefit of being part of the project.

There were a number of people working on the larger project, including people based in London and a research team based in North America, who were spearheading the project. The managers flew over from America every few months to facilitate meetings with all involved in the project, and to make themselves

available to answer questions and clarify any uncertainty around research proceedings. Creating opportunities to refine elements of the data collection process was very containing as a researcher.

Soon after my involvement in the project it became apparent that peer supervision would be a good idea, and I think this should have been a formal recommendation within the project as there were so many people involved and it minimised data discrepancies. Peer supervision was organised sporadically by people in the project, and it was mainly used to create a space to discuss responses that were difficult to rate from the SCID-II interview (Pfohl, Blum, & Zimmerman, 1997) and for peer support following difficult testing sessions. Having other trainees and assistants involved allowed for collective problem solving and mutual support during the length of the project.

Although it was beneficial to have many other team members involved in the project, this also created an opportunity for lack of communication between people at times. There was also room for error with so many different people carrying out testing. It became apparent towards the end of my project that there were discrepancies in the larger database and data had been entered incorrectly at times due to people recording it in different ways. Therefore, a fellow trainee and I had to spend a long amount of time cleaning the database and re-entering data to make the data set reliable. I believe that some of these issues represent common difficulties in carrying out a large research project with multiple researchers involved, but this highlighted the importance of maintaining good quality data records at every stage of research, and the importance of communication in a large team to ensure that everybody is conducting the research in a standardised manner.

The limitations of joining an already established research project include being removed from the design elements. There was less flexibility on input to the project, and many of the assessment tools were already decided upon. I was able to choose an empathy measure to include in the project, but the project administrators included it without the filler items to save on time given that there were a lot of tests included. Although this has been done in studies before without impacting the results (Wakabayashi et al., 2006), this was a consequence of joining a larger study that may not have been the case in a smaller project.

Similarly, the attachment questionnaire employed in the study was chosen prior to me joining the project, thus somewhat shaping the possible remit of my study. The measures used in the study are discussed further below in the section on self-report measures.

Being part of a larger project resulted in not having to apply for ethical approval for the study independently, which created ease around the set up of my project. However, it would have been a beneficial learning experience to run a project independently and to carry out all elements, from the inception of the idea to making final conclusions. Having less control around the project created a different research experience from an independent project, but was still a highly informative learning experience.

Overall, it was very interesting and informative to learn about how large projects are run, and to be involved in a study of this magnitude.

Self-report Measures

There are numerous benefits to using self-report measures; they can be completed by participants independently, do not require multiple resources, and are often time

efficient. However, there are limitations to the use of self-report measures as discussed in the empirical paper. It is possible that people complete questionnaires based on their own biased beliefs about their abilities rather than a true reflection of their personality, and it is equally possible that people complete questionnaires based on how they would like to be seen or thought about.

It is important to think about the demographic in question when employing self-report measures. For example, it has been suggested that the use of self-report measures in people with personality disorders may be affected by their current levels of symptoms (Zanarini et al., 2000). It has also been suggested that people with personality disorders may lack the necessary insight to judge their own personality difficulties (Hopwood et al., 2008). However, this could be said for everyone to a degree, as the way somebody completes a self-report questionnaire could be affected by confounding variables such as their mood or current situation (Cusi, MacQueen, Spreng, & McKinnon, 2011; Negd, Mallan & Lipp, 2011).

The present study required participants to complete self-report questionnaires on empathy and attachment. Attachment theories (Ainsworth, Blehar, Waters, & Wall, 1978) state that attachment is an internal working process that is partially unconscious and therefore difficult to capture via self-report measures (Wilson & Wilkinson, 2012). However, research has evidenced that self-report measures of attachment are able to identify unconscious nuances of attachment styles reliably (Shaver & Mikulincer, 2004). The results in the present study corroborated that there were distinct differences in the attachment types of participants with Borderline Personality Disorder (BPD) and the control group that were captured by a self-report measure.

As stated in the section regarding the benefits and limitations of joining an established research project, a number of the measures were already chosen for the project, including the attachment measure. Criticisms of the attachment measure used in the present study have been provided in the empirical paper, mainly surrounding the fact that the paper asks about peoples' attachment styles specifically in romantic relationships. An alternative attachment measure would have been advisable, notably the Experiences in Close Relationships, Relationships Structures (ECR-RS) (Fraley, Niedenthal, Marks, Brumbaugh, & Vicary, 2006; Fraley, Hefferman, Vicary, & Brumbaugh, 2011).

In regards to the self-report measure used for empathy in the present study, the Empathy Quotient (EQ) (Baron-Cohen & Wheelwright, 2004), it has been shown to have excellent reliability and validity as an empathy measure for use within clinical populations (Baron-Cohen & Wheelwright, 2004; Lawrence et al., 2004). The findings from the Literature Review confirmed that the EQ is the most appropriate measure of empathy for use in clinical groups. However, the current project, and previous research, has suggested that there are several questions within the EQ that do not fit neatly into an empathy factor and therefore it is unclear exactly what those questions are measuring. Further research into the reproducibility of the EQ factor structure across different clinical groups would be very interesting.

Further Limitations of the Study

As stated in the empirical paper, the present study did not control for Axis I comorbidities (American Psychiatric Association, 2013) that participants may have been experiencing at the time of assessment. Axis I comorbidities are common in people with BPD (Gremaud-Heitz et al., 2014). Without measuring or controlling for

this it is not possible to confidently state whether the empathy profiles were unaffected by participants' mood or state at the time of testing.

It is very difficult to be able to control for all possible confounding factors in a study, however, given the demographic involved in the present study, measuring and controlling for depression and anxiety would have strengthened any conclusions drawn. The results of the Literature Review suggested that both the IRI and the EQ are well-validated and reliable empathy measures to use, however, the use of a well-validated tool in a study is less influential if well-known confounding factors are not measured or controlled.

Another limitation of the study was the assessment process. Participants taking part in the overarching project had to undergo eight hours of testing split over two days. Participants sat through two four-hour testing sessions which involved completing a multitude of questionnaires, computer tasks and clinical interviews. The sessions required a sustained period of concentration and although participants were able to take as many breaks as they wanted, it is very possible that participants could have become bored or exhausted during the testing. Exhaustion and boredom could have affected the way participants completed tasks and therefore could have influenced the validity of the results. Improvements could be made by either shortening testing sessions to a maximum of two hours, or by reducing the amount of tasks given.

Concept of Empathy

My understanding of empathy has changed a great deal over the course of the project. My initial understanding of empathy was slightly bilateral in that I considered that people either had a 'healthy' level of empathy or had empathy

deficits. It has become apparent through the duration of the project that empathy is a multifaceted construct, and people can have difficulties and strengths in different empathic factors.

I was fascinated by the mixed literature surrounding empathy in BPD, and keen to explore why there were so many varied findings, which inspired the question of whether empathy can be measured reliably for the Literature Review. The process of conducting the Literature Review highlighted that the way empathy is conceptualised and measured in clinical research has a significant impact on the outcomes and future research.

Linking back to the limitations of using self-report measures, it is unclear whether empathy measures are measuring empathic ability, motivation or are a representation of how people think they should respond. Functional contextualism literature (Biglan & Hayes, 1996; Gifford & Hayes, 1999) states that people respond differently in varying contexts, and therefore it is important to consider cross-sectional research designs, and to measure possible confounding variables in empathy research such as Axis I disorders, and current life stressors or experiences.

The entire project, the Literature Review included, has highlighted how important it is to understand the results of a study based on the context in which it was carried out and the methodological design. Methodological designs influence results greatly, so it is important to ask the right questions in research; not just identifying the difficulties in and differences between people, but focusing on what may contribute to those differences and how interventions can be designed to help people adapt to or overcome issues that arise from their mental health problems.

In the context of the present study it appears that people with BPD have difficulty in perceiving the emotional state of others correctly, and this can have very

distressing and destructive consequences in interpersonal relationships and daily life (Fonagy et al., 1996; Sack, Sperling, Fagen, & Foelsch, 1996; Fossati et al., 2001). It is important for future research to focus on how we can help expand the empathic potential for people with BPD rather than observing any difficulties as a fixed state.

Previous 'empathy training' has employed strategies such as getting people to watch emotional based clips and identifying with characters whilst thinking of people they know that identify to that (LeBlanc et al., 2003). However, research has suggested that tasks such as this may just teach people to recognise empathy rather than to inherently feel it (Meffert et al., 2013).

In order to be able to help adapt behaviours we need to understand them, to be able to predict and influence them. The question around empathy may not be whether somebody inherently has the ability to empathise, but whether they choose to employ it. For highly avoidant people, empathising with another person could be very uncomfortable and feel unsafe, and if empathising with others causes distress and pain that people are not always equipped to regulate or control, this may lead to avoidance of the experience. For example, studies have shown that bullies have low levels of empathy, but others have suggested that bullying involves advanced perspective taking skills (Sutton, Smith & Swettenham, 1999), and it has been suggested that bullies' emotions are suppressed rather than not present. The suggestion that people may suppress feelings rather than not feel them indicates that more research is needed into whether apparent empathy deficits are really present.

Future Research

To promote prosocial behaviour and the development of a flexible sense of self and way of being with internal experiences, interventions may require more than teaching

how to recognise emotions, but also about accepting them and having exposure to them in a safe and contained way. The inclusion of this process in treatment may achieve greater improvements in social cognition.

As an elaboration to the present study, I would test participants in a much shorter assessment in order to minimise for possible confounding effects of boredom or exhaustion. It would also be advisable to measure and control for the effects of possible confounding states such as anxiety and depression as described above. I would use the EQ, inclusive of the original filler items to minimise bias, and would explore differences in empathy across clinical groups whilst also using another empathy measure to corroborate the findings. Based on the findings from the Literature Review, the IRI is the best placed measure to use in line with the EQ. It would also be advisable to use a more global attachment measure (as described in the empirical paper) to explore whether the correlation between empathy and attachment holds for relationships other than romantic partnerships. A study of this design would be able to draw much stronger conclusions in regards to empathy and attachment in people with BPD.

I believe this is a very important area of research as empathy is a defining feature of human relationships. Having lower levels of empathy does not equate to thinking badly of others or wishing harm on others, but instead implies that people have difficulty reading an emotional atmosphere or responding appropriately within it. Future research should employ a focus on how to help people maximise their empathy potential.

Clinical Implications

The present study implies that people with BPD have difficulty perceiving and understanding other people's emotional states and knowing how to respond appropriately to emotional social situations, but they do feel emotional responses to others' emotion. The findings indicate that their empathy difficulties are mainly of a cognitive origin, which suggests that future research and intervention should focus on this specifically.

The present study suggests that insecure attachment is related to lower levels of empathy skills, which corroborate findings (Bowlby, 1973; 1980) that early experiences in life affect the social cognition and interpersonal functioning throughout the lifespan. However, it is unclear what underlying neurocognitive mechanisms underpin empathic ability. It is not clear exactly how insecure attachment translates into experiencing a difficulty, or avoidance, of being able to predict or read the emotions of others. There is a wealth of research exploring mentalising in people with BPD (Bender & Skodol, 2007; Choi-Kain & Gunderson, 2008; Fonagy & Luyten, 2009), however, I think there needs to continue to be a differentiation between differing abilities of predicting behaviour, thoughts and emotions of others. The present study indicated that there are three well-founded factors of empathy and that people can function well according to one factor but less well to another. Suggesting that people have a general deficit in empathising or mentalising may be disregarding more acute nuances within social cognition and behaviour.

Specifying deficits or difficulties within a clinical population will allow for a better understanding of social cognition within disorders, and can allow for

treatments to take this into account, with the aim of achieving greater improvements in social cognition in BPD.

Conclusions and Recommendations

The present critical appraisal has presented reflections on the strengths and weaknesses of being part of a large project, considered the utility of self-report measures, and discussed the concept and measurement of empathy. The points made may be relevant for researchers joining established research projects, and for future research conducted in the area of empathy and personality disorders.

My knowledge of research has developed significantly over the course of the project, and I have a much clearer idea of the aspects that are vital to good quality research, including having a strong methodological design, good team communication, utilising supervision, keeping a clean and up-to-date database and considering the scientific and clinical implications of the research.

I hope my comments will be of use to researchers in the future when conceptualising and carrying out their research.

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Appendices

APPENDIX A: Qualsyst Appraisal Tool

Criteria		Yes (2)	Partial (1)	No (0)	n/a
1	Question / objective sufficiently described?				
2	Study design evident and appropriate?				
3	Method of subject/comparison group selection or source of information/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 (if applicable) 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?				

APPENDIX B: Overview of Quality Appraisal Scores

Quality of Studies Analysis Results by Rater 1

Study	1. Question / objective sufficiently described	2. Study design evident and appropriate	3. Method of subject / comparison group selection or source of input variables described and appropriate	4. Subject characteristics sufficiently described	5. Sample size appropriate	6. Analytic methods described / justified and appropriate	7. Some estimate of variance reported	8. Controlled for confounding	9. Results reported in sufficient detail	10. Conclusion supported by results	Total[1]
Alterman et al 2003	1	2	1	2	1	2	1	2	2	2	0.8
Baron-Cohen et al 2004	2	2	2	2	2	2	0	1	2	2	0.85
Berthoz et al 2008	2	1	2	1	2	2	2	2	2	2	0.9
Beven et al. 2004	2	1	2	2	1	2	1	2	0	2	0.75
Chakrabarti et al 2013	2	2	1	0	1	2	0	1	2	2	0.65
Cusi et al 2010	2	2	2	2	1	1	0	0	1	2	0.65
Davis et al 1983	2	1	1	0	2	1	0	0	1	1	0.45
DeCorte et al 2007	2	0	1	1	2	2	1	0	2	1	0.6

[1] *Summary scores are calculated by summing the total score obtained and dividing it by the total possible score*

Study	1. Question / objective sufficiently described	2. Study design evident and appropriate	3. Method of subject / comparison group selection or source of input variables described and appropriate	4. Subject characteristics sufficiently described	5. Sample size appropriate	6. Analytic methods described / justified and appropriate	7. Some estimate of variance reported	8. Controlled for confounding	9. Results reported in sufficient detail	10. Conclusion supported by results	Total[1]
Fernandez et al 2011	2	1	0	1	2	2	0	0	2	1	0.55
Gilet et al 2013	2	1	0	1	2	2	0	0	2	1	0.55
Gouveia et al 2012	1	1	1	1	2	1	0	0	1	1	0.45
Guan et al 2012	1	1	2	1	1	2	1	1	2	2	0.7
Haker et al 2012	1	2	1	2	0	1	0	0	1	1	0.45
Hojat et al 2011	1	1	0	0	2	2	1	0	2	0	0.45
Huang et al 2012	1	2	2	1	2	2	2	1	2	2	0.85
Lawrence et al 2004	2	2	2	2	1	2	1	1	2	1	0.8
Lepage et al 2009	1	1	1	2	1	2	1	0	2	1	0.6
Muncer et al 2006	2	2	1	1	2	2	1	1	2	2	0.8
Nettle, 2007	2	1	2	2	1	2	2	1	2	1	0.8
Oswald,	0	0	0	1	2	1	1	0	0	0	0.25

Study	1. Question / objective sufficiently described	2. Study design evident and appropriate	3. Method of subject / comparison group selection or source of input variables described and appropriate	4. Subject characteristics sufficiently described	5. Sample size appropriate	6. Analytic methods described / justified and appropriate	7. Some estimate of variance reported	8. Controlled for confounding	9. Results reported in sufficient detail	10. Conclusion supported by results	Total[1]
2003											
Péloquin et al 2010	1	1	2	2	2	2	2	0	2	1	0.75
Preti et al 2011	2	1	1	1	2	2	1	2	2	1	0.75
Pulos et al 2004	1	1	0	0	2	2	1	0	1	1	0.45
Samson et al 2010	2	1	1	1	2	2	1	0	2	2	0.7
Smith et al 2012	2	2	2	2	1	2	2	1	2	1	0.85
Wakabayashi et al 2006	2	1	1	1	2	2	0	1	2	2	0.7
Wheelwright et al 2006	2	2	2	2	1	2	2	2	2	2	0.95
Wright et al 2012	2	2	2	1	2	2	2	0	2	2	0.85
Yarnold et al 1996	2	2	1	1	2	2	2	0	2	1	0.75

Quality of Studies Analysis Results by Rater 2

Study	1. Question / objective sufficiently described	2. Study design evident and appropriate	3. Method of subject / comparison group selection or source of input variables described and appropriate	4. Subject characteristics sufficiently described	5. Sample size appropriate	6. Analytic methods described / justified and appropriate	7. Some estimate of variance reported	8. Controlled for confounding	9. Results reported in sufficient detail	10. Conclusion supported by results	Total
Baron-Cohen et al 2004	2	2	2	2	2	2	1	1	2	2	0.9
Chakrabarti et al 2013	2	2	1	1	1	2	1	1	2	2	0.75
Cusi et al 2010	2	2	2	2	1	1	0	0	1	2	0.65
Fernandez et al 2011	2	1	1	1	2	2	0	0	2	1	0.6
Guan et al 2012	2	2	2	1	1	2	1	1	2	2	0.8
Hojat et al 2011	1	1	0	0	2	2	1	0	2	1	0.5
Huang et al 2012	1	2	2	1	2	2	2	1	2	2	0.85
Lawrence et al 2004	2	2	2	2	1	2	1	1	2	2	0.85
Muncer et al 2006	2	2	1	1	2	2	1	1	2	2	0.8
Péloquin et	2	1	2	2	2	2	2	0	2	1	0.75

Study	1. Question / objective sufficiently described	2. Study design evident and appropriate	3. Method of subject / comparison group selection or source of input variables described and appropriate	4. Subject characteristics sufficiently described	5. Sample size appropriate	6. Analytic methods described / justified and appropriate	7. Some estimate of variance reported	8. Controlled for confounding	9. Results reported in sufficient detail	10. Conclusion supported by results	Total
al 2010											
Preti et al 2011	2	1	1	1	2	2	1	2	2	1	0.75
Smith et al 2012	2	2	2	2	1	2	1	1	2	1	0.8
Wheelwright et al 2006	2	2	2	2	1	2	2	2	2	2	0.95
Yarnold et al 1996	2	2	1	1	2	2	2	0	2	1	0.75

APPENDIX C: Interpersonal Reactivity Index (IRI)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D, or E. When you have decided on your answer, fill in the letter next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE:

A	B	C	D	E
Does not describe me very well				Describes me very well

	A	**B**	**C**	**D**	**E**
1. I daydream and fantasize, with some regularity, about things that might happen to me. (FS)					
2. I often have tender, concerned feelings for people less fortunate than me. (EC)					
3. I sometimes find it difficult to see things from the "other guy's" point of view. (PT) (-)					
4. Sometimes I don't feel very sorry for other people when they are having problems. (EC) (-)					
5. I really get involved with the feelings of the characters in a novel. (FS)					
6. In emergency situations, I feel apprehensive and ill-at-ease. (PD)					
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it. (FS) (-)					
8. I try to look at everybody's side of a disagreement before I make a decision. (PT)					
9. When I see someone being taken advantage of, I feel kind of protective towards them. (EC)					
10. I sometimes feel helpless when I am in the middle of a very emotional situation. (PD)					
11. I sometimes try to understand my friends better by imagining how things look from their perspective. (PT)					
12. Becoming extremely involved in a good book or movie is somewhat rare for me. (FS) (-)					
13. When I see someone get hurt, I tend to remain calm. (PD) (-)					
14. Other people's misfortunes do not usually disturb me a great deal. (EC) (-)					

	A	B	C	D	E
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments. (PT) (-)					
16. After seeing a play or movie, I have felt as though I were one of the characters. (FS)					
17. Being in a tense emotional situation scares me. (PD)					
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them. (EC) (-)					
19. I am usually pretty effective in dealing with emergencies. (PD) (-)					
20. I am often quite touched by things that I see happen. (EC)					
21. I believe that there are two sides to every question and try to look at them both. (PT)					
22. I would describe myself as a pretty soft-hearted person. (EC)					
23. When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)					
24. I tend to lose control during emergencies. (PD)					
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while. (PT)					
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me. (FS)					
27. When I see someone who badly needs help in an emergency, I go to pieces. (PD)					
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place. (PT)					

NOTE: (-) denotes item to be scored in reverse fashion
PT = perspective-taking scale
FS = fantasy scale
EC = empathic concern scale
PD = personal distress scale

Scoring - A=0 B=1 C=2 D=3 E=4
Except for reversed-scored items, which are scored: A=4 B=3 C=2 D=1 E=0

APPENDIX D: Ethical Approval Confirmation Letter

Part of the research infrastructure for Wales funded by the National Institute for Social Care and Health Research, Welsh Government.
Yn rhan o seilwaith ymchwil Cymru a ariannir gan y Sefydliad Cenedlaethol ar gyfer Ymchwil Gofal Cymdeithasol ac Iechyd, Llywodraeth Cymru

NISCHR
Gwasanaeth Moeseg Ymchwil | RES | Research Ethics Service

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

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 (see "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 in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research 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

GIG NHS | Bwrdd Iechyd Addysgu Powys | Powys Teaching Health Board

Cynhelir Cydweithrediad Gwyddor Iechyd Academaidd y Sefydliad Cenedlaethol ar gyfer Ymchwil Gofal Cymdeithasol ac Iechyd gan Fwrdd Addysgu Iechyd Powys

The National Institute for Social Care and Health Research Academic Health Science Collaboration is hosted by Powys Teaching Health Board

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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

12/WA/0283	**Please quote this number on all correspondence**

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

Yours sincerely

[redacted]

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"

Copy to: David Wilson, University College London
Dr Janet Feigenbaum, North East London Foundation Trust

APPENDIX E: Risk and Safety Protocol

Protocols for clients with Borderline Personality Disorder (BPD) or emerging BPD

Research staff meeting with clients at clinical (NHS) sites and the Wellcome Trust Centre for Neuroimaging (MRI site) will be trained in the assessment and management of risk. The key risk issues which may arise are thoughts of suicide, expressions of suicidal intent, thoughts of deliberate self-harm, expressions of intent to engage in self-harm, and thoughts of harm to others or expressions of intention to harm others. Within a research setting these risks are usually minimal. However, some individuals with BPD have strong emotional responses to the Adult Attachment Inventory, and some may react to some of the questions on the SCID-II and questionnaires.

All research staff will be trained in NHS breakaway techniques. All research staff will adhere to the 'no lone working' policy. On NHS and fMRI sites staff will only see clients within standard clinical hours (for the Wellcome Trust Centre for Neuroimaging this aspect might be revised). Research staff will ensure that reception staff are aware in which room they are seeing clients and when they anticipate completing the session. Research staff will ensure that they have access either to building based alarm systems, or carry a personal alarm with them into sessions. Reception/building staff will need to be alerted to the use of personal alarms and a plan agreed in the event the alarm is activated.

All research staff will ensure they are familiar with the fire safety protocols and exits from the building for any site on which they are conducting research sessions. Research staff will ensure they have identified a plan for assisting disabled clients from the building in the event of a fire or other reason to evacuate.

At clinical and fMRI sites

1. All clients will be asked about risk of suicide, self-harm, and harm to others at the end of the research session as part of an extensive debriefing. If any issues of risk are raised, the researcher will undertake the risk protocol (see below).
2. If at any point during the research session the client becomes emotionally dysregulated or expresses any risk intent, the research session will cease and the following risk protocol will be applied.

Risk protocol for BPD on both clinical and fMRI sites:

Before the client is booked to attend a research session, it will be ensured that the responsible researcher has the name and phone number of relevant therapist and the GP.

1. Assist the client with a range of calming techniques including deep breathing, muscular relaxation and a mindfulness exercise.
2. Assist the client to distract from the problematic thoughts or emotions.
3. Once calm discuss with the client options for remaining safe rather than engaging in risk behaviour.
4. Identify a safety plan with the client.
5. With the client present, contact the treating clinician and/or GP to alert them of risk and facilitate contact between client and treatment provider.
6. Ensure that the client is provided with the handout on emotional regulation skills, and crisis phone numbers.

7. Research to alert Dr. Feigenbaum, as NHS lead, and Dr. Nolte, as study lead, of any risk issues within an hour by email and/or mobile.

Additional risk factors which are more likely at the fMRI site are: panic attacks, claustrophobia (leading to aggression or thoughts of self-harm).

All research staff will be trained in the de-escalation of panic attacks including paced breathing (with an associated hand-out for clients) and breathing into cupped hands. Once the client has regained control over their panic, the risk protocol above will be carried out.

To decrease the probability of fear arising from the scanning technique, all potential participants will have the protocol fully explained, will be shown photos of someone inside the MRI machine, and will be played a recording of the sound the MRI machine emits.

Risk protocol for Anti-Social Personality Disorder (ASPD) and emerging ASPD clients

The main risks associated with the Antisocial Personality disorder clients are anger, and associated aggression or violence. However the risk of aggression on sites of authority is reduced and not common in research studies. The main risk may be anger following fear associated with scanning or anger following financial loss in the tasks.

To decrease the possibility of anger associated with fear arising from the scanning technique, all potential participants will have the protocol fully explained, will be shown photos of someone inside the fMRI machine, and will be played a recording of the sound the fMRI machine makes, before being asked if they wish to participate.

Protocol for risk for ASPD participants

Prior to booking in any ASPD participants, the name and phone number of their probation officer and GP will be obtained. If relevant the name of any treating clinician will also be obtained.

Participants with ASPD will only be seen at probation offices during normal working hours. The 'no lone working' policy will be followed, again ensuring that reception staff are aware of what room the session is taking place and the intended end of session time. If any breaks are offered, allowing the participant to exit the building, reception staff will alerted to the exit of the participant and, if relevant, the researcher. All probation sites policies for entry and exit from the building will be adhered to.

If risk is identified during the research session, the research will firstly alert a probation officer on site and follow the below protocol.

Risk protocol and ASPD on MRI site:

In order to minimize risk to the MRI site, participants will be informed that no money will be available on the MRI site. They will be required to collect their remuneration from the probation site at an agreed time after the completion of the fMRI assessment.

In order to minimize risk associated with individuals with ASPD in the waiting area, we will arrange for participants to wait elsewhere to be collected [NB: Dr. Nolte to negotiate a location for waiting]. Participants will be escorted into the MRI building by two researchers (one of which will be Dr. Nolte).

Research staff on the MRI site will carry personal alarms with them at all times, and negotiate with staff on site a process for responding in the event the alarm is activated.

All MRI sessions will be scheduled during normal working hours when sufficient staff are on site to assist in the event of an incident.

If risk is identified at any time the standard protocol will commence:

1. Assist the client with a range of calming techniques including deep breathing, muscular relaxation and a mindfulness exercise.
2. Assist the client to distract from the problematic thoughts or emotions.
3. Once calm discuss with the client options for remaining safe rather than engaging in risk behaviour.
4. Identify a safety plan with the client.
5. With the client present, contact the responsible probation officer and/or GP to alert them of risk. If relevant facilitate contact between client and treatment provider.
6. Ensure that the client is provided with the handout on emotional regulation skills, and crisis phone numbers.
7. Research to alert Dr. Feigenbaum, as NHS lead, and Dr. Nolte, as study lead, of any risk issues within an hour by email and/or mobile.
8. Escort the participant out of the building and facilitate their return journey.

Protocols for clients being seen in their own homes:

Several of the participants, in particular those in the emerging groups, are drawn from services delivering Multisystemic Therapy (MST). For those it is a standard procedure that clients are assessed and seen by clinicians at the client's home. Therefore, it would be more appropriate to see these participants in the place they usually meet with their lead clinician (i.e. their homes) so as not to disrupt usual clinical practice and to reduce attrition. This is common practice for MST treatments and has been successfully implemented in clinical trials of MST (e.g. the START trial which the PI of the current study is overseeing). This will also make participation for participant recruited from MST sites easier as these tend to find it difficult to engage with clinical/academics setting so that we could ensure that hard-to-reach participants from often disadvantaged backgrounds can have the experience of contribution to a research project.

For these assessments to take place in the current study, there would be a "no lone working protocol" whereby all researchers would attend any assessments in the community or at homes in pairs in addition to all other risk and safety protocols outlined in this document.

Risk protocol – blood samples

With both the BPD and ASPD group, caution needs to be exerted when taking the blood samples. Both groups have a higher probability of carrying a blood borne virus (e.g. HIV, hepatitis). Thus the blood sample will only be taken on the fMRI site with both research staff present. Blood will be drawn in the CPR room in the event of fainting or other adverse response to the taking of blood. One research member will gently hold the participants arm while the other takes the sample to reduce the possibility of a needle stick if the participant moves suddenly or becomes fearful/angry. In most cases it will be Dr. Nolte taking the blood sample.

In the event of any adverse incident on the MRI site, all further booked sessions that day will be cancelled. Prof. Dolan or the relevant centre director will be

contacted immediately. Both Professor Montague and Professor Fonagy will be contacted immediately. The study will cease at this point until an assessment and agreement to re-commence has occurred between the directors of the centre and the Principle investigators.

For all sessions, on clinical sites, probation sites, and MRI site, a log will be kept of any adverse incidents or risk issues. The research staff will meet monthly, including Dr. Feigenbaum as NHS lead and a member of probation (to be identified), to discuss risk and review protocols. The minutes of this monthly meeting will be sent to the principle investigators, Professor Montague and Professor Fonagy.

Note: The handouts (paced breathing, muscular relaxation, distraction, brief mindfulness, crisis help lines, and reminder of sources of support) will be given to all participants at the end of each testing session, irrespective of whether they disclose any risk during the research sessions.

APPENDIX F: Project Information Sheet

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 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 the brain activation patterns of people suffering from personality disorders (both in adults and adolescents) or similar traits and compare them with healthy control participants. Only little is known about the neurobiology of Borderline and Antisocial Personality Disorders. Our study design will address some of these. 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.

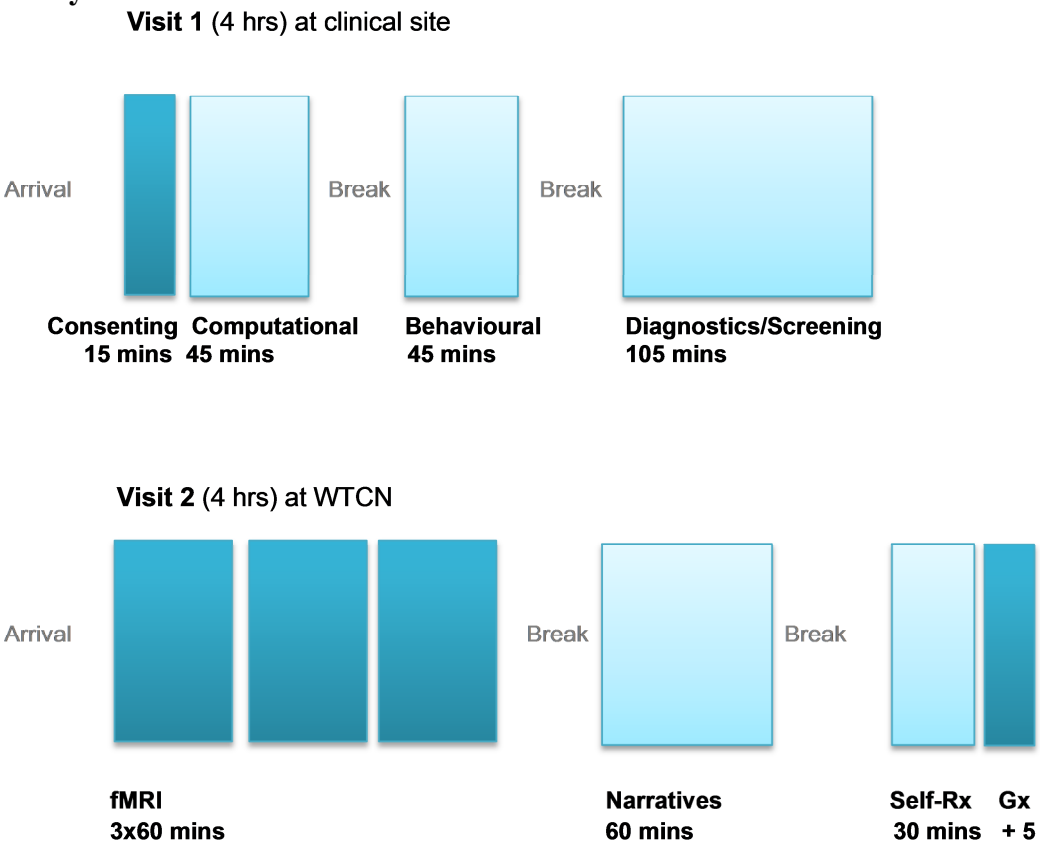
Why have you been invited to take part?
You have been invited to take part in the study because you have recently been assessed by a clinician at one of the clinical or probation services currently collaboration with the research team.

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. Deciding not to take part in the study will not affect the care you receive from services either now or in the future. 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. This will not affect the care you are currently receiving, or will receive in the future. 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 wish to take part in the study, then you can get in touch with the research team or provide your contact details so that we can arrange a time to discuss the study in more detail and to book in the assessments if consent is obtained. We can then contact you to arrange a convenient time to meet. At this meeting you will meet a member of the research team and you can ask any other questions you may have. You will then be asked to sign a consent form to say that you wish to take part in the

study. You will also be asked about your eligibility for brains scans as not every person can undergo these.

Study overview:



There will be two or three assessments with approximately 8 hours in total duration. In the first assessment, which will be held at the clinical site or the probation service, you will be asked to fill in questionnaires on personality functioning, developmental history, symptomatology etc. You will then perform several computer-based cognitive tasks and have a SCID I and II (relevant sections only) which is a psychiatric interview that takes approximately 30 to 60 minutes to complete. Any of these measures that have already been routinely obtained at your service will not be repeated if you are happy for your service to share the data with us (your consent provided).

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 5 computerised tasks (which you will do whilst lying in a magnetic resonance imaging (MRI) brain scanner). In the tasks you will have to perform some tasks such as responding to written cues using different buttons to estimate or compare different events or conditions (similar to simple computer games) In some of them you will play another person who is being scanned at a different laboratory at the Principal Investigator's second laboratory at Virginia Tech University.. This phase will last roughly 3 hours but it is broken down into 3 sections of 60 minutes maximum with lots of breaks. After each hour you will have a longer break and leave the scanner. 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 and which will be audio-recorded and transcribed before being coded for attachment by a reliable and experienced member of the research team. Before coding, all identifiable information will be removed from the audio file for anonymity.

If you have a tattoo, we will ask you to participate in a study that investigates any adverse effects which may occur as a result of MRI, such as heating or pulling on the tattoo.
No part of the study is compulsory and there will be separate consent sections for each part of the study.

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 personal therapist or probation officer if you have been recruited via these services. 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 US.. 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 therapist or 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, not 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. Those 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 Peter 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)

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

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

APPENDIX G: Empathy Quotient version for Present Study

Below are a list of statements. Read each statement very carefully and rate how strongly you agree or disagree with it by circling your answer. There are no right or wrong answers, or trick questions.

Strongly agree = A Slightly agree = B
Slightly disagree = C Strongly disagree = D

	A	B	C	D
1. I can easily tell if someone else wants to enter a conversation				
2. I find it difficult to explain to others things that I understand easily, when they don't understand it first time				
3. I really enjoy caring for other people				
4. I find it hard to know what to do in a social situation				
5. People often tell me that I went too far in driving my point home in a discussion				
6. It doesn't bother me too much if I am late meeting a friend				
7. Friendships and relationships are just too difficult, so I tend not to bother with them				
8. I often find it difficult to judge if something is rude or polite				
9. In a conversation, I tend to focus on my own thoughts rather than on what my listener might be thinking				
10. When I was a child, I enjoyed cutting up worms to see what would happen				
11. I can pick up quickly if someone says one thing but means another				
12. It is hard for me to see why some things upset people so much				
13. I find it easy to put myself in somebody else's shoes				
14. I am good at predicting how someone will feel				
15. I am quick to spot when someone in a group is feeling awkward or uncomfortable				
16. If I say something that someone else is offended				

	A	B	C	D
by, I think that that's their problem, not mine				
17. If anyone asked me if I liked their haircut, I would reply truthfully, even if I didn't like it				
18. I cant always see why someone should have felt offended by a remark				
19. Seeing people cry doesn't really upset me				
20. I am very blunt, which some people take to be rudeness, even though this is unintentional				
21. I don't tend to find social situations confusing				
22. Other people tell me I am good at understanding how they are feeling and what they are thinking				
23. When I talk to people, I tend to talk about their experiences rather than my own				
24. It upsets me to see an animal in pain				
25. I am able to make decisions without being influenced by people's feelings				
26. I can easily tell if someone else is interested or bored with what I am saying				
27. I get upset if I see people suffering on news programmes				
28. Friends usually talk to me about their problems as they say that I am very understanding				
29. I can sense if I am intruding, even if the other person doesn't tell me				
30. People sometimes tell me what I have gone too far with teasing				
31. Other people often say that I am insensitive, though I don't always see why				
32. If I see a stranger in a group, I think that it is up to them to make an effort to join in				
33. I usually stay emotionally detached when watching a film				
34. I can tune into how someone else feels rapidly and intuitively				

	A	B	C	D
35. I can easily work out what another person might want to talk about				
36. I can tell if someone is masking their true emotion				
37. I don't consciously work out the rules of social situations				
38. I am good at predicting what someone will do				
39. I tend to get emotionally involved with a friend's problems				
40. I can usually appreciate the other person's viewpoint, even if I don't agree with it				

Scoring the EQ

Approximately half of the items on the EQ are reversed. "Definitely agree" responses received 2 points and "slightly agree" responses received 1 point on the following items; 1, 3, 11, 13, 14, 15, 21, 22, 23, 24, 26, 27, 28, 29, 34, 35, 36, 37, 38, 39, 40. "Definitely disagree" responses received 2 points and "slightly disagree" responses received 1 point on the following items; 2, 4, 5, 6, 7, 8, 9, 10, 12, 16, 17, 18, 19, 20, 25, 30, 31, 32, 33.

APPENDIX H: Experiences in Close Relationships – Revised Questionnaire

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

	Strongly disagree	Disagree	Disagree slightly	Neutral / mixed	Agree slightly	Agree	Strongly agree
1. My romantic partner makes me doubt myself							
2. I find it easy to depend on romantic partners							
3. It's easy for me to be affectionate with my partner							
4. When my partner is out of sight, I worry that he or she might become interested in someone else							
5. I rarely worry about my partner leaving me							
6. I often wish that my partner's feelings for me were as strong as my feelings are for them							
7. I get uncomfortable when a romantic partner wants to be very close							
8. I prefer not to show a partner how I feel deep down							
9. I find it relatively easy							

	Strongly disagree	Disagree	Disagree slightly	Neutral / mixed	Agree slightly	Agree	Strongly agree
to get close to my partner							
10. I often worry that my partner doesn't really love me							
11. I worry that I won't measure up to other people							
12. I worry that romantic partners won't care about me as much as I care about them							
13. My partner only seems to notice me when I'm angry							
14. I often worry that my partner will not want to stay with me							
15. I tell my partner just about everything							
16. I don't feel comfortable opening up to romantic partners							
17. I usually discuss my problems and concerns with my partner							
18. I'm afraid that I will lose my partner's love							
19. I prefer not to be too close to							

	Strongly disagree	Disagree	Disagree slightly	Neutral / mixed	Agree slightly	Agree	Strongly agree
romantic partners							
20. It helps to turn to my romantic partner in times of need							
21. I'm afraid that once a romantic partner gets to know me, he or she won't like who I really am							
22. I find it difficult to allow myself to depend on romantic partners							
23. It's not difficult for me to get close to my partner							
24. My desire to be very close sometimes scares people							
25. My partner really understand me and my needs							
26. Sometimes romantic partners change their feelings about me for no apparent reason							
27. I am nervous when partners get too close to me							
28. I feel comfortable sharing my							

	Strongly disagree	Disagree	Disagree slightly	Neutral / mixed	Agree slightly	Agree	Strongly agree
private thoughts and feelings with my partner							
29. When I show my feelings for partners, I'm afraid they will not feel the same about me							
30. I worry a lot about my relationships							
31. I do not often worry about being abandoned							
32. I talk things over with my partner							
33. I find that my partner(s) don't want to get as close as I would like							
34. I am very comfortable being close to romantic partners							
35. It makes me mad that I don't get the affection and support I need from my partner							
36. I feel comfortable depending on romantic partners							

APPENDIX I: Participant Consent Form

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 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 J: Empathy Quotient Factors

FACTOR 1 – Cognitive Empathy
Q1. I can easily tell if someone else wants to enter a conversation**.**
Q8. I often find it difficult to judge if something is rude or polite**.**
Q11. I can pick up quickly if someone says one thing but means another.
Q13. I find it easy to put myself in somebody else's shoes.
Q14. I am good at predicting how someone will feel.
Q15. I am quick to spot when someone in a group is feeling awkward or uncomfortable.
Q22. Other people tell me I am good at understanding how they are feeling and what they are thinking.
Q26. I can easily tell if someone else is interested or bored with what I am saying.
Q29. I can sense if I am intruding, even if the other person doesn't tell me.
Q34. I can tune into how someone else feels rapidly and intuitively.
Q35. I can easily work out what another person might want to talk about.
Q36. I can tell if someone is masking their true emotion.
Q38. I am good at predicting what someone will do.

FACTOR 2 – Affective Empathy
Q28. Friends usually talk to me about their problems as they say that I am very understanding.
Q3. I really enjoy caring for other people.
Q16. If I say something that someone else is offended by, I think that that's their problem, not mine.
Q19. Seeing people cry doesn't really upset me.
Q24. It upsets me to see an animal in pain.
Q27. I get upset if I see people suffering on news programmes.
Q33. I usually stay emotionally detached when watching a film.
Q39. I tend to get emotionally involved with a friend's problems.

FACTOR 3 – Social skills
Q5. People often tell me that I went too far in driving my point home in a discussion.
Q9. In a conversation, I tend to focus on my own thoughts rather than on what my listener might be thinking.
Q12. It is hard for me to see why some things upset people so much.
Q18. I can't always see why someone should have felt offended by a remark.
Q20. I am very blunt, which some people take to be rudeness, even though this is unintentional.
Q30. People sometimes tell me what I have gone too far with teasing.
Q31. Other people often say that I am insensitive, though I don't always see why.
Q32. If I see a stranger in a group, I think that it is up to them to make an effort to join in.
Q40. I can usually appreciate the other person's viewpoint, even if I don't agree with it