# Are difficulties in mentalizing associated with severity of Antisocial Personality Disorder?

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**Overview**

Part 1 of the thesis reviews the literature on the measurement of mentalization in adult clinical populations. As mentalization is a broad multi-faceted term, the search incorporates the related concepts of Theory of Mind (ToM) and Emotional Intelligence (EI) as these have been widely operationalised. The review presents a framework for different types of measures, including performance-based tasks and self-report questionnaires, and considers their relative psychometric strengths. It finds an absence of any one measure that covers the breadth of the mentalization construct, however, a set of recommendations are made for an optimal approach using currently available tools.

Part 2 presents an empirical study of the relationship between mentalizing capability and severity of Antisocial Personality Disorder (ASPD) in an offender sample. The results show that some specific mentalizing measures were able to modestly predict severity of ASPD. These were the ability to take the perspective of another person, the ability to read mental states from the 'eyes' and a general inability to mentalize. These findings suggest that a greater understanding of mentalizing capacities in people with ASPD may support improved risk assessment and clinical treatments. The study's limitations are considered and its implications for further research and practice.

Part 3 presents a critical appraisal of the process of undertaking this research. It describes some of the challenges to joint working across the NHS and the Criminal Justice System. It considers how the use of psychometric assessment can be improved in an ASPD/offender population. It builds on the literature review to recommend how the operationalisation of mentalization can be further enhanced.

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# Acknowledgements

**Part 1: Literature *Review*.**

***Can mentalizing be reliably measured in adults?***

# Abstract

**Aims**

Mentalization is a broad multidimensional concept. This review assesses whether mentalizing can be reliably measured in adults, where differences are likely to be fine, in a way that is relevant to the real world.

**Method**

The search looked for measures of mentalization, theory of mind and emotional intelligence used in clinical settings with adults.

**Results**

145 references were identified, of which 122 were consistent with the search parameters. From these: 28 measures of mentalization were found; 11 were excluded using the review criteria; 2 were added from other sources. A total of 19 measures were reviewed.

**Conclusions**

Their relative psychometric strengths were assessed. No comprehensive measure of mentalization was found. It is recommended that a battery of tests be deployed and further design criteria are suggested.

## 1 Introduction

Mentalization is outlined in Fonagy's (1991) original definition as *"the capacity to conceive of conscious and unconscious mental states in oneself and others"* (p641). Mental states include desires, needs, feelings, thoughts, beliefs and fantasies (Allen, Fonagy, & Bateman, 2008). In emphasising the key role of emotion, mentalization has also been described as *"thinking and feeling about thinking and feeling"* (Allen et al., 2008, p63). Mentalization has been growing in importance as a construct for understanding psychopathology (Choi-Kain & Gunderson, 2008). Mentalization deficits have been described in relation to autism (Baron-Cohen, Ring, Moriarty, & Schmitz, 1994), dementia (Lough, Gregory, & Hodges, 2001), personality disorder (Fonagy & Luyten, 2009), schizophrenia (Corcoran, Mercer, & Frith, 1995), and various brain lesion studies (Channon & Crawford, 1999). Furthermore, Allen et al (2008) suggest that mentalization is crucial to delivering effective therapies.

As well as appearing relevant for a range of clinical presentations, mentalization is a broad concept, multi-faceted and multi-dimensional (Allen et al., 2008). In fact, Choi-Kain and Gunderson (2008) argue that it is too broad to be operationalised. Unless a construct can be defined and measured, it is not open to empirical research (Geher & Renstrom, 2004). This review set out to find if a psychometrically robust mentalization measure is available to discriminate amongst adults.

Firstly, definitions of mentalization will be explored to inform the review question and literature search parameters. The results of the search will be analysed to identify a shortlist of measures, which will then be examined in depth. The aim is to outline a way ahead for the measurement of mentalization.

## 2  Mentalization: issues of definition and measurement

The fundamental clinical aspects of mentalization are *attending to mental states* such as desires, needs, feelings, beliefs and reasons, (Bateman & Fonagy, 2008) of *oneself and others,* coupled with *implicit or explicit awareness* that these are *representations of reality* from one of *many perspectives* (Allen et al., 2008; my italics). At the same time, mentalization is an inclusive term that has meaning across a range of psychological disciplines.

Mentalization has been referred to in the psychoanalytic literature as a super-ordinate concept encompassing processes of representation, symbolisation and abstraction; top of a hierarchy supporting mental elaboration and psychic transformation (Lecours & Bouchard, 1997). In contrast, Fonagy (1991) introduces mentalization by taking theory of mind and placing this into an object relations and developmental frame. In attachment theory, the ability to reflect on one's own mind and empathise with the thoughts and feelings of others is nurtured by the baby's interaction with the mother in a secure bonding (Bowlby, 1977). Conversely, in a negative attachment, the child may defend against early neglect or trauma by disregarding the thoughts and feelings of the primary object or parent as it would be too painful to acknowledge the hurt being inflicted (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Whilst initially functional, it is theorised that this impairs the person's mentalizing capability in the long-term and, in later situations of stress, these early responses of "decoupling" from one's own and others' mental states re-emerge (Fonagy & Bateman, 2006). Mentalization is not confined to a psychoanalytic perspective.

Choi-Kain and Gunderson (2008) place mentalization alongside mindfulness, psychological mindedness, empathy and affect consciousness. Allen et al (2008) add: mindreading, theory of mind, metacognition, reflective functioning, emotional

intelligence and insight. In trying to distinguish mentalizing[1] as a construct, Allen et al (2008) propose five criteria. The activity should focus exclusively on mental states. These mental states should include both the self and others. The processes of cognition and emotion should be integrated rather than working separately. The theory should be developmental with individual differences explained via the risk of impairments and different pathways. It is a capability which is open to change, in contrast to a fixed trait. It is the breadth encompassed in these criteria that makes it so difficult to operationalise. This breadth also distinguishes mentalization from other social cognition constructs such as theory of mind, emotional intelligence and empathy. However, these concepts are important as they have been operationalised.

Theory of Mind (ToM) (Premack & Woodruff, 1978) is often used interchangeably with mentalizing. ToM encapsulates the ability to understand and predict one's own and others' attributions and intentions. It has proved particularly useful in defining developmental stages of social cognition. Initially a baby is unable to differentiate its own mind from its carer's (Baron-Cohen, Leslie, & Frith, 1985). The shift from an egocentric social viewpoint to an acknowledgement that others have thoughts that are different in content from one's own normally occurs from about the age of four. These competencies have been operationalised in ToM tests. A 1st order false belief test is the ability of a child, typically by the age of 3-4, to understand that another person can hold a mistaken belief; that other people may not know what they know (Wimmer & Perner, 1983). A 2nd order false belief, usually acquired by age 6-7, is the ability to represent a person recognising the false belief of another person; a belief about a belief (Perner & Wimmer, 1985). By the age of 9-11, children usually achieve the more demanding understanding of a faux pas (Stone, Baron-Cohen, & Knight, 1998). This requires an appreciation that one can have knowledge the other is unaware of, accompanied by the empathic

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[1] Mentalizing is different from mentalization by emphasising it as an activity (Allen et al, 2008).

understanding of what might upset or insult someone. This description recognises the integration of reasoning and emotional understanding. Allen et al (2008) and Lecours (1997) refer to a person's capacity to form a theory of mind as the product of basic mentalization processes.

Whilst defining developmental milestones in children, these definitions have also proved valuable in assessing mentalizing deficits in clinical groups such as autism, schizophrenia or certain brain impairments. Autism has been described as a ToM deficit (Baron-Cohen et al., 1985), whereby the inability to reflect on what another person might be thinking lies at the root of their social difficulties. In people with schizophrenia, positive symptoms such as paranoia have been linked to an impairment in the ability to infer the mental states of others (Corcoran et al., 1995). Whilst these groups have demonstrated impairments in 1st and 2nd order false belief tasks, such measures are insufficiently demanding for most adults.

ToM is predominantly about cognition in relation to others and has little to say about the role of emotion. Emotional thinking has been developed into an influential theoretical model (Emotional Intelligence (EI); Mayer, Salovey, Caruso, & Sitarenios, 2001). Their model has four branches in a hierarchy of abilities starting with perceiving emotions, then using emotions to facilitate thought, understanding emotions and, at its apex, managing emotions so as to support personal growth. There are other theories of EI (e.g., Lumley, Gustavson, Partridge, & Labouvie-Vief, 2005), however, the common added value of these models lies in the centrality of emotion and a focus on both the self and others. Like ToM, EI has been operationalised with a number of measures.

ToM and EI have both been broadened in response to identified limitations, which increases their overlap with the mentalization terrain. So, ToM started as a primarily cognitive development with a greater emphasis on the other than the self. However, in their modularity model (Baron-Cohen, Golan, Wheelwright, & Hill, 2004), an 'emotion detector' and 'empathising system' were added, which

acknowledged emotions and self-reflection. Emotional Intelligence (EI) is close to mentalizing in its central focus on emotional expression, understanding and regulation, as well as including the self and the other. However, Mayer et al (2001) also described the competence of accessing emotion in thought.

The question being reviewed is:

*Can mentalizing be reliably measured in adults? What measures of mentalizing have been developed for adults and what are their strengths and weaknesses in terms of validity, reliability and utility?*

In summary, mentalizing is inclusive, complex and multidimensional. However, its unity as a construct and operationalisation are questionable. The related concepts of ToM and EI have been operationalised but their scope is too narrow. In specifying the search for a measure of mentalization, this related family of concepts was employed: mentalization, ToM and emotional intelligence. Empathy was excluded as it is included within most definitions of EI, and its general use makes it too broad to be helpful.

The other focus of the search was for mentalization measures relevant to adults. The capability to mentalize develops through childhood, adolescence and into adulthood (Dumontheil, Apperly, & Blakemore, 2010). Most research assessing mentalizing abilities has focussed on child development and socially impaired clinical groups. This has resulted in 'ceiling' effects for adults and this review aims to find measures that can identify fairly nuanced differences in mentalization that are relevant to the real world.

## 3 Method

In order to explore the review question a search was carried out using the following method. Measures eligible for inclusion were those that:

i. Evaluated individual differences in mentalizing;

ii. Were appropriate for adults, 18+;

iii.    Provided sufficient description and relevant psychometrics;

iv.    Were written in English.

The search strategy identified relevant measures by:

a)    Keyword searches of electronic databases (Psychinfo; Embase; Web of Science; Medline).

  ➢ The basic search string was: *(mentali\*ing OR mentali\*ation OR theory of mind OR emotional intelligence)*

  ➢ *AND (measure\* OR test\* OR task\* OR scale\*) to be within 3 words of the above to optimise the likelihood of a relationship between the 2 terms[2];*

  ➢ Limits: (i) human; (ii) English language, (iii) 1990-April 2011, (iv) Adults 18+, (v) Clinical studies; (vi) Peer Reviewed journal.

b)    Personal contacts;

c)    Looking further at references in studies found from the above search to find new references.


## 4   Results: Output of Search and Shortlisting of Measures for Analysis

The search of databases resulted in 145 references. Some did not meet the initial criteria: not being studies about 'adults' (22); and, not using clinical populations (1)[3]. The remaining 122 references were reviewed and 28 actual measures were identified: Appendix A1 lists these by their original study, showing where they were replicated and in what clinical condition. Table 1 details 11 exclusions for not fitting the review question.

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[2] By specifying that the main term and the linked term be 3 or less words apart, this reduced the number meeting the search criteria from 410, when the two terms were specified anywhere in the abstract, to 145.
[3] Given the author's intention to research mentalization in an offender population, any studies found with this group were included.

Table 1

| Reason for exclusion | Measures excluded |
|---|---|
| 1) Adapted from child research and being insufficiently demanding. | 3 *False Belief* tasks (Perner et al., 1985; Baron-Cohen et al., 1985; Baron-Cohen, 1989); *Animations Task* (Abell, Happe, & Frith, 2001*)*; *Cartoon Task* (Woolfe, Want, & Siegal, 2002). |
| 2) Based on earlier measures unless demonstrating additional novelty. | *False Belief Stories Task* (Corcoran & Frith, 2003); *Cartoon Picture Stories* (Brune & Bodenstein, 2005). |
| 3) Not being a mentalization task. | *Predicaments Task* (Channon et al., 1999) - presented as a general problem-solving task. |
| 4) Weak or unavailable psychometrics (unpublished; no assessment of external validity; an experimental group of N<10). | *Projective Imagination Test* (Blackshaw, Kinderman, Hare, & Hatton, 2001); *Abbreviated Trustworthiness Task* (Adolphs, Tranel, & Damasio, 1998); *Social Attribution Task* (Klin, 2000). |

By personal contact with leading researchers[4], another 2 measures were added to the list - *Reflexive Self-Function Test* (Fonagy et al., 1991) and the *Perspectives Test* (Dumontheil et al., 2010) - leaving a total of 19 for detailed examination that fitted the original definition. In order to facilitate the process of analysis, these shortlisted measures were categorised on the basis of test type and mentalization sub-domain. Test type defines the mode of delivery to the participant varying from: self-report to performance of a task, with the latter covering: written, sound or picture (still or moving); and, verbal or non-verbal. These types are important in understanding the demands of each test and any possible confounding aspects. Mentalization has been defined across three sub-domains (Choi-Kain et al., 2008; Allen et al., 2008): implicit and explicit functioning; relating to self or other; and involving cognitive or affective aspects. These categorisations are used to indicate the mentalization scope of each measure in Table 2 below.

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[4] The following made suggestions for possible mentalization measures for able adult populations: Professor Simon Baron-Cohen, Dr Janet Feigenbaum, Professor Peter Fonagy, Professor Chris Frith, Professor Patrick Luyten, Dr Woodbury-Smith.

Table 2

*Shortlisted Measures by Test Type and Dimensions of Mentalization (N=19).*

| Measure (in order of publication) | Test/task type | Dimensions of mentalization | | |
|---|---|---|---|---|
| | | Implicit/ explicit | Self/ other | Cognitive/ Affective |
| Facial Emotion recognition (Ekman & Friesen, 1976) | Performance task: pictorial stimuli | Explicit | Other | Affective |
| Interpersonal Reactivity Index (Davis, 1983a) | Self-report questionnaire | Implicit/ Explicit | Self/Other | Affective/ Cognitive |
| Reflexive Self-Function Test (Fonagy et al., 1991) | Independent rating scale | Implicit | Self/Other | Affective/ Cognitive |
| Strange Stories (Happe, 1994) | Performance task: verbal stimuli | Implicit | Other | Cognitive |
| Hinting Task (Corcoran et al., 1995) | Performance task: verbal stimuli | Implicit | Other | Cognitive |
| Reading the Mind in the Eyes (Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) | Performance task: pictorial stimuli | Explicit | Other | Affective/ Cognitive |
| Bell Lysaker Emotion Recognition Test (Bell, Bryson, & Lysaker, 1997) | Performance task: audio-visual stimuli | Explicit | Other | Affective |
| Picture Sequencing Story-telling task (Langdon et al., 1997) | Performance task: pictorial /verbal stimuli | Implicit/ Explicit | Other | Affective/ Cognitive |
| Picture Stories Inference Intention Task (Sarfati, Hardy-Bayle, Besche, & Widlocher, 1997) | Performance task: pictorial stimuli | Implicit/ Explicit | Other | Affective/ Cognitive |
| Emotional Intelligence (Schutte et al., 1998) | Self-report questionnaire | Implicit/ Explicit | Self | Affective/ Cognitive |
| Faux Pas (Stone et al., 1998) | Performance task: visual/verbal stimuli | Implicit | Other | Affective/ Cognitive |
| Cartoon Task (Happe, Brownell, & Winner, 1999) | Performance task: pictorial /verbal stimuli | Implicit/ Explicit | Other | Affective/ Cognitive |
| MSC EIT (Mayer, Salovey, Caruso, & Sitarenios, 2003) | Performance tasks: pictorial /verbal stimuli | Implicit/ Explicit | Self/Other | Affective/ Cognitive |
| Awkward Moments Test (Heavey, Phillips, Baron-Cohen, & Rutter, 2000) | Performance task: audio-visual film | Implicit/ Explicit | Other | Affective/ Cognitive |

| Sarcasm Comprehension Task (Channon, Pellijeff, & Rule, 2005) | Performance task: verbal stimuli. | Implicit | Other | Affective/ Cognitive |
|---|---|---|---|---|
| Movie for Assessing Social Cognition (Dziobek et al., 2006) | Performance task: audio-visual film | Implicit/ Explicit | Other | Affective/ Cognitive |
| Cambridge Face-Voice Battery (Golan, Baron-Cohen, & Hill, 2006) | Performance task: audio-visual stimuli | Implicit/ Explicit | Other | Affective |
| Yoni Cartoon Eye gaze inference task (Shamay-Tsoory et al., 2007) | Performance task: visual/verbal stimuli | Implicit/ Explicit | Other | Affective/ Cognitive |
| Perspectives Task (Dumontheil et al., 2010) | Performance task: audio-visual stimuli | Implicit | Self:Other | Cognitive |

The 19 measures cover a broad range of test types and all of the dimensions of mentalization, although measures considering how people view their own mental processes are scarce. These measures are now assessed for the robustness of their psychometrics in terms of validity, reliability and utility.

## 5  Critical analysis of validity, reliability and utility of mentalization measures

This section analyses the relative psychometric strengths of the measures, using criteria of reliability, validity, utility and statistical power.

Reliability is the extent to which output measures are consistently reproduced, usually assessed by three possible methods. Firstly, where an answer is open to interpretation, rather than being obvious as with 'yes/no' or multiple choice, *inter-rater reliability* (IRR) is a measure of correlation for the marks of two or more raters for the same answers. Secondly, test results may vary when repeated; therefore, a *test-retest* score correlates the results of the same participant in the same conditions after a period of time has elapsed. For groups of people, the replication of results in different studies for the same group over time would indicate reliability. A difficulty is that the change found over time may be real. Therefore, reliability should be understood as consistency over a period in which the function being measured is stable.  Thirdly, a reliability coefficient of internal consistency

indicates the extent to which the items in the test all target the construct the measure purports to assess.

Validity is a more varied concept relating to whether the test measures what it intends to. Campbell and Fiske's (1959) framework captures the main considerations. Firstly, criterion or external validity is the extent to which there is convergence with similar measures. This might be looked at concurrently with another measure taken at the same time for the same construct. Or, it may be predictive of a future event, for example, does a test of IQ predict exam success? For a new test, it may be compared with existing widely accepted tests. Secondly, the construct validity refers to how well a measure truly represents what it is aiming to measure. An approach to this is its ability to discriminate between clinical and normal groups with different behaviours or capabilities according to an explanatory theory. There is also the important consideration of face or ecological validity - does the task match the relevant real world demands?

Utility refers to cost-effectiveness and user-friendliness. In assessing aspects of reliability and validity, there are inherent tensions and trade-offs in arriving at an optimum test. For example, the techniques to achieve internal reliability will usually employ highly selected and homogenous samples. This poses a threat to the external validity as these standards may be less meaningful in the real world. Furthermore, there is a likely trade-off between the speed of administration or the length of the test and the internal consistency of the items in the test.

In considering the application of measures, the statistical concept of power is important. Power is the probability of successfully finding an effect if one exists. It relates to the design of the study and can mean a study may be undermined by a lack of power, which is most likely to result from too small a sample and/or a small effect size. A lack of power may not mean the measure is weak; it just means that conclusions cannot be drawn from that particular study. In the main, 'under-powered' studies were excluded.

The psychometric properties of the 19 measures are summarised in Table 3.

Table 3

*Shortlisted Measures with Summary of Psychometrics (N=19).*

| Measure | Reliability | | | | | Validity | |
|---|---|---|---|---|---|---|---|
| | Sample N, matched/ controlled for: | Test-retest | Replic ation[5] | IRR | Internal | Discriminant: between-group[6] | Convergent: between measures |
| Facial Emotion Recognition (Ekman et al., 1976) | | | 4 | 70% | ✓ | ✓ Predictive of emotion: 88%<br>✓ Also: autism; autonomic failure; epilepsy; schizophrenia | |
| Interpersonal Reactivity Index (Davis, 1983a) | 156 and 1,344 students,<br>✓ gender | *r*=.62 to .71 | 5 | n/a | 4 scales: *r*=.71 to .77 | ✓ Social competence, self-esteem, emotionality, sensitivity to others.<br>✓ Gender (*p<.05*)<br>✓ Also: ASPD; autism; depression. | ✓ Empathic concern to emotional reaction (*p<.01*)<br>✓ Perspective-taking to social functioning (*p<.05*) |
| Reflexive Function Test (Fonagy et al., 1991) | 200 pre-natal parents<br>✓ socio-economic | n/a | X | *r*=.7 to .75 | ✓ | ✓ Mother's AAI scores @ 12m (*r=.7 to 1.0*)<br>✓ Child's security of attachment<br>✓ Mother's coherence (AAI) (*r=.51*) | ✓ Strange Situation Observer ratings: avoidance (*r=.37, p<.001*); contact maintenance (*r=.30, p<.002*) |
| Strange Stories (Happe, 1994) | Autism: 18<br>Controls:<br>• Children 26<br>• Mental health 13<br>• Adult 10<br>? IQ<br>✓ Comprehens'n<br>Age effects found in later | X | 16 | 85% | ✓3/12 story types | ✓ Initial study: (*F(3,63)=18.4, p<.0001*);<br>✓ Also: autism; autonomic failure; bipolar disorder; brain damage; epilepsy; psychopathy; schizophrenia; frontal leucotomy; Huntingdon's; Tourette's Syndrome | ✓ (Wimmer et al., 1983)<br>✓ (Baron-Cohen et al., 1985) |

[5] As measured from Literature Review.
[6] Significance levels for discriminant validity are quoted for the original study and 'Also' refers to clinical groups in other studies.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | study. | | | | | | |
| Hinting Task (Corcoran et al., 1995) | Schizophrenia: 55<br>Controls:<br>• Normal 30<br>• Mental health 14<br>✓ IQ | X | 6 | X | ✓ | ✓ Initial Study: (*t=4.2; 97 df; p<.0001*)<br>✓ Also: autism, bipolar; schizophrenia. | X |
| Reading the Mind in the Eyes (Baron-Cohen et al., 1997; Baron-Cohen et al., 2001) | 1997:<br>Autism: 16<br>Controls: 50 & 10<br>2001:<br>Autism: 15<br>Controls: 203 & 14<br>✓ IQ | n/a | 22 | n/a | ✓ > 50% selected target; < 25% selected foil (n=225). | ? gender (approaching significance: *p=.067*)<br><br>✓ Initial 2001 study: (*F(3,250)=17.9,p=.0001*)<br>✓ Also: Alzheimer's; anorexia; ASPD; autism; brain injury; dementia; depression; sex offenders; schitzotypy; schizophrenia; Williams Syndrome | ✓ (Happe, 1994) |
| Bell Lysaker Emotion Recognition Test (Bell et al., 1997) | Schizophrenia: 50<br>Substance: 25<br>Control: 81<br>X age, gender, IQ | *r*=.76 @ 5mths | 2 | | *K*=.93 | ✓ Initial study: impairment on –ve affect recognition (*F=137.02;df=2,154;p<.0001*)<br>✓ Also: schizophrenia, substance misuse. | X |
| Picture Sequencing Story-telling task (Langdon et al., 1997) | Schizophrenia: 20<br>Control: 20<br>✓ Age, gender.<br>X IQ | X | 5 | X | X | ✓ Initial study: < false belief stories, adjusted for covariates (*F=5.6;df=1,36;p=.023*)<br>✓ Also: alexithymia; schizophrenia | X |
| Picture Stories Inference Intention Task | Schizophrenia: 24<br>Controls:<br>• Mental health | X | 4 | | 28/30 | ✓ Initial study: Across 3 groups (*F=5.2; df2,54; p<.009*) and with Schiz sub-gp with thought & speech impairment (*p<.0006*) | X |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (Sarfati et al., 1997) | 12<br>• Normal 24<br>✓ Age, gender, IQ, | | | | | ✓ Also: brain Injury; schizophrenia | |
| Emotional Intelligence (Schutte et al., 1998) | ✓ IQ | $r$=.78 @ 2w | 3 | | α=.90 | ✓ Non-clinical: therapists > prisoners ($p<.0125$) and substance misuse ($p<.035$)<br>✓ Female > Male ($p<.001$)<br>✓ Openness to experience: $r=.54$<br>✓ Clinical: BPD; mood disorder; substance misuse | ✓ Toronto Alexythmia Scale ($p<.0001$)<br>✓ Trait Meta mood scale ($p<.0001$) |
| Faux Pas (Stone et al., 1998) | Brain lesion (left lateral frontal cortex): 5<br>Controls:<br>• Other lesion 5<br>• Normal 5 | X | 15 | | | ✓ Initial study: ($t=2.8, p<.02$)<br>✓ Also: Alzheimer's; ASPD; autism; brain damage; dementia; epilepsy; schizophrenia | Shown to find impairment where less demanding tests did not:<br>• 1$^{st}$ order (Wimmer et al., 1983)<br>• 2$^{nd}$ order (Baron-Cohen, 1995) |
| Cartoon Task (Happe et al., 1999) | Rt hem dementia: 14<br>Control: 19<br>✓ Age, gender, IQ | X | 7 | 87% | | ✓ Initial study: ($F(1,31)=38.5,p=.000$)<br>✓ Also: anorexia; bipolar disorder; brain injury; epilepsy; Huntingdon's; schizophrenia | ✓ (Happe, 1994) |
| MSC EIT (Mayer et al., 2003) | 2,000 | Split-half: r=.90 | 12 | r=.98 | Full: r=.93 to .91<br>Branch: r=.76 to .91<br>Task: r=.55 to .88 | ✓ Personality and wellbeing measures<br>✓ Predicts social deviance<br>✓ Clinical: alexythmia; BPD; brain injury: HIV; depression, substance misuse; schizophrenia; schizotypy; sex offenders; social anxiety. | ✓ Understanding emotions branch correlates with IQ.<br>? Factor structure is different between schiz and normal samples (Eack, Pogue-Geile, Greeno, & Keshavan, 2009) |
| Awkward Moments Test (Heavey et al., | Autism: 16<br>Control: 15<br>✓ IQ, verbal, | X | 1 | r=.99 | | ✓ Autism:<br>Accuracy = ($F(1,27)=18.3,p<.001$)<br>Response time = n/s | ✓ (Happe, 1994) |

| Task | Sample | r | | % | | Findings | References |
|---|---|---|---|---|---|---|---|
| Sarcasm Task (Channon et al., 2005) | CHI: 19 Control: 19 ✓ Age, IQ, | X | 1 | | ✓ Detail p127 | ✓ Head Injury: (*F(1,36)=23,p=.0001*) | ✓ Mentalizing action comprehension task |
| Movie for Assessing Social Cognition (Dziobek et al., 2006) | Autism: 19 Control: 20 ✓ Age, gender, IQ | *r*=.97 | 5 | 97% | *A*=.84 | ✓ Initial: (Mann-Whitney: *U=9.5,p<.001*) ✓ Also: bipolar, depression, stress, BPD (in press) | ✓ (Happe, 1994) ✓ (Ekman et al., 1976) ✓ high ROC v other measures |
| Cambridge Face-Voice Battery (Golan et al., 2006) | Autism: 21 Control: 17 ✓ Age, IQ, socio-ec, gender | X | 1 | | ✓ Across all areas | ✓ Autism: Overall: *(F(1,31)=25.32,p<.001)* Faces: *(F(1,31)=15.61,p<.001)* Vocal: *(F(1,31)=21.26,p<.001)* ✓ Gender: F>M (*p<.05*) | ✓ (Baron-Cohen et al., 2001) (*p<.001*) ✓ (Rutherford, Baron-Cohen, & Wheelwright, 2002) (*p<.001*) |
| Yoni Cartoon Eye gaze inference task (Shamay-Tsoory et al., 2007) | Schizophrenia: 24 Brain lesion: 43 Control: 28 ✓ Age, verbal IQ X gender | X | 2 | | | ✓ Initial: Perspective taking: (*p<.05*) Basic emotions: n/s ✓ Autism | ✓ (Davis, 1983a) ✓ (Ekman et al., 1976) |
| Perspectives Task (Dumontheil et al., 2010) | 5 groups (Mean age): I) 35 (8.9) II) 36 (10.6) III) 35 (12.7) IV) 35 (15.3) V) 36 (22.8) ✓ gender, age, IQ. | X | X | n/a | ✓ exp errors> control *F(1,172)=6 84,p<.001* ✓ Director errors > non-D F(1,172)=5 | ✓ Accuracy changed with age (*F(4,172)=9,p<.001*) ✓ RTs changed with age (*F(4,137)=5,p=.002*) | X |

| | |
|---|---|
| ✓ executive functions of inhibition, ego function, motor coordination. | 53,p<.001 <br> ✓ Director response times (RT) > No-D RT <br> F(1,137)=3 8,p<.001 <br> ✓ Control RTs<Exp RTs <br> *F(1,137)=9, p=.004* |

The critical analysis elaborating on Table 3 follows the various modes categorised in Table 2 above.

**5.1 Verbal Tasks**

Administering tasks verbally tends to be straightforward, cost-effective and is appropriate for adult populations. The *Strange Stories* task (Happe, 1994) was the earliest found that explicitly aimed to be a more demanding test. It assesses cognitive understanding of mental states through story comprehension, likely to be at the level of a normal 8-9 year-old, and has been widely used. *Strange Stories* shows that the approach can be naturalistic as it comprised of short vignettes of everyday situations where people say things they do not literally mean. It requires participants to demonstrate understanding of this with descriptive answers of mental states referring to thoughts, feelings, desires and dispositions. Happe's original experiment showed discriminant validity between the experimental autistic group and all three controls (young normal, adult normal and 'mental handicap': *p<.0001*). External validity was positive through consistency with previous child orientated ToM tests. The test has been widely replicated showing discriminatory power between a variety of clinical groups and control conditions (16 are referenced in Appendix A1).

However, the study illustrates the difficulties of psychometrically sound verbal measures. IQ is a potential confound in verbally-based studies as, without this factor being controlled, a difference in IQ might explain performance variations better than ToM deficits. The study also identifies the potential confusion of ToM with 'central coherence', a broader capacity to extract meaning from information by understanding the context within which it is presented (Frith, 1989). Central coherence and the related concept of executive function, which refers to broader abilities to direct attention, comprehend and integrate information, are sometimes presented as alternative explanations of impaired performance. There is ongoing debate, for example, Frith and Happe (1994) argue for the separateness of ToM and

executive function whilst others (Jarrold, Butler, Cottington, & Jimenez, 2000) suggest that they are inextricably linked.

The relative strengths and weaknesses of open-ended versus closed questions are highlighted. Random error from rater reliability is a risk in open-ended answer formats, although this measure later achieved 85% inter-rater reliability (Happe et al., 1999). Happe suggests open-ended questions have an advantage over multiple choice formats as the latter emphasise salient features and are therefore leading for participants. However, some rater training would be required for effective administration and scoring.

The *Strange Stories* task does not control for variations in memory and comprehension amongst participants. Frith and Corcoran (1996) found that some of the more demanding tasks had to be removed as they co-varied with this a comprehension control item. Although they still found between group differences (*p<.01*), this lowered the ceiling for more able populations. Verbal tests risk measuring other verbal intelligences unless they are matched for information content across the mentalizing and control conditions.

There is a trade-off between tasks that include a wide range of skills testing the breadth of mentalization and the need for internal consistency. Whilst the *Strange Stories* task explores a wide range of mental states such as lying and persuasion, only 25% of the items showed good discriminative power. This suggests low internal consistency across the mental state measures. On the other hand, the *Hinting* Task focuses more narrowly on the understanding of social inference in direct speech (Corcoran et al., 1995). Its weakness is becoming less representative of real world demands and only exploring a limited dimension of mentalization. Even when the internal consistency is stronger, the construct validity may be weak: the *Hinting* Task was unable to attribute differences in performance to mentalizing as opposed to poorer episodic memory linked to more limited social experience.  In contrast with *Strange Stories*, the *Hinting* Task did include a control question to

ensure encoding of the information so as to rule out the explanation of impairments being due to working memory difficulties.

Stone's *Faux Pas Task* (1998) is a developmentally advanced measure recognising that effective mentalization involves a wide range of capabilities. Participants are read a story and are assessed for identifying and understanding a faux pas; ability normally achieved at the age of 9-11. As predicted the measure showed significant differences ($p<.02$) between a group with orbito-frontal cortex damage (OFC) and control groups based on their known difficulties with social cognition. The measure has robust design features that confront possible confounds and separate various mentalization processes. There are control questions on non-mentalistic inferencing and 'true belief' tasks and minimising memory load. Whilst the OFC group were as good as the controls in empathic understanding, they seemed to be impaired in integrating inferences (ToM) with understanding that the person might be upset (EI). Although it was based on a small sample, this measure has been widely replicated (15 studies; Appendix A1).

Similar to the judgement required for faux pas, sarcasm is a complex communication processing non-literal meanings. Both comprise everyday social challenges for adults. The *Comprehension of Sarcasm Test* (Channon et al., 2005) found a significant main effect of people with closed head injury, which is associated with difficulties in social communication, compared with a control group ($p<.0001$). The task adds to this analysis by being presented alongside other tests to tease out alternative explanations, for example, a measure of social knowledge. The results also showed that the open-ended verbal answers picked up subtle differences that closed formats did not: whilst the fact of a non-literal meaning was usually picked up by the experimental group, it was only the descriptive answer that showed they did not necessarily understand why. Even with this careful design, the researchers still acknowledge that, whilst there is a relationship between sarcasm comprehension

and mentalizing, there may be other routes to this impairment, such as poor executive skills.

The lack of evidence to support reliability in individual studies found here is partially mitigated by Hughes et al (2000) review of early simple false belief ToM tests. Test-retest reliability for individual test scores was in the fair to moderate range (mean *kappa coefficient = 0.51*[7]) and high for aggregate test scores (*r=.76*). Internal consistency was measured by firstly, finding that scores across the tests were highly correlated (r(46)=.7) and, secondly, creating an aggregated 9-item scale which strongly indicated a single construct (*r=.85*). This is a helpful review but cannot be generalised with confidence as the tests examined here are more complex.

In sum, verbally-based tests can be problematic in distinguishing between mentalization and other language-based abilities such as memory, comprehension and executive functioning. Valid tests need to be able to demonstrate that these other factors are neutralised and, more broadly, that the task is not just a measure of intelligence. There are also trade-offs: between measures that seek to assess the breadth of mentalization and internal consistency; and between the more time-consuming marking of open-ended answers and non-descriptive answers that may miss more subtle differences in performance.

## 5.2 Pictorial Tasks

The problems with verbal tests, particularly their correlation with IQ, may be overcome by presenting pictorial stimuli as the basis for assessing the ability to 'read' mental states. The earliest of the identified measures, the widely used *60 Faces Test* (Ekman et al., 1976) assesses the ability to perceive and recognise basic emotions, which is the first tier of Mayer et al's model of EI (2003). The

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[7] In this context the kappa statistic assesses whether performance on a task is more consistent across the re-test interval than would be expected by chance.

'Pictures of Facial Affect' feature six basic emotions (happiness, sadness, disgust, fear, surprise and anger) and elicited at least 70% agreement across observers and a further panel of judges. A previous study by Ekman and Friesen (1971) had demonstrated agreement across 11 literate and 1 pre-literate culture on the identification of emotions from posed facial expressions. The development of objective scoring systems (Facial Affect Scoring Technique - Ekman, Friesen, & Tomkins, 1972; Facial Action Coding System - Sayette, Cohn, Wertz, Perrott, & Parrott, 2001) further supports their validity. These systems have shown that the 'eyes' area of the face is most reliable for correctly judging emotion with 73% success compared with 88% for the face as a whole (Ekman et al., 1972).

The extensive research base of the *60 Faces Test* has been a starting point for subsequent mentalization tests and the adoption of materials particularly based on the eyes. This measure has been consistently replicated for assessing differences in the ability to detect emotion, for example, a study of autism to ascertain if their difficulty was not only inattention to the eyes, but also impairments in reading their mental states (Kleinman, Marciano, & Ault, 2001). The test has also been used to externally validate other facial emotion measures. The test has a limited application for adult groups as the six basic emotions do not pick up more nuanced differences in emotional recognition.

The *Reading the Mind in the Eyes Task* (Baron-Cohen et al., 1997; Baron-Cohen et al., 2001) is a more demanding measure that remains quick and easy to administer. The task asks participants to put themselves into the mind of the other person and 'read' their mental states from the eyes. The initial version was substantially amended to eradicate psychometric weaknesses and increase its discriminatory performance. Increasing the forced choice from two to four responses and the number of items from 25 to 36 enhanced the statistical power of the test. The task was made more suitable for able adults by only including emotions that involved the attribution of a belief or intention and by having all of the foil words as

the same valency as the answer rather than being the semantic opposite. The possible confound of comprehension problems was negated by providing a glossary of definitions to be available when participants were trying to map a word to a picture.

This revised version replicated the between-group results of the original with much larger control groups (*p=.0001*) and this review found replication in 22 studies. The construct validity appears strong. Firstly, it assesses the recognition of both affect and cognition. For example, it only partially mirrored a straightforward facial emotion task (60 Faces Test; Ekman et al., 1976), and it converged with Happe's *Strange Stories* (1994). However, the control group was at ceiling on the *Strange Stories* task, which may limit this conclusion. Secondly, the study design enabled possible alternative explanations of facial perception, emotional insight, social understanding, IQ or executive function to be discounted. This is one of the few mentalization tasks to demonstrate no correlation with IQ.

However, the assertion that the test is not affected by executive functioning ability remains controversial. Jarrold, Butler, Cottington, & Jimenez (2000) concluded that ToM relies on executive functioning and cannot be distinguished from it when they found an association between the early *Reading the Mind in the Eyes Task* (1997) and a test of executive functioning for adults (Embedded Figures Test; Witkin, Oltman, Raskin, & Karp, 1971). Both tests require the ability to integrate visual information by paying attention to the self and the other and relating to certain concepts. On the other hand, the *Reading the Mind in the Eyes Task* has been contrasted with false belief tasks as it only requires an understanding of how others are thinking about the world, whilst the latter also demands the identification of the content of these attitudes. There has been inconsistent correlation between the *Reading the Mind in the Eyes Task* and ToM tests, although, one review suggested that they do have in common the requirement to correctly appraise intentions and feelings (de Achaval et al., 2010).

The foregoing debate about what is being measured and the lack of consistency found between different types of measures probably attests to the breadth of the mentalization construct; it should not be surprising that tests do not have convergent validity as they may be assessing different aspects of the same construct. The added value of the pictorial measures is their focus on external explicit aspects of mental states, especially emotion. Importantly, they rely less on verbal comprehension and reduce or eliminate correlations with IQ.

## 5.3 Pictorial-Verbal Tasks

Pictorial-verbal measures raise the possibility of combining the strengths of pictures with verbal stimuli, reducing reliance on verbal elements and introducing explicit facial and body information. Langdon's introduction of the *Picture Sequencing Story-telling Task* (1997) attempts to link the test to the underlying processes of mentalization. The different stories allow for controls of non-mentalizing, general conceptual reasoning and attention and assess four types of ToM – pretence, unrealised goal, intention and false belief. The results were interpreted as distinguishing performance on the false belief pictures from a more general cognitive or executive functioning deficit. This measure adds to the mentalization literature by suggesting that it is not a unitary construct, instead there are at least two mechanisms: a general sequencing process that enables the manipulation of symbolic representations; and the facility to critically evaluate cause and effect.

However, the ambition and careful design of the *Picture Sequencing Story-telling Task* still lacks clarity about what skills are needed for successful completion. For example, it does not take account of variation in the ability to read facial and body language, nor does it control for differences in language competence and task difficulty. A widely used measure that does recognise these confounds is the *Cartoon Task* (Happe et al., 1999). The design balanced relative difficulty across:

mentalistic and non-mentalistic demands; pictures with and without facial expressions; verbal and non-verbal; humourous and non-humourous. Participants are marked for their description of why cartoons are funny (87% inter-rater reliability). The study showed significant predicted mentalizing impairments both within and between groups (*p=.000*). The design of the measure enabled the conclusion that this was not due to the general task difficulty, differences in recognising emotion or processing facial information. The integration of visual information was the same in both conditions. Furthermore, the different conditions facilitated the dissociation of ToM ability from executive function.

Another verbal-visual measure, the *Picture Stories Inference Intention Task* (Sarfati et al., 1997)*,* is presented as it combines a number of design challenges*.* On the face of it, the experiment found significant impairments in the ability of people with schizophrenia to attribute mental states as compared with control groups (*p<.009*) and an even greater difficulty amongst the sub-group with thought and language problems (*p<.0006*). However, all of the items tested understanding of mental states with no comparison of the ability to infer from physical relationships, so, the impairment cannot be confidently attributed to difficulties in inferring mental states rather than something else. Furthermore, the study refers to the known association of schizophrenia with dysfunctional action planning and, therefore, an alternative interpretation would be a deficit in executive function rather than ToM. Along with many ToM measures, as there was a significant correlation of task performance and IQ in all groups, it is not possible to conclude that ToM explains differences in successful performance. Certain aspects of ToM may be attributed to gender differences, particularly a reading of emotion (Baron-Cohen et al., 2001) and one of the control groups had significantly more women. Whilst the overall size of the experimental group (24) was reasonable, the four symptom-based sub-groups averaged 6 each, which is too small to be meaningful. In fact, there were no

differences between these groups which left the largest explanatory factor being impaired communication.

An example of the importance of measures being formulated against an established model of mentalization is the widely-used *Mayer Salovey and Caruso EI Test (MSCEIT)* (2003). All the tasks contained in the measure are positively correlated with the four branches of EI set out in the theory (see p7 for overview of model). For example, there are picture emotional recognition tasks for the first ability of perceiving emotions and tests of emotional management and relationships at the highest level. Good standards of reliability were found at task (*r=.55 to .88*), branch (*r=.76 to .91*) and full test level (*r=.93 to .91*). The measure was rigorously validated in pilot studies with over 2,000 participants and an independent expert group (International Society of Research in Emotions ICC: *r=.98*).

The *MSCEIT* was developed for able adult populations and, although it has been widely used amongst non-psychiatric populations (12 studies, Appendix 1), it has mixed results. For example, in schizophrenia, Eack et al (2010) found that a 2 factor structure of EI representing emotional knowledge and regulation appeared to best describe people with schizophrenia. This makes comparisons with normative populations characterised by the 4 factor model problematic. In relation to external validity, the *MSCEIT* has shown minimal relationships with self-report EI tests that are also based on the Mayer model (Brackett & Mayer, 2003). This may not be a problem with the model, instead showing how ability and self-report measures provide different information on the same person. Another overview of measures of EI found that the *MSCEIT* did correlate as predicted with self-report measures of alexythymia, emotional coping and metamood skills (Lumley et al., 2005).

The final verbal-visual ToM measure reviewed, the *Yoni Cartoon Eye Gaze Inference Task* (Shamay-Tsoory et al., 2007), shows how the validity of a measure can be diminished when the results are inconsistent with the theory or do not converge with other similar tests. This measure used a range of verbal and non-

verbal cues and examined impairments of cognitive and affective mental states. The measure picked up significant perspective taking cognitive deficits in people with schizophrenia and brain damage as compared with the controls ($p<.05$). This relationship converged with the perspective taking element of the *Interpersonal Reactive Index* (Davis, 1983a). However, all patients had better performance on the affective condition, which is contrary to their hypothesis suggesting people with fronto-limbic disturbances have difficulties reading emotions. Other studies have shown difficulties in emotional intelligence amongst people with schizophrenia (e.g., Eack, Hogarty, Greenwald, Hogarty, & Keshavan, 2007; Lo et al., 2010). There are other reservations about the test: the brain lesion patients were divided into small sub-groups of 7-11 people, which reduced the statistical power of the analysis; there is no mention of the gender balance of the groups, which could be a confounding variable in the analysis.

Combining verbal and pictorial cues in a task enables a more realistic measure as people use more senses to mentalize. The presentation of mental states can be more sophisticated, which enables more demanding tests to be constructed. However, this greater complexity means that more mental processes are at work and more controls are needed to be confident about what is being measured. These measures also show the benefit of starting with a theory of mentalizing. In terms of design, the lessons emphasise the need to control for gender and IQ and to ensure sufficient numbers and homogeneity in the groups to be tested.

### 5.4 Audio-Visual Tasks

The measures reviewed so far have been static, but everyday mentalizing requires a subtle appreciation of movements in expression. Film-based tests have been developed to achieve this ecological validity approximating more closely to the real world. The *Bell Lysaker Emotion Recognition Test (BLERT)* (1997) builds on the

*Faces Test* by presenting the six emotions with the use of voice and a broader body language including movement of the upper body as well as the face. The study showed people with schizophrenia have poorer affect recognition than people with substance misuse problems or undergraduates (*p<.009*). The test produced more robust results than the *Faces Test* and the authors suggest this is due to the multi-channel communications enabling 'normals' to score more highly. The test design ruled out other explanations such as verbal learning ability, memory or general intelligence. The test also demonstrated good reliability (test-retest - *R=.76* at 5 months; consistency - *K=.93*). The lack of matched samples is a limitation with the experimental group comprising of male veterans in their forties, probably a chronic sub-group, and the control group being younger and more female. Bell et al do not provide details of any external validation and, when used alongside the *Hinting Task* (Corcoran et al., 1995), only the latter showed between group differences. This may reflect the latter being a ToM test as distinct from an EI task, which again emphasises the breadth of the mentalization concept.

The content of the *BLERT* is monologues about work situations. A more naturalistic approach is the *Awkward Moments Test* (Heavey et al., 2000), which shows social interactions between characters and asks participants to infer their thoughts and feelings. The study demonstrated significant group differences on the mental state questions (*p<.001*). There was some external convergence with Happe's *Strange Stories* (1994)*,* although this association did not reach significance for the experimental group (correct answers: *r=.48*). This may have been because the two tests require different cognitive strategies and the sample was relatively small (*N=16*). It cannot be concluded whether the test is a measure of ToM or executive function as it makes demands on the holding and integration of social information.  The scoring included both multiple choice and a mini interview about the intentions of characters; both showed group differences, with the latter being more sensitive in differentiating the groups (Correct answers: *M=5.97 v 4.54*;

Intention questions: *M=22.6 v 8.31*). However, the open-ended intention questions needed more verbal skills and this might have linked to the finding that the control performance was mediated by verbal IQ (*p<.01*). So, again, the question arises as to whether differences in ToM or IQ or executive function are being found.

These concerns are recognised in the development of the *Movie for Assessing Social Cognition (MASC)* (Dziobek et al., 2006), which aims to approximate a real life situation whilst minimising the distracting stimuli that require the retention and integration of information. This instrument focuses on specific social cognitions, including sarcasm, faux pas, false beliefs and metaphor, rather than a general ability to determine the inferences of others. The assessment covers thoughts, emotions and intentions that require a reading of verbal (literal and figurative) and non-verbal (facial and body) communications. In its development, external validity was assessed by including other mentalization measures – *Strange Stories* (Happe, 1994), *Reading the Mind in the Eyes* (Baron-Cohen et al., 2001) and *Emotion Recognition* (Ekman et al., 1976), as well as separate measures of attention, memory and executive function.

Of the four mentalization measures, the MASC showed the largest between group differences. A calculation of the relative value of the four measures (Recovery Operating Characteristic Curve) showed that the MASC (*0.98*) was able to make a better group distinction than the others (*0.65 to 0.86*). The researchers explicitly built on the critique of the *Awkward Moments Task* and minimised executive function demands by questions being phrased simply and coming directly after an action sequence. This appears to have been successful: the MASC did not correlate with the measures of executive function, memory, attention or visual processing. There were no between group differences on the control questions as there had been on the *Awkward Moments Test*, which indicated the two conditions were equally challenging. As predicted from previous studies, the *Strange Stories* correlated with the vocabulary test (*p<.05*). However, there was no association of the MASC and

IQ. The MASC seemed to be the broadest of the mentalization measures as the only correlations were of the MASC and the *Strange Stories* in the autistic group (*p<.05*) and with the *Emotion Recognition* task in the control group (*p<.01*). The MASC was extensively validated in this study and reliability was also demonstrated (internal consistency, *A=.84;* test-retest *ICC=.97*). The possible limitations identified were that the movie characters were of a similar age to each other and the study participants; there may be language and cultural confounds across a more mixed age study.

The *Cambridge Face-Voice Battery* (Golan et al., 2006) also aims for a naturalistic test that more closely mimics real situations. However, conceptually it is better appreciated as a development of the *Reading the Mind in the Eyes Test* (Baron-Cohen et al., 2001) and the *Reading the Mind in the Voice Test* (Rutherford et al., 2002), with which there are strong correlations (*r=.74, p<.01 and r=.62, p<.001* respectively). It measures performance in relation to a moving picture of facial emotion and a vocal-based emotion based on a well-researched taxonomy of 412 unique emotions with developmental levels (Baron-Cohen et al., 2004). This made it possible to focus the task on adult populations by only including emotions that are normally understood by a 15-year old or above. The test distinguished between groups in a predicted way across all measures – overall recognition of emotions, facial recognition, vocal recognition and concept recognition (*p<.001*) - with all showing high power calculations (*0.999 at α=.01*). As predicted, and consistent with similar tests, there was a main effect of gender on the facial scale with females outperforming males (*p<.05*). Interestingly, women found it easier to mentalize from faces and men from voices (*p<.05*); the authors suggested the latter might be due to males using the vocal content to compensate for face recognition difficulties. There was no correlation with age or IQ and, given the minimal demands on memory and understanding of context, it is suggested that the test measures mentalization independently of executive function.

A rather different audio-visual ToM test of mentalization specifically designed for adults is the *Perspectives Task* (Dumontheil et al., 2010). Bateman and Fonagy (2004) suggest that successful mentalization requires inhibitory control of the natural egocentric bias, particularly as it relates to impulsiveness. This was tested out by requiring practical decision-making whilst having to take account of another person's perspective. In a large sample (*N=176*), the *Perspectives Task* showed significant improvements in the ability to take the perspective of others beyond adolescence into adulthood compared with the control condition (*p<.001*). Even the adults performed the experimental condition well below ceiling. The two conditions were matched for executive function capabilities so that it was clear the improvement beyond adolescence seemed to be entirely in perspective taking. The task appears to have robust internal controls but lacks any external validity check, making the construct validity debatable. The task seems to include two mentalizing abilities, those of taking another's perspective and of inhibiting the egocentric bias, without being clear what their contribution and interaction is for the task.

These audio-visual tasks show that it is possible to develop naturalistic measures with strong psychometric properties and relevance to normal adult populations. The tests are more demanding and discriminate across able groups without a ceiling effect. However, whilst the good design of controls can increase confidence that one is observing variation in mentalization, the complexity of the processes involved means straightforward interpretation is not possible. In particular, the contribution of executive function – the ability to hold and integrate information – is required for these tests and is difficult to separate from mentalization.

## 5.5 Self-Report and Rating Measures

The measures so far have been ability-based, externally assessing the performance of a task against a 'correct' answer. In contrast, self-report measures

rely on the participant to rate themselves against criteria, usually with closed question for ease of marking and administration. A rating measure is an assessment of the attributes of others by 3rd party raters.

The *Interpersonal Reactivity Index (IRI)* (Davis, 1983a) is a 28 item self-report empathy questionnaire with four subscales encompassing dimensions of mentalization. Firstly, perspective taking is described as the fundamental social ability of entertaining the mind of another, an essentially cognitive quality. Secondly, empathic concern relates to responsivity to others. Thirdly, personal distress assesses feelings about the self in challenging situations. Fourthly, fantasy is the tendency to imagine oneself in place of characters in books or films. These constructs can also be understood as a developmental transition: from self-focussed emotional reactions to a more other-orientated perspective.

The IRI has been validated in large samples ($N=1,500$), albeit of psychology students and shown robust reliability (ICC - $r=.71$ to $.77$; test-retest - $r=.62$ to $.71$). The affective and cognitive sub-scales had convergent validity with similar measures. There were significant gender differences as predicted ($p<.05$). Hypotheses regarding the relationship of the different sub-scales with other measures were validated, for example, *Perspective Taking* was related to social functioning ($p<.05$) and self-esteem ($p<.05$) as well as having less emotionality. In another study, *Perspective Taking* and *Empathic Concern* were shown to differ as predicted in relation to emotion reactions, the former being unrelated and the latter being positively correlated ($p<.01$) *(Davis, 1983b)*. The task is helpful in covering many of the conceptual aspects of mentalization. Although it has been successfully used in clinical studies, it was not developed or tested with clinical populations. It is short and practical in research settings.

Another self-report measure is the 33 item *Self-Report Emotional Intelligence Scale (SREIS)* (Schutte et al., 1998). This aims to cover the whole EI model but is also criticised for being unclear as to what it actually measures. Despite having

robust reliability, it is not significantly related to the *MSCEIT* which applies the same model and theory of EI (Brackett et al., 2003). This could be a problem with the model but, given the widespread research into the Mayer model, it is more likely to indicate how ability and self-report measures provide different information on the same person. People tend to be poor self reporters and there is an acknowledged susceptibility of self-reports to being manipulated. Furthermore, many self-report scales use a more mixed model by combining mental abilities and self reported qualities.

The *Reflective-Self Function Scale* (Fonagy et al., 1991) is the only example found of 3rd party rating of attributes, in this case, a parent's capacity for internally observing and understanding the behaviour of themselves and others. It is a 9-point scale assessed by independent rating of Adult Attachment Interviews (AAI) (Main & Goldwyn, 1991). The scale runs from: (1) the parent showing minimal appreciation of the motives of others in determining their behaviours; to (9), the parent demonstrating an organised and consistent understanding of others. The scale aims to predict and understand the impact of the parent's mentalization on the emotional and cognitive development of their child.

The scale was applied to 200 parents and showed discriminatory validity. It was able to predict: AAI classifications for mothers at twelve months ($r=.7 \text{ to } 1.0$); the child's security of attachment as measured in the Strange Situation (Ainsworth, Wall, Waters, & Blehar, 1978) (75% predictive rate); dimensions within the AAI, for example, parental ability to observe their own mental functioning, which relates to secure children ($r=.51$ for mothers); and, observer ratings of child behaviours in the Strange Situation ($r=.37$ for avoidant behaviour). This longitudinal predictive strength contrasts favourably with standard questionnaire personality measures. It also had reasonable inter-rater reliability ($r=.7$ for the mother interviews) and was independent of demographic variables, personality measures and verbal intelligence. Whilst the scale can assess understanding of the self and others, it

does not discriminate between the inclination to reflect and the accuracy of that ability. In the review, there are no replication studies to confirm its utility. This may be due to its narrow application and being resource intensive as a research tool.

This section highlights the contribution of rating scales to measure mentalization. Self-report scales are relatively easy to administer, but they rely on the person having the insight and inclination to respond accurately. There is a lack of convergence between some self-report and performance measures that purport to assess the same construct. This may be because they are measuring different aspects of mentalization or that they vary in reliability.

## 6. Conclusion

This review aimed to find if a psychometrically robust mentalization measure was available for use with adults and had the strength to discriminate amongst normal populations. Following a search incorporating the terms mentalization, ToM and EI, 19 measures of adult mentalization were identified. The majority of these focussed on either ToM or EI and none assessed all of the mentalization domains, that is: cognitive and affective insight; reflection on the self and others; and, making judgements from both explicit information and a sense of internal mental states. The processes underlying these domains are insufficiently precise and too broad to successfully operationalise. Given this reservation, this review can set out the critical points in developing an optimal approach to measuring mentalization.

The review found that the tests provided good discriminant validity. They distinguished clinical from normal populations, based on theory, and usually achieved high significance levels with quite modest sample sizes. However, these clinical groups had quite significant mentalization impairments and for measures to be able to differentiate amongst normal populations, minimal ceiling effects are required and this was unclear from most studies. Where the measures were able to

discriminate between groups, it was not always clear to what extent this was due to differences in mentalization.

Construct validity was widely recognised as a challenge. The variety of measures purporting to assess ToM recognises the complexity of trying to delineate different thinking and feeling processes and separate these from other factors that may be contributing to impairment. For example, it is not clear to what extent mentalization difficulties may actually be attributed to differences in social experiences, attention, inferential reasoning skills, memory and verbal aptitudes. The more demand placed on verbal skills, the more IQ becomes a confounding factor and needs to be controlled by balancing of groups. The creators of the *MSCEIT* accept that a confound with verbal ability is inevitable and a correlation of about 0.4 is to be expected between EI and verbal ability as they both tap intelligence (Lumley et al., 2005). However, most of the above factors can be controlled by good design and recruitment procedures. A more difficult issue of construct validity was whether mentalization could be distinguished from executive function.

There are different views as to the separateness of ToM and executive function. Performance on many of the mentalization tests correlates with verbal skills, which suggests some sort of verbal scaffolding is required. A study by Bull et al (2008) in healthy functioning adults found that an association between ToM and executive function depended on the measure chosen as different methods placed different demands on executive function. Stories tasks were found to make high demands on executive functions, particularly attentional resources – this suggests the need for a non-mental state control. Pictorial tasks made relatively low demands on executive functioning. These findings and further research in this area will help design and interpret appropriate studies.

Just as construct validity was often unclear, external validity also showed discrepancies as to what was being measured. There are mixed and inconsistent

results when mentalization measures are compared. This may reflect the breadth of the mentalization construct or it not being a unitary construct. However, any single test is likely to miss important aspects of mentalization. The solution is either to have a battery of complementary tests designed to cover different aspects of mentalizing, or, to operationalise and validate a specific domain.

In relation to measures being consistently reproducible, few of the studies present a comprehensive analysis of reliability. The Hughes et al (2000) review of reliability showed that their results were most robust for aggregate scores across tests; looking at an aggregate index of internal consistency, alphas never dropped below .80. This suggests that improved reliability can be gained by administering multiple measures.

As a test of social cognition, it is essential that results can be generalised to the real world. Ecological validity and whether competence predicted performance in the real social world was unclear. Most measures tended towards concrete questions. However, in real life, mentalizing takes place in a complex environment, problems are not well-defined and responses tend to be more dimensional. Perhaps not surprisingly, open-ended questions were often better at finding differences. There is a tension between achieving naturalistic contexts and also retaining a simple account of the mentalization construct being applied and its administration. However, some of the film-based measures showed that naturalistic measures could be combined with psychometrically robust design.

A number of tentative conclusions can be drawn from this review. There is no single valid and reliable measure of mentalization. The breadth of the construct makes the development of such a test unlikely. However, with a clear theory-led hypothesis, an experiment might be constructed with measures closely aligned and meeting the following criteria. Firstly, tests should have well developed controls for executive functioning and verbal ability. Secondly, samples need to be matched to minimise contamination from variables such as IQ and gender. Thirdly, there is a

case for developing a battery of measures so there is a range covering different aspects of mentalization, depending on the hypothesis. Fourthly, the tests should include naturalistic settings, which, as far as possible are relevant to the population being studied. Fifthly, these should have minimal context so as to prevent confounding variables being introduced. Where the study is considering adults that are functioning at a high level, it is essential that any ceiling effect is minimal.

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## Part 2: Empirical Paper

*Are difficulties in mentalizing associated with severity of Antisocial Personality Disorder?*

**Abstract**

**Aims**

The aims were to examine mentalization in people with Antisocial Personality Disorder (ASPD) and contribute to improved risk assessment and treatment.

**Method**

Eighty-two male offenders on community license, recruited from probation services in London, completed a battery of computerised mentalizing tests. The population included a significant proportion meeting the threshold for ASPD

**Results**

The group were impaired at mentalizing on some of the tasks compared with control group performance in published studies. In line with the hypothesis, three of the mentalization sub-scales were able to modestly predict the severity of ASPD: the *Perspectives* task, the *MASC absence of mentalization* sub-scale and the *Mind in the Eyes* task.

**Conclusions**

The deficits in mentalizing ability in ASPD are subtle. There are lessons to be learnt in the development of mentalization measures and the assessment of ASPD, which have implications for both the NHS and the Criminal Justice System.

## 1. Introduction

There is little evidence for the effective treatment of people with Antisocial Personality Disorder (ASPD) (NICE, 2009). This study aimed to explore possible mentalization deficits in people with ASPD, so as to support research into the development of clinical interventions. The study investigated a community sample of offenders where a significant prevalence of ASPD was expected. This group was also selected for their relevance to current public policy aiming to find alternatives to prison (Ministry of Justice, 2010), in particular, for those with mental health difficulties (Bradley Report, 2009; Ministry of Justice, 2010).

ASPD is categorised as a pervasive pattern of disregard for and violation of the rights of others, present since the age of 15, and accompanied by at least 3 specified characteristics, for example, antisocial behaviour, deceitfulness, impulsivity and a lack of remorse (American Psychiatric Association, 2000)[8]. The disorder is also termed psychopathy, sociopathy or dissocial personality. This diversity of labels reflects a broad definition that may contain a range of presentations. In an analysis of forensic populations, Hare (1991) identified two psychometric factors within the construct of psychopathy: affective and interpersonal traits such as callousness and deceit; and, impulsive and antisocial aspects. Hare's analysis not only recognises the antisocial manifestation but also points to emotional dysregulation in relationships and the exploitative nature of people with ASPD. This interpersonal and emotional orientation, combined with the typical behaviours of ASPD, sets out a possible framework for the potential benefits of psychological therapy.

There are a number of overlapping models seeking to explain anti-social and violent behaviour in psychopathy. The low fear hypothesis (Lykken, 1995) is based on a diminished capacity for emotion. The Response Modulation model (Patterson & Newman, 1993) points to attentional deficiences in processing emotional

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[8] Diagnostic and statistical manual of mental disorders (Revised 4th ed.) (DSM).

information. In his impaired violence inhibition model, Blair (2001) suggests a disorder of emotional empathy based on a defective amygdala and reduced recognition of fear. These theories point to certain neural pathways to explain the basis for antisocial behaviour. The amygdala is important for the emotional content of memories and for learning on the basis of reward or punishment (Ward, 2006); the detection of fearful stimuli is essential for this and regarded as particularly impaired in these theories. Shamay-Tsoory et al (2010) implicate the orbitofrontal cortex as the main neural area explaining antisocial tendencies. They suggest that the difficulty lies in the abilty to integrate emotional and mindreading processes for which the orbitofrontal cortex's executive functioning, including attention, comprehension and the integration of information, is crucial. Blair (2005) expanded his model by proposing an Integrated Emotions System (IES). This placed impaired amygdala functioning at the root of psychopathic characteristics and an impaired orbitofrontal cortex as partly explaining impulsive and aggressive behaviour.

All of these models of ASPD point to disruption in recognising or responding to other's emotional states and some also highlight possible cognitive impairments. Another model that brings together emotional and cognitive aspects is mentalization, which emerged from thinking about people with Borderline Personality Disorder (BPD) and was broadened out to include ASPD (Bateman & Fonagy, 2008). Mentalization is the way people make sense of their social world by imagining their own and others' mental states, including beliefs, intentions, emotions and motivations (Fonagy, 1991). It describes a complex understanding of oneself and others, which requires a stable sense of self as well as interpersonal abilities.

Mentalization as presented by Fonagy (1991) derives from developmental thinking that recognises the vitality of attachment relationships whereby the caregiver's reflective position stimulates the growth of mentalizing capacity in the child. In a secure attachment (Bowlby, 1977), the carer models emotional regulation as well as helping to mirror the baby's feelings, thereby aiding the experience and

comprehension of emotions. This process provides experience of understanding one's own mind and the existence of another mind (Fonagy, Steele, Steele, Moran, & Higgitt, 1991). Conversely, a disorganised attachment history makes certain people vulnerable to mentalization deficits and certain social situations add risk to the antisocial expression of that impaired interpersonal understanding. Crucially in the Bateman and Fonagy model (2008), this impaired mentalization is triggered as a temporary retreat to the coping mechanism used during the original development of attachment; usually, shutting oneself off from considering the other person's mind. It is hypothesised that this brief loss of the ability to mentalize is triggered by current threat to the self.

A strength of the mentalization model is that it includes difficulties that people with ASPD have in relation to others as well as a diminished sense of self-worth. This fragile sense of self is at the root of complementary theories of antisocial and violent behaviours. For example, it has been suggested that feelings of worthlessness may be activated by feelings of shame, leading to a sense of humiliation that can only be dealt with by the violent humiliation of others (Gilligan, 1996; Stuewig & Tangney, 2007). The mentalization model may also be contrasted with the previous group of ideas that tend towards an explanation that assert a biological impairment. Whilst the mentalization model can also be described in terms of neural pathways, it places this in the context of the plasticity of the brain, the influence of social and environmental risks and indicates a possible role for psychosocial interventions.

Research into people with ASPD has been inconsistent with only a few patterns emerging. The main measures applied have been for Theory of Mind (ToM) or Emotional Intelligence (EI), although umbrella descriptions such as social cognition or mentalizing are also used. ToM is the abilty to understand and predict one's own and other's attributions and intentions (Premack & Woodruff, 1978).

Emotional Intelligence refers to the expression, understanding and regulation of emotion (Mayer, Caruso, & Salovey, 1999).

Tests of ToM have not indicated a purely cognitive impairment in people with ASPD to identify intentions, states of mind or the fact someone else may believe something that is in fact untrue (false belief tasks) (Richell et al., 2003; Blair, 2005). On the other hand, some evidence has been found relating to the mispercepton of others (Widom, 1976) and to subtle impairments in a higher level (faux pas) ToM task (Dolan & Fullam, 2004). 'Faux pas' tasks require empathic understanding as well as cognitive appreciation of the difference between the listener's and the speaker's knowledge. Shamay-Tsoorey and colleagues (2010) found impairments in 'affective ToM' but not in 'cognitive' ToM, the difference being that the former required participants to think about affect. Studies with child and adolescent conduct-disordered populations have been mixed, two studies showed impairment in hard to manage preschoolers (Happe & Frith, 1996; Hughes, Dunn, & White, 1998) and others found no differences (Sutton, Smith, & Swettenham, 1999; Sutton, Reeves, & Keogh, 2000).

The results of facial emotion EI tests have also been inconsistent but have tended towards an impairment in recognising specific negative affects. For example, deficits have been found in recognising sad faces (Hastings, Tangney, & Stuewig, 2008; Dolan & Fullam, 2006; Blair, Colledge, Murray, & Mitchell, 2001), fearful faces (Blair et al., 2001; Montagne et al., 2005) and expressions of anger and disgust (Jones, Forster, & Skuse, 2007). Other studies have also found impairments in the recognition of emotion (e.g. Dolan et al., 2004). However, other studies have found no impairments (Glass & Newman, 2006). Interestingly, a method which differentiated types of psychopaths found that callous and unemotional traits were positively correlated with accuracy of perception of fearful faces and positive emotion, and negatively associated with negative emotion, while impulsive and

antisocial traits were not related to emotional recognition or positive emotion, but positively associated with negative emotion (Del Gaizo & Falkenbach, 2008).

Self-report EI questionnaires have also revealed differences within the psychopathy dimension. The callous unemotional sub-type gave less attention to affective information, whilst the impulsive antisocial type had difficulty inhibiting emotions (Malterer, Glass, & Newman, 2008). Another self report method showed differences between low and high anxiety psychopaths with the latter showing a deficit in EI (Vidal, Skeem, & Camp, 2010)

There are several important conclusions from this research in respect of the current study. Firstly, regarding the various models, there is some support for a deficit in the recognition of fear and possibly some other negative affects, in line with the amygdala or reward-based theories. Criminality or antisocial personality may be associated with a deficit in the recognition of aversive cues in others. Although, this has also been conceptualised as a deficit in non-verbal emotional processing (Shamay-Tsoory, Harari, Aharon-Peretz, & Levkovitz, 2010). There seems to be some impairment in the more sophisticated ToM/EI ability to integrate emotional and mindreading processes.

Secondly, most of the research has concentrated on samples of serious offenders in prison who meet the Hare Psychopathy Checklist (1991). People who meet ASPD criteria but who are not in this 'psychopath' sub-type have been poorly researched. An exception was the Dolan & Fullam study (2004) which discriminated between psychopathic and non-psychopathic sub-groups of ASPD and found that only the latter were impaired in their recognition of basic emotions. This study suggests that important differences may have been lost at a general diagnostic level or by too great an emphasis on the callous unemotional low anxiety (Psychopath) group.

Thirdly, there is a lack of clarity with what the various research tasks are measuring. At the more demanding level, it is hard to distinguish between a ToM

and an EI task as the abilities seem to need to work together. Constructs such as ToM, EI and empathy are complex and the underlying processes are not fully understood. Blair distinguishes emotional empathy and cognitive empathy, with the latter being akin to ToM (2005). It may be that in areas of sophisticated social functioning, the conceptual separation of emotional processing in the limbic system and the frontal lobe's higher level cognitive networks is unhelpful. In examining higher order ToM tests, Stone et al (1998) suggest that ToM inferences require emotional understanding; while "hot" aspects of ToM require the amygdala and the orbito-frontal cortex for people to appreciate others' actions and intentions. Fourthly, and arising from the last point, differences that do exist will only be identified by tests that are relatively demanding and are appropriate for an able population.

Fifthly, some of the studies suggest that the apparent inconsistency in test results at the level of the psychopath construct may be hiding other differences. For example, there is some evidence that there are differences between those: with high or low anxiety levels; or, those who are impulsive versus those who are more detached and controlled. These factors may explain differences in mentalization performance.

Arising from this review of the research, the study was designed to examine relative mentalization capabilities in a community sample of offenders with varying degrees of ASPD. Mentalization was deemed the most appropriate measure as its breadth is a strength when it comes to examining abilities to 'read' the minds of oneself and others. ToM and EI emphasise the cognitive and affective components as being more separate than is helpful. The assessment needs to be able to consider the two in harmony – the ability to "think and feel about thinking and feeling" (Allen, Fonagy, & Bateman, 2008). In recognition of the need to integrate these cognitive and affective aspects, mentalization was adopted as a way of conceptualising and assessing differences in this study. However, the disadvantage is that there is no current valid single assessment tool for mentalization (Choi-Kain &

Gunderson, 2008). A variety of tests were selected for their validity in assessing differences across able populations and covering the basic dimensions of mentalization (Allen et al., 2008) (for detail, see the literature review for this thesis). This includes the ability to: (a) 'read' others minds and body language as to their intentions; (b) take a perspective on oneself in relation to others; and, (c) comprehend both affective and cognitive aspects of oneself and others.

In summary, there are inconclusive results and remaining questions around the ability of people with ASPD to mentalize. By concentrating on the psychopathic groups, research has largely involved those who are unemotional and callous, missing those who are more disinhibited, impulsive and perhaps higher in anxiety. It might be formulated that this latter ASPD sub-group are more susceptible to the risks of transitory mentalization impairments as described by Bateman and Fonagy (2008). They may be more amenable to treatment and further investigation in this area would therefore have clinical application, particularly with such interventions as Mentalization Based Therapy, Dialectical Behavioural Therapy and Cognitive Behavioural Therapy. In the area of personality disorder, these treatments have demonstrated improvement in people with BPD. Indeed, Paris (1997) has conjectured that BPD and an emotional variant of ASPD are the same disorder; the former particularly applied to women and the latter to men. This strengthens the justification for research into how these therapies might help with ASPD.

This study assessed mentalization impairments in a community sample of offenders. The principle hypothesis was that the greater the degree of ASPD, the greater would be the mentalization impairment as measured across a battery of computerised tests. A second prediction was that, when applying a variable 'stress' condition ('shame in relation to others') aimed at triggering emotional arousal, mentalization difficulties would become even greater.

**2. Method**

**2.1 Design**

This was a correlational study using a cross-sectional design. Participants completed a series of self-report questionnaires and computerised tasks.

**2.2 Participants**

Eighty-two male participants, aged between 18 and 72 years, under license conditions following a convicted offence were recruited from local probation services in West and NW London. Assessment took place in 5 locations: Probation Office A (n=20); Probation Office B (n=31); Hostel C (n=18); Hostel D (n=5); and, Day Centre E (n=8).

**2.3 Procedure**

The NW London Research Ethics Committee 2 approved the study (Appendix B1). Participants were recruited via Offender Managers making referrals from their caseload. They were requested to refer a cross-section of their clients, excluding people with a known learning disability or current severe mental health problem. A self-report screening form was used to identify other characteristics being controlled for, including severe head injury and current use of psychotropic medication. Written informed consent was obtained from all participants (Appendix B2). A battery of measures and tests was completed via individual appointments in an interview room in the local London Probation Trust premises.

This battery comprised the following measures:

a) Personality: the Antisocial Personality Questionnaire (APQ; Blackburn & Fawcett, 1999 ); the Personality Assessment Inventory for ASPD and Borderline Personality Disorder (PAI; Morey, 1991).

b)  Mental Health: Brief Symptom Inventory for Axis I disorders (BSI; Derogatis & Melisaratos, 1983) was administered to ensure anyone with a current severe mental health problem was excluded.

c) IQ: the Wechsler Test of Adult Reading was administered as a proxy measure of intellectual function.

d) Mentalization: The Perspectives Task (Dumontheil, Apperly, & Blakemore, 2010) was always first. For a random 50% of the sample, this was followed by a stress condition (Goss, Gilbert, & Allan, 1994), and then everyone went on to the next step. The order of the remaining two mentalization tasks was random and balanced; either, the Movie for Assessing Social Cognition (Dziobek et al., 2006) followed by the Mind in the Eyes (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) or the reverse. This was to avoid possible 'order' effects between these two tests due to exhaustion or frustration.

All these tasks were completed in a single session of about 2 hours duration excepting one person who attended on two different days. Participants received £10 plus travel expenses for their time.

## 2.4 Measures of Personality, Mental Health and Intellectual Functioning.

### a) Antisocial Personality Questionnaire (APQ) (Blackburn et al., 1999) .

Antisocial Personality was assessed using this 125 item multi-trait self-report inventory which measures cognitive, affective and behavioural dispositions of relevance to offender and antisocial populations. The measure provides 8 basic scales (self-control, self-esteem, avoidant, paranoid suspicion, resentment, aggressive, deviance, extraversion) and 2 factor scores (impulsivity, withdrawal), for which the reliability (Cronbach's alpha) ranges from 0.77 to 0.87 suggesting satisfactory internal consistency. The scales differentiate the mentally disordered offender and normal groups ($p < 0.001$).

The measure provides a raw score and a T-score for each scale. For the purpose of analysis, this instrument provided the following measures:

i) APQ ASPD: Three of the scales (*Resentment, Aggression and Deviance)* can be grouped to measure antisocial personality disorder with their validity confirmed through correlation with the MCMI-1 antisocial personality category items: resentment (.37), aggression (.41) and social deviance (.21). This measure of ASPD was created in line with the manual by aggregating the three factors. This summed value provided a Cronbach's Alpha of .874 and the analysis showed that if any of the three factors were taken away, this value would reduce.

ii) APQ ASPD Group: The 2 factor scales can be combined into 4 profile patterns of antisocial personality: (a) primary psychopath – highly extraverted, dominant, aggressive, impulsive, mistrusting, showing deviant behaviour and untroubled by anxiety; (b) secondary – different form the primary group by being socially anxious, submissive lacking in self-esteem and very vigilant to threat; (c) controlled – overcontrolled, extraverted, self-accepting and denying mistrust or suspicion; (d) inhibited – similar to controlled except being introverted, withdrawn and reporting social deviance.

**b) Personality Assessment Inventory (PAI) (Morey, 1991)**.

The PAI measure contains ASPD and BPD subscales. The antisocial component taps into three facets of the syndrome. *Antisocial Behaviours* corresponds to conduct problems that characterise the DSM definition of the ASPD. *Egocentricity* includes the self-centredness and narcissism often thought to lie at the core of the psychopathic disorder. *Stimulus-Seeking* involves a tendency to seek thrills and excitement and low boredom tolerance.

The borderline sub-scale covers four elements. *Affective Instability* describes rapid and extreme mood swings. *Identity Problems* refers to having little sense of purpose, typically including a feeling of emptiness. *Negative Relationships* includes a history of ambivalent, intense or unstable relationships, often accompanied by feelings of resentment or betrayal. *Self-harm* describes people who are impulsive in

areas where negative  consequences are likely such as sex or substance misuse and high scorers report increased risk of self-mutilation or suicide.

Studies have shown these subscales to be reliable and valid (Morey, 1991). In terms of external validity, the antisocial sub-scale correlates with the Hare Self-Report Psychopathy Scale (.82) and both the antisocial and borderline scales correlate with the respective MMPI scales (antisocial: .60; borderline: .77)[9]. The raw score is converted into a T-score, which is intepreted as follows: Antisocial scale: (a) 60-69T: somewhat impulsive and a risk-taker, increasingly self-centred, sceptical and unsympathetic to others in interpersonal relationships towards the upper end; (b) above 70T: likely to be impulsive and hostile, to have a history of antisocial acts and to be seen by others as beng exploitative in relationships; (c) above 82T: prominent features of ASPD.

**c) London Probation Trust Offender Assessment System (LPT OASys): ASPD dataset.**

The LPT OASys contains a 9 item ASPD dataset derived from professional assessment of offender behaviour and history to assist in risk management. The dataset is comprised of: number of court appearances before the age of 18; use of violence or coercion; excessive use of violence; recognition of the impact on the victim; over-reliance on family for financial support; manipulative or predatory lifestyle; recklessness or risktaking behaviour; childhood behavioural problems; impulsivity; and, aggressive or controlling behaviour. This rating provided a behavioural measure of ASPD as an externally rated alternative to the self-report questionnaires. The following measures were used in this analysis:

i) The LPT use definitions of: (a) *Low* ASPD, where less than 5 of the above items are scored; (b) *Moderate* ASPD, where 5-6 items are scored; and (c) *Severe* ASPD where 7+ items are scored.

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[9] All validity correlations for PAI with College Student  samples.

ii) For the purposes of this analysis, a *LPT ASPD Behaviour* measure was created in two stages. Firstly, the 9 items were converted where necessary so they were all binary scores. This 9-item dataset had a Cronbach's Alpha of .59, which was improved by extracting 3 factors (recognition of impact, court appearances before the age of 18 and excessive violence) leaving a more reliable set of 6 factors[10] (Cronbach's Alpha = .68). Next, these items were used to create a dichotomous variable with a low ASPD group (n=39) and a high ASPD group (n=43). This became the behavioural measure of ASPD (*LPT ASPD Behaviour*).

**d) Brief Symptom Inventory (BSI) (Derogatis et al., 1983).**

The BSI is a 53 item self-report symptom inventory, which identifies the status of psychological symptoms over the last seven days. Nine factors of mental health are measured by the BSI and a Global Severity Index score, Positive symptom total score, and Positive Symptom Distress Index score (all expressed as T-scores). Internal consistency coefficient alphas for the nine symptom dimensions range from .71 for Psychoticism, to .85 for Depression. The test-retest reliability coefficient is .91 for the Global Severity Index over a 2-week period. The BSI is also normed on four gendered groups, including adult psychiatric inpatients, adult psychiatric outpatients and adult non-patients, therefore providing suitable norms for the participants in the current study.

**e) Wechsler Test of Adult Reading (WTAR, Wechsler, 2001).**

This reading test is composed of a list of 50 words that have atypical grapheme to phoneme translations and was used to assess participant's level of verbal intellectual functioning. Unlike many intellectual and memory abilities, reading recognition is relatively stable in the presence of cognitive declines associated with normal aging or brain injury. It is normed with the Wechsler Adult Intelligence Scale

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[10] 6 item OASys dataset used to form behavioural measure of ASPD: offence involving threat or violence; over-reliance on others for financial support; manipulative or predatory lifestyle; reckless/risk taking behaviour; impulsivity; aggressive or controlling behaviour.

(WAIS-III). It has excellent internal consistency with Pearson correlation coefficients ranging from 0.87 to 0.95 for the UK sample. The test-retest coefficients indicate a high degree of temporal stability in a range (0.90 to 0.94) consistent with the internal consistency coefficients. The raw score (0-50) can be converted to an estimated verbal IQ, (depending on age: mean IQ=100, sd=15).

**Mentalization Tasks**

**f)The Perspective Taking Test (Dumontheil et al., 2010).**

This computer simulated task was written in E-Prime 2.0 (Psychology Software Tools, Inc.) and presented on a laptop. Participants are read instructions (Appendix B3) and are presented with a 4x4 set of shelves with 8 of the compartments containing a different object and receive an auditory instruction to move an object using the computer mouse (see Figure 1 below).

**Figure 1**

**Illustration of Perspectives Task**
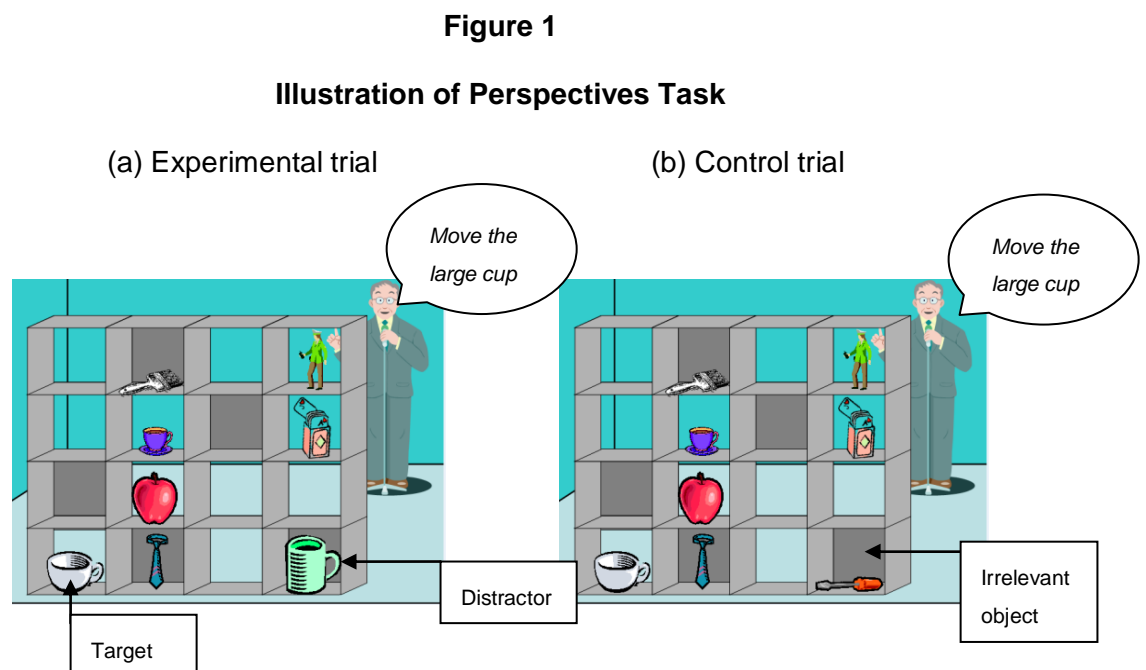


**Figure 1** Example of an Experimental (a) and a Control trial (b) in the Director condition. The participant heard the verbal instruction: "Move the large cup up" from the director. In the experimental trial, if the participant ignored the director's perspective, he would choose the distractor cup (large mug), which is the largest cup on the shelves but which cannot be seen by the director, instead of the smaller cup shared by both the participant's and the director's perspective (Target). In the Control trial (b), the irrelevant object (screwdriver) replaces the distractor item.

In the *Director* condition, 5 of the compartments are closed at the back and could not be seen by the director who stands behind the shelves and gives the instructions. Participants were told to take into account what the director could see when deciding how to respond. Sixteen shelf-object configurations were shown sequentially, each with 3 instructions. Of the 48 trials: 8 were experimental trials where the participant was tested in their ability to take the perspective of the director into account rather than moving the 'distractor' object which was invisible to the director and would have reflected an egocentric bias; 8 were control trials with an identical shelf arrangement but with an irrelevant 'distractor' object; the other 32 were fillers. In the *No-Director* condition, participants were told that the director had gone and they would hear instructions to move objects again and that these only referred to the objects in the clear slots and to ignore objects in those with grey backgrounds. Other than this it was identical to the *Director* condition in terms of the number of trials, how they were counterbalanced and the mix of experimental, control and fillers. Each stimulus lasted 2.2 seconds and participants had 3.6 seconds to respond. They were told to respond as quickly and accurately as possible. Each condition lasted 5.5 minutes. Participants are measured for their accuracy and their speed (where they are accurate) in a repeated measures design by condition (Director/No-Director) and trial type (Experimental/Control).

This task requires participants to use information about the Director's perspective in order to interpret instructions and respond appropriately by inhibiting their egocentric bias. Both conditions require a mixture of executive functions. In addition, the Director condition also requires level-1 perspective taking, the ability to represent what another person can see. This ability is a core component of internal mentalizing since, to predict and explain another person's behaviour, people make inferences about their knowledge or beliefs on the basis of their visual access.

The measure has shown to be sensitive to differences in performance between the conditions ($p<.001$) and the trial types ($p<.001$) across different age

groups (*p<.001*). It is sufficiently challenging for adults with no floor or ceiling effects found in previous studies with normal populations.

The outcome measures for this instrument are: (a) Director condition experimental errors (%); (b) Director condition control errors (%); (c) No-Director condition experimental errors (%); (d) No-Director condition control errors (%); (e) Director condition experimental response time (milliseconds) (RTms); (f) Director condition control RTms; (g) No-Director condition experimental RTms; and, (h) No-Director condition control RTms.

**g) The Movie for the Assessment of Social Cognition (MASC; Dziobek et al., 2006).**

The MASC was administered by the researcher who controlled the laptop presentation of the test's slides and video clips put together on Microsoft Powerpoint. The testing starts with a slide instruction that the participant is going to watch a 15 minute film and he should try to understand what the characters are feeling and thinking. The tester navigates through several slides containing instructions and then through the entire test using the mouse or space bar. As part of the first slides, the four characters are introduced in the form of photographs and names. After that, participants are instructed that the film shows these four people getting together for a Saturday evening and that the movie will be stopped at various points and questions will be asked. Participants are informed that the film has been dubbed and told to try to imagine what the characters are thinking or feeling at the very moment the film is stopped.

Following the instructions, the 43 video segments are presented, each followed by a question in the same format followed by four possible answers (see Figure 2 below). Participants are instructed to tick the answer they think is closest to their understanding on a multiple choice answer sheet. Administration of the MASC took between 25 and 40 minutes as participants were not put under a time constraint. The video is paused 43 times and 45 questions are asked concerning the

characters' intentions (19), feelings (18), and thoughts (8), plus 6 control questions where no mentalization is required.

**Figure 2**

**Multiple Choice Format in the MASC.**
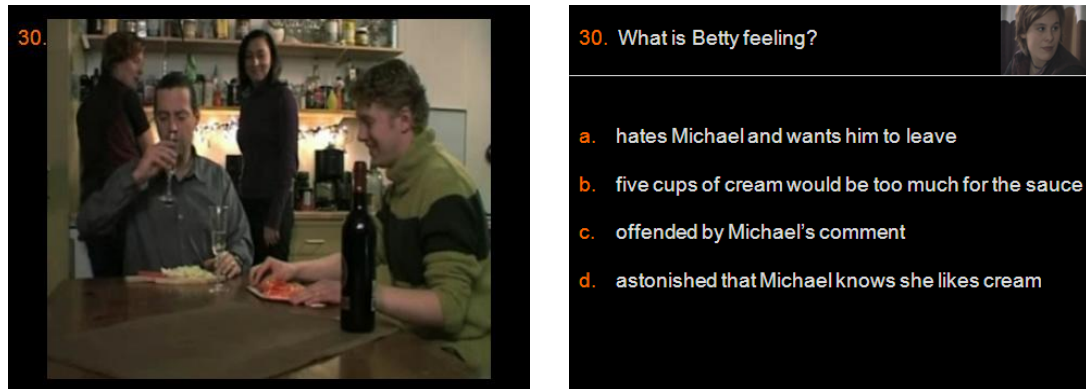


**Figure 2** presents an example of a multiple choice question in the MASC. Michael has just said to Betty (photo inset on answer slide): *"I bet if it was left to you, you'd go for 5 cups of cream, right?"* (Sandra has just said that the recipe requires 2 cups). Unknown to the participant, the four possible answers represent different degrees of mentalization: (a) excessive mentalization; (b) no mentalization; (c) correct answer; (d) insufficient mentalization.

The design includes traditional mentalization concepts such as first and second order false belief, deception, faux pas, persuasion, metaphor, sarcasm, or irony. As well as the different mental state modalities categorised above, the emotional valence (3 positive, 13 negative and 2 neutral) varies and approximates the frequency distributions previously considered by others (Ekman & Friesen, 1976). The items varied as to their conversational content, specifically, being either verbal or non-verbal; with the verbal items to be taken literally or not literally (those containing figurative speech and other aspects of pragmatics) and the non-verbal category providing items to assess the recognition of facial expressions, as well as general body language and gestures. Single items could cover more than one domain. The control questions are for memory, general comprehension and attention.

In previous studies the MASC test has proved to be sensitive to social impairments in psychiatric populations such as Autism (Dziobek et al., 2006), Bipolar disorder (Montag et al., 2010), Depression (Wilbertz, Brakemeier, Zobel, Harter, & Schramm, 2010) and BPD (Sharp et al., 2011). The test has good indices of reliability (Cronbach's alpha .84, test–retest reliability .97). However, the interpretation of varying patterns of intercorrelations with other ToM tests remains unclear.

The MASC test has strong face validity and was used in this study to assess affective and cognitive aspects of mentalization. The multiple choice format provides a correct mentalization score (0-45) with sub-divisions of feelings (0-18), intentions (0-19) and thoughts (0-8); correct control responses (0-5); and three different types of mistakes that reflect (a) mental state inferences that are ''insufficient'' (0-45) and (b) ''too excessive'' (0-45) and (c) a non-mental state inferences (i.e., physical causation) (0-45). All of these raw scores were transformed into a percentage for analysis.

**h) Reading the Mind in the Eyes, Revised Version (Baron-Cohen et al., 2001).**

This test involves presenting participants with a series of 36 photographs of the eye region of the face of different actors using a Powerpoint show on a laptop. An equal number of male and female faces were used. Four complex mental states descriptors were typed at each corner of the photograph. One of these words correctly identified the mental state and the other three foils were of the same emotional valence as the target word. Participants are instructed to read all four words and choose one of the four words that best described what the person in the photo is thinking or feeling and tick their choice on a multiple choice answer sheet. A glossary of all the terms used in the test was provided for reference and participants were able to work through the test at their own pace. As a control for facial

recognition and attention, participants were also asked to identify the gender of the person in each photograph (M or F).

**Figure 3**

**Mind in the Eyes Examples**.



**Figure 3** displays 2 of the 36 questions, illustrating the presentation and multiple choice question format. In these examples, the answers are: (6) fantasising/female; (7) uneasy/male.

This 10 minute test is widely used in research and has successfully differentiated mentalization impairments in a number of clinical populations including Autism (Baron-Cohen et al., 2001), Schizophrenia (Schimansky, David, Rossler, & Haker, 2010), brain injury (Stone, Baron-Cohen, Calder, Keane, & Young, 2003) and sex offenders (Elsegood & Duff, 2010). In the original study, a one-way ANOVA comparing the 4 groups on the revised Mind in the Eyes task revealed a significant main effect of group, $F(3,250) = 17.87$, $p = 0.0001$. The answers have been subjected to a consistency check so that the target word was identified at least 50% of the time and the foil word no more that 25% of the time. The test does not show floor or ceiling effects. In this study, the measure was used to assess the external dimension of mentalization and both cognitive and affective impairments.

**i) Arousal Condition: Other as Shamer Scale (OAS; Goss et al., 1994)**.

A 'shame arousal' condition was randomly administered to 50% of participants. In this condition, the participant completed the OAS, a 17 item questionnaire exploring expectations of how others see or judge the self. It has three factors: Factor I relates to being seen as 'inferior' (7 items). Factor 2 relates to what might be called 'emptiness' (4 items). Factor 3 consists of items which ask "how others behave when they see me make mistakes" (6 items). The scale was developed as the 'external' version of the Internalised Shame Scale (ISS; Cook, 1988). A significant correlation was found between the ISS and the OAS ($r = 0.81$). The study supported the view that shame involves self-evaluations ("I am ...") and beliefs about how others see the self ("They see me as ..."). It has been shown that how one sees others as judging the self is highly related to self judgments; in other words, self and other's judgments of self are highly correlated (Goss et al., 1994).

The researcher administered this task by saying: "*most people feel a level of embarassment, self-consciousness or shame at some time...could you think about your life over the last 12 months and then hold those thoughts in mind as you answer the following questions*". When the questionnaire was completed, the participant would be asked how they were feeling. This protocol was tested in a pilot and found to increase self-reported anxiety on a Likert-type scale (*t(6)=-2.83,p=.03*)[11].

**2.5 Other Sources of Data**

As well as the ASPD dataset, the LPT OASys provided demographic data (date of birth, ethnicity) and a tiered rating of risk to the public[12]: Tier 1 – low risk of harm; Tier 2 – medium to low risk; Tier 3 medium to high risk; and, Tier 4 – very high and high risk.

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[11] Paired samples t test.
[12] Tiering as defined in London Probation Tiering Guidance is based on PC08/2008 "National Rules for Tiering Cases and Associated Guidance". *"Tiering is about the level and type of intervention that will be deployed in managing a case. As such it is principally, but not exclusively, guided by the sentence imposed by the court as well as the level of risk and offender need/complexity of the case."*

## 2.6 Sample size and Statistical Power

Power analysis for this study was informed by prior work by Dolan and Fullam (2006). In this study the Faux Pas task (Stone, Baron-Cohen, & Knight, 1998) was used with people with ASPD, and found an effect size of d=0.89 (large). Assuming equal group sizes, power calculation was carried out using the "G*Power 3" computer program (Faul, Erdfelder, Lang, & Buchner, 2007) specifying $\alpha$=5% and desired power = 80%. For a comparison between 2 groups, the required sample size was estimated at 42 (2 groups of 21). The achieved sample size was 82.

## 2.7 Data Analysis

Scores on completed questionnaires and answer sheets from the *MASC* and *Mind in the Eyes* Tests were manually entered in an SPSS 18.0 database together with information collected from OASys. The results from the *Perspectives* Test were collected automatically as part of the E-Prime programme. These were exported to an Excel spreadsheet and the key outcome variables calculated for each participant and then transferred to the SPSS database.

To adjust for individual differences in overall task difficulty and for the confounding influence of strategies (e.g. rates of guessing answers), the differences in correct response rates for mentalizing and control items were calculated as a proportion of total correct scores. Adjusting for the overall likelihood of correct responses made no difference in two of the three mentalzing tests (*MASC* and *Mind in the Eyes*) but did affect scores on the *Perspectives* Test, probably because it demands considerable visio-spatial skills in addition to mentalizing competance. Individual differences on the former would have swamped variablity in terms of mentalizing without correcting for differences in this capacity. Therefore, for the *Perspectives* output measure, the fraction of the total number of accurate scores for each individual was used as the data point for that person[13].

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[13] The corrected Perspectives Test outcome score calculated as follows: (Director Experimental Errors-Director Control Errors)/(Director Experimental Errors+Director Control Errors).

A preliminary scan of the data confirmed the experimental impression that the shame condition was not sufficiently evocative to yield an effect and there were no differences in the performance of participants in the two conditions on any of the mentalization measures. Following a preliminary statistical test confirming homogeneity of distributional properties the groups were therefore combined into a single group of 82.

The combined data were checked for normality using visual analysis of histograms and statistical tests of skewness and kurtosis. Parametric tests were used where the measure met common standards of normality. Non-parametric tests were only required for the more arbitrary Probation ASPD behavioural measure, which did not meet criteria for normal distribution.

T-tests, correlational and regression analyses were used to test the hypotheses in the following steps:

Step 1: A comparison of the sample's average performance on measures of mentalization with published results from other studies based on normal and offender/personality disordered samples;

Step 2: A correlational analysis of the ASPD variables with each of the mentalization tests;

Step 3: Reconsidering significant associations whilst controlling for possible influence from variables such as age, IQ (WTAR), mental health severity (BDI GSI), BPD, ethnic origin;

Step 4: A logistic regression was used to assess the predictive value of mentalization performance on Probation ASPD outcome variable;

Step 5: A multivariate backwards stepwise regression analysis was used to assess the predictive value of the mentalization measures in relation to the self-report ASPD outcome variables.

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## 3. Results

### 3.1 Descriptive Statistics

Table 1 presents a demographic profile of the participants.

**Table 1**
**Demographic Information (N=82)**

| Variable | Mean(s.d) | Range |
|---|---|---|
| Age (years) | 33 (10.9) | 18-72 |
| Education (years after age 7) | 9.7 (2.5) | 3-21 |
| IQ (WTAR)<br>Population mean = 100 (15) | 91.6 (17.5) | 50-123[a] |
| Mental Health Severity Index<br>(GSI)   (T-score) | 59.5 (14.6) | 34-80 |
| | **%** | |
| Ethnicity (%) | | |
| *White* | 39% | |
| *Black* | 31% | |
| *Asian* | 21% | |
| *Mixed* | 2% | |
| *White other* | 7% | |

[a] 10 participants (12%) scored 70 or less. This indicates a learning disability. However, as a result of reservations regarding the WTAR for this population, the Learning Disability record on the OASys was used for this screening. All these participants were kept in the study.

Participants had a mean age of 33, ranging from 18 to 72. They had a mean of 10 years in education after age 7 and their mean estimated IQ (WTAR) was in the low average range at 91.6. The mean overall level of mental health difficulties reported (General Severity Index of the Brief Symptom  Inventory) was 59.5 which indicates a high level of mental distress (84th percentile) compared with a general male population (Derogatis et al., 1983). The ethnic diversity of the sample is consistent with that found in the boroughs where the research took place with the three main ethnic groups of White, Black Afro-Carribbean and Asian each representing between 20-40% of the sample.

Table 2 shows how the sample compares with the London-wide offender profile.

**Table 2**
**Comparison of Sample and London Offender Profile[14]**

|  | This Study (N=81[a]) | London (N=18,110) |
|---|---|---|
| **Risk Tier** |  |  |
| *Level 1 – Low risk* | 0% | 2% |
| *Level 2 – medium to low* | 16% | 22% |
| *Level 3 – medium to high* | 42% | 59% |
| *Level 4 – very high & high* | 42% | 14% |
| **Use of violence/ aggression in crime** |  |  |
| *Yes* | 51% | 43% |
| *No* | 49% | 57% |

[a] This information was not available for one of the participants.

The sample distribution for level of risk differs significantly from the London Offender Profile *($\chi^2$(3)=52.3, p<0.0001)*. Proportionally, the sample was comprised of three times as many offenders assessed as being in the "high and very high" risk tier category compared with the London-wide picture. The sample also included a higher proportion of offenders convicted of a crime that included violent or aggressive acts although this was not significant *($\chi^2$(1)=2.12, p=0.15)*. The higher risk ratings represented by the sample are in line with the recruitment strategy which aimed to find offenders more likely to have ASPD characteristics. High risk hostels were targetted and the briefing to Offender Mangers, who were instrumental in referring offenders, gave this aim (Appendix B4).

Table 3 presents the severity and type of ASPD amongst the sample.

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[14] Source: London Probation Trust Research Department from OASys.

**Table 3**
**ASPD Characteristics (N=82)**

| ASPD Measure | | Score (sd) |
|---|---|---|
| Self-report: | APQ ASPD | |
| Antisocial Personality | (Mean T-score/sd) | 58.3 (9.9) |
| Questionnaire | | |
| (Blackburn et al., | ASPD Group: | |
| 1999) | *Primary* | 54% |
| | *Secondary* | 9% |
| | *Controlled* | 31% |
| | *Inhibited* | 7% |
| | | |
| Self-report: | PAI ASPD | |
| Personality | Mean T-score/sd | 65 (12.9) |
| Assessment Inventory | >60 (ASPD features) | 65% |
| (Morey, 1991) | >70 (ASPD) | 24% |
| | >82 (Prominent ASPD) | 12% |
| | | |
| London Probation | *Low ASPD* | 48% |
| Trust -LPT  ASPD | *High ASPD* | 52% |
| Behavioural measure[a] | | |

[a] This is the binary measure created from the main LPT ASPD categorisation for analytical purposes.

The two self-report measures indicate high levels of ASPD in the sample. The APQ mean of 58.3 compares with normative data with 50 as the mean (s.d=10). The PAI shows a mean score of 65 with 65% having individual scores over 60, which indicates features of ASPD such as being impulsive, a risk-taker, increasingly self-centred, sceptical and unsympathetic to others in interpersonal relationships. The APQ categorises types of ASPD and the two main groups found in the sample were *primary psychopaths* (highly extraverted, dominant, aggressive, impulsive, mistrusting with a history of deviant behaviour and conflict in relationships, who are relatively untroubled by anxiety of self-criticism) and *controlled psychopaths* (overcontrolled, conforming, sociable, extravert, self-accepting and denying interpersonal mistrust or suspicion). Both these categories are relatively outgoing

and low on anxiety compared with others and the main difference is that the *primary* group are more impulsive.

As noted, a variety of measures of ASPD were used in the study and Table 4 assesses their relationship based on Pearson's correlations.

**Table 4**
**Correlation of ASPD Measures (N=82, unless otherwise stated)**

|  |  | APQ ASPD | APQ Group | PAI ASPD | LPT ASPD[a] | LPT Risk Tier[b] |
|---|---|---|---|---|---|---|
| APQ ASPD | Pearson's Corr | | .629** | .605** | -.016 | -.023 |
|  | Sig. (2-tailed) | | .000 | .000 | .889 | .839 |
| APQ Group | Pearson's Corr | .629** | | .350** | .061 | .022 |
|  | Sig. (2-tailed) | .000 | | .001 | .583 | .845 |
| PAI ASPD | Pearson's Corr | .605** | .350** | | .143 | .022 |
|  | Sig. (2-tailed) | .000 | .001 | | .199 | .846 |
| LPT ASPD[a] | Pearson's Corr | -.016 | .061 | .143 | | .452** |
|  | Sig. (2-tailed) | .889 | .583 | .199 | | .000 |
| LPT Risk Tier[b] | Pearson's Corr | -.023 | .022 | .022 | .452** | |
|  | Sig. (2-tailed) | .839 | .845 | .846 | .000 | |

[a] This was derived from the LPT behavioural measure of ASPD and calculated for reasons of statistical reliability (see Data Analysis section).
[b] N=81 as this information was not available for one of the participants.
** Correlation is significant at the .01 level (2-tailed)

The two self-report measures (APQ and PAI) were closely correlated (*p<.001*) which is reassuring as they have both been validated against other, albeit different, measures of ASPD. The two measures taken from the LPT information system were also closely correlated (p<.001), which helps to validate the use of the LPT ASPD as a variable to measure ASPD. However, the self-report and behavioural measures do not correlate with each other. At this stage, it was hypothesised that they may be measuring different aspects of ASPD and, as performance on various mentalization measures were available, this possibility could be examined further. Both self-report and behavioural measures of ASPD were therefore retained for analysis.

### 3.2 Pre-Hypothesis Testing of Mentalization Performance

Prior to hypothesis testing, performance in each of the mentalization tasks was compared with results from other studies and these are presented in Table 5-7. Clearly, if mentalization is to be associated with severity of ASPD, then the entire anti-social group in this study should score below the comparator group on this task. Further, the validity of the results for this sample would be strengthened if the instruments can be shown to behave in a similar way in the current sample as in the original investigations where the instruments were standardized.

**Table 5**
**Mentalization Performance in the Perspectives Task Compared**

|  | This Study | Other Study (Dumontheil et al., 2010) | |
| --- | --- | --- | --- |
| **Errors:** | | | |
| Director Control | 8% | Adults[a] | 2% |
| | | Adolescents[b] | 3% |
| Director Experimental | 77% | Adults | 45% |
| | | Adolescents | 60% |
| No Director Control | 8% | Adults | 3% |
| | | Adolescents | 3% |
| No Director Experimental | 28% | Adults | 8% |
| | | Adolescents | 7% |
| More errors in experimental than control condition | $t(81)=24.5, p<0.001$ | $F(1,172)=684, p<.001$ | |
| More errors in the Director than in the No-Director | $t(81)=10.2, p<0.001$ | $F(1,172)=553, p<.001$ | |

[a] Adults (N=36) had a mean age of 22.8 (sd 2.3) and a verbal IQ of 119.5 (sd 15.1).
[b] Adolescents (N=35) had a mean age of 15.3 (sd 1.2) and a verbal IQ of 114.3 (sd 18.7).

Performance in the *Perspectives Task* was in line with the direction of the original study (a normal sample of females), that is, there was a tendency towards an egocentric bias with significantly more errors in the experimental than the control situation and more errors in the Director than the No-Director condition. In terms of the pattern of this tendency, in comparison with different age groups represented in

the original study, this sample had substantially more Director Experimental errors than the adult group and an elevated level of errors when compared to the adolescent group.

**Table 6**
**Mentalization Performance in the MASC Compared**

|  | This Study | Other Studies[a] |
|---|---|---|
| Correct answers | 61.4% (14.3) | 75.74% (7.32) |
| Control answers | 69% (20.7) | 79.5% (18) |

[a] Weighted mean and sd from control groups in 4 studies: (Dziobek, Fleck, Rogers, Wolf, & Convit, 2006, N=17; Montag et al., 2010, N=29; Smeets, Dziobek, & Wolf, 2009, N=16; Wilbertz et al., 2010, N=16).

In the *MASC*, the antisocial sample made significantly more errors than the average of control groups in other studies *(t(122)=-8.01,p<.001)*[15], with only 1% performing at the higher level of the control groups. At the same time, performance in the control condition was not significantly poorer.

**Table 7**
**Mentalization Performance in the Mind in the Eyes Compared**

|  | This Study | Other Studies | Sample (Author) |
|---|---|---|---|
| Correct answers | 21.8 (5.9) | 26.0 (4.2) | Male Controls (N=55)[a] |
|  |  | 26.3 (4.3) | Male Prisoners (N=18) (Richell et al., 2003) |
|  |  | 23.9 (5.3) | Psychopathic male prisoners (N=19) (Richell et al., 2003) |
|  |  | 24.5 (5.8) | Male Child Sex Offenders (N=46), (Elsegood et al., 2010) |
|  |  | 21.9 (6.6) | Autism/Asperger Adults (N=15), (Baron-Cohen et al., 2001) |
| Control answers | 95.4% | Normal adults performed at ceiling in original study. | |

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[15] This is an independent samples t-test and using the Welch-Satterthwaite equation for the df.

[a] This result from the original study (Baron-Cohen et al., 2001) has been regularly replicated in a variety of control groups and analysis has demonstrated that this measure is independent of IQ.

Performance on the *Mind in the Eyes* Task was significantly poorer than achieved by the normal control group in the original study **(t(135)=-4.88,p<.001).** Furthermore, the performance of offenders in this study was not significantly poorer than a general prison population or a prison psychopathic population in another study. This sample obtained a similar score to that achieved by high performing people with autism from the original study.

## 3.3 Hypothesis Testing

<u>Main Hypothesis</u>: the greater the degree of ASPD, the greater will be the mentalization impairment.

A correlational analysis of mentalization performance in relation to measures of ASPD was carried out and is presented at Table 8.

**Table 8**
**Correlation of Mentalization Performance and Measure of ASPD**

| | | APQ ASPD | APQ Group | PAI ASPD | LPT ASPD Behaviour | LPT Risk Tier |
|---|---|---|---|---|---|---|
| **Perspectives Task** | | | | | | |
| Experimental Error Score (corrected[a]) | Correlation | .14 | .00 | .20 | **.35\*\*** | **.20\*** |
| | Sig.(2-tailed) | .223 | .992 | .075 | **.001** | **.038** |
| | N | 81 | 81 | 81 | 81 | 80 |
| **MASC** | | | | | | |
| Correct total | Correlation | .06 | .01 | **-.27\*** | -.05 | .04 |
| | Sig.(2-tailed) | .592 | .919 | **.013** | .640 | .674 |
| | N | 82 | 82 | 82 | 82 | 81 |
| Feelings | Correlation | -.01 | .09 | **-.22\*** | -.03 | .02 |
| | Sig.(2-tailed) | .925 | .436 | **.048** | .761 | .861 |
| | N | 82 | 82 | 82 | 82 | 81 |
| Cognition | Correlation | .11 | .05 | **-.23\*** | -.04 | .05 |
| | Sig.(2-tailed) | .344 | .64 | **.04** | .72 | .57 |
| | N | 82 | 82 | 82 | 82 | 81 |
| Exceeding Mentalization | Correlation | .02 | .05 | .05 | -.02 | -.11 |
| | Sig.(2-tailed) | .888 | .669 | .690 | .896 | .229 |
| | N | 82 | 82 | 82 | 82 | 81 |
| Less Mentalization | Correlation | -.15 | -.03 | .21 | .07 | .00 |
| | Sig.(2-tailed) | .172 | .813 | .057 | .515 | .961 |
| | N | 82 | 82 | 82 | 82 | 81 |
| No Mentalization | Correlation | .03 | -.05 | **.30\*** | .05 | .06 |
| | Sig.(2-tailed) | .781 | .661 | **.007** | .650 | .547 |
| | N | 82 | 82 | 82 | 82 | 81 |
| **Mind in the Eyes** | | | | | | |
| MiE Correct | Correlation | .01 | .01 | **-.27\*** | .01 | .05 |
| | Sig.(2-tailed) | .925 | .963 | **.016** | .958 | .590 |
| | N | 82 | 82 | 82 | 82 | 81 |

Note: Pearson's Correlation used for all ASPD variables except *LPT Risk Tier* for which a Kendall's non-parametric correlation was used.
[a] See Data Analysis section for methodology
\* Correlation is significant at the .05 level (2-tailed)
\*\* Correlation is significant at the .01 level (2-tailed)

This table shows the correlations of measures of mentalization (Perspectives, MASC sub-scales and Mind in the Eyes) with ratings of ASPD. Strong significant correlations ($p<.01$) were found between performance on the *Perspectives Task* and the LPT behavioural measure of ASPD. A significant correlation ($p<.05$) was found between the *Perspectives Task* and the LPT Risk measure. Further significant correlations were found between various sub-scales of the *MASC*, the *Mind in the Eyes* and the PAI self-report ASPD measure. There were no correlations between mentalization tasks and the APQ self-report measure even though the latter corresponded highly with the PAI and both these measures have been externally validated against other similar measures of ASPD.

It is possible that the correlations found between mentalization and ASPD can be explained by other variables such as age, IQ (WTAR), Severity of Mental Health Problems (BSI GSI), Ethnicity and BPD. Partial correlations were carried out whilst controlling for these variables and changes in the coefficients are summarised in Table 9.

**Table 9**
**Correlation of Mentalization Performance and Measure of ASPD after Controlling for Variables**

| Mentalization measure | ASPD measure | Controlling for variables | Revised correlation (significance) |
|---|---|---|---|
| Perspectives Task | LPT Behaviour | Age, IQ, Mental Health, Ethnicity & BPD[a] | .36** (p=.002) |
| | LPT Tier | Age | .20 (p=.078) |
| | | IQ | .20 (p=.072) |
| | | Mental Health | .18 (p=.115) |
| | | Ethnicity | .24* (p=.031) |
| | | BPD | .20 (p=.078) |
| MASC (Correct) | PAI | Age | .24* (p=.035) |
| | | IQ | .20 (p=.075) |
| | | Mental Health | .26* (p=.024) |
| | | Ethnicity | .31** (p=.006) |
| | | BPD | .26* (p=.021) |
| MASC (Feelings) | PAI | Age | .18 (p=.109) |
| | | IQ | .16 (p=.147) |
| | | Mental Health | .22 (p=.059) |
| | | Ethnicity | .23* (p=.038) |
| | | BPD | .20 (p=.08) |
| MASC (Cognition) | PAI | Age | .20 (p=.08) |
| | | IQ | .15 (p=.181) |
| | | Mental Health | .21 (p=.07) |
| | | Ethnicity | .27 (p=.017) |
| | | BPD | .22* (p=.049) |
| MASC (No mentalization) | PAI | Age | .25* (p=.026) |
| | | IQ | .23* (p=.037) |
| | | Mental Health | .28* (p=.012) |
| | | Ethnicity | .30* (p=.006) |
| | | BPD | .25* (p=.025) |
| Mind in the Eyes (Correct) | PAI | Age, IQ, Mental Health, Ethnicity & BPD | .24* (p=.041) |
| | | Age | .25* (p=.027) |
| | | IQ | .20 (p=.07) |
| | | Mental Health | .29* (p=.011) |
| | | Ethnicity | .31** (p=.006) |
| | | BPD | .26* (p=.018) |

[a] The correlations with each of these variables individually was p<.005.
 * Correlation is significant at the .05 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)

The significance of the correlation found between the *Perspectives task* and the LPT ASPD behavioural measure was changed minimally by controlling for all of these variables. However, the other LPT measure of Risk Tier was no longer statistically significantly associated with perspective taking when controlling for most of the variables. The relationship found between the *MASC* and the PAI ASPD reduced so that the only sub-score remaining significant when these variables were controlled was the *MASC "No mentalization"*. IQ was the most common in providing an alternative explanation for the relationship of ASPD severity and mentalizing. The *MASC "No mentalization"* remained significant when examined against each of these variables, although both age and IQ reduced the strength of the correlation. The *Mind in the Eyes* measure no longer reached significance when IQ was controlled. These findings were instructive in specifying the variables to include in the regression analyses at the next stage when unique predictors of ASPD are to be identified. It should be noted that in all cases controlling for possible confounding variables reduced but by no means eliminated the associations observed. The indication is that a larger sample would have yielded significant correlations in all cases.

Before proceeding to a multivariate analysis of the ASPD mentalization association, the relationship between the mentalization measures was examined to ascertain if excessively high correlations between the mentalization variables could cause possible collinearity problems. In fact, the associations between mentalizing scores were modest. There was a significant relationship between the *MASC "No mentalization"* and the *Mind in the Eyes* measures ($r=.46; p<.001$), but no relationship between either of these and the *Perspectives Task*. In the light of the modest associations, the analysis proceeded to identifying the combination of mentalization variables that explained variation in ASPD once the influence of confounding variables was controlled.

Multivariate regression analyses were carried out to assess how well the mentalization measures in combination could predict high or low ASPD. The two ASPD outcome measures that had shown a relationship with mentalization (the LPT behavioural and the PAI self-report scores) were regressed separately. Firstly, direct logistic regression was performed to assess the predictive value of the mentalisation tasks on the severity of ASPD assessed by the LPT measure (*LPT ASPD*) used with offenders in the sample. The model contained the six independent variables (*age, IQ, Severity of Mental Health Problems*, *Mind in the Eyes* Correct score, *MASC no mentalization* score, *Perspectives corrected error* score). As shown in Table 10, two of the independent variables made a unique statistically significant contribution to the model (*Mind in the Eyes Correct score* and *Perspectives corrected error* score).

**Table 10**
**Logistic Regression Predicting Likelihood of ASPD[a]**

| | B | S.E. | Wald | df | p | Odds Ratio | 95% C.I.for Odds Ratio | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Upper | Lower |
| Age | -.02 | .03 | .37 | 1 | .541 | .99 | .94 | 1.04 |
| IQ | -.00 | .02 | .03 | 1 | .865 | 1.00 | .96 | 1.03 |
| Severity Mental Health Problems | -.02 | .02 | 1.07 | 1 | .301 | .98 | .95 | 1.02 |
| MiE Correct | .11 | .06 | 3.83 | 1 | **.050** | 1.12 | 1.00 | 1.24 |
| MASC "no mentalization" | .05 | .05 | 1.20 | 1 | .273 | 1.06 | .96 | 1.16 |
| Perspectives | -4.93 | 1.59 | 9.67 | 1 | **.002** | .01 | .00 | .16 |
| Constant | 3.34 | 2.51 | 1.77 | 1 | .183 | 28.33 | | |

[a.] Dependent Variable: LPT ASPD Behavioural Measure. As this is a binary variable, Logistic Regression was used.

The full model containing all the predictors was statistically significant, $\chi^2(6,N=77)=15.382,p=.017$, indicating that the model was able to distinguish between offenders who were categorised as having 'high' or 'low' ASPD as derived

from the LPT ASPD score at above chance level. The model as a whole explained between 18.1% (Cox & Snell R square) and 24.1% (Nagelkerke R squared) of the variance in ASPD, and correctly classified 70.1% of cases as severe or not.

Multiple linear regression was used to assess the ability of the three mentalization variables to predict ASPD severity as measured by the PAI self-report measure whilst controlling for *Severity of Mental Health Problems, Age* and *IQ*. The only mentalization measure achieving significance when controlling for these other factors was the *MASC "no mentalization"* measure. The results of a three step regression analysis showing the contribution of these variables is presented in the final model at Table 11.

**Table 11**
**Summary of Multiple Regression Analysis for ASPD[a] (N=77)**

| Final Model Variables[b] | B | SE(B) | β | t | Sig.(p) | 95% C.I for B Lower | Upper |
|---|---|---|---|---|---|---|---|
| (Constant) | 73.64 | 5.13 | | 14.35 | .000 | 63.42 | 83.86 |
| Severity of Mental Health Problems | .26 | .07 | .38 | 3.78 | .000 | .12 | .39 |
| Age | -.20 | .09 | -.22 | -2.19 | .032 | -.38 | -.02 |
| MASC no mentalization | .34 | .16 | .22 | 2.13 | **.037** | .02 | .65 |

[a.] Dependent Variable: PAI ASPD Self-report
[b.] Variables excluded from the final model: Perspectives Error score, Mind in the Eyes correct, IQ.

*Severity of Mental Health Problems* was entered at Step 1, explaining 15.1% of the variance in reported ASPD. Age was then entered at Step 2, explaining a further 7% of variance. No other confounding variables remained significant. At this point mentalization variables were considered for entry into the model. After entry of the *MASC "no mentalization"* measure at this third step, the total variance explained by the final model as a whole was 26.6%, *F(3,74)=8.951,p<.001*. No other mentalization variable could be used to account for variance in ASPD.The

mentalization measure explained an additional 4.5% of the variance in ASPD, ($R$ *squared change=.045, associated F (1,74) =4.535, p=.037)*. Thus even after controlling for the possible confounding effect of younger age and more severe mental health problems, both of which predicted poor mentalization and higher ASPD scores, MASC scores remained statistically significant predictors of ASPD. Offender characteristics, particularly mental health problems and age, were also predictive of ASPD (Appendix B5 provides the detailed supporting tables).

In summary, with reference to the main hypothesis that the greater the degree of ASPD, the greater would be the mentalization impairment, there are two significant results. Firstly, the *Perspectives* and the *Mind in the Eyes* tasks are both significant predictors of ASPD in offenders as measured by the LPT ASPD categorisation. Secondly, the best fitting model for predicting self-reported ASPD (PAI) comprises of the *MASC sub-scale "no mentalization"* (as an independent predictor) together with Mental Health severity and age. There was no support for the second hypothesis that any mentalization impairment found in people with ASPD would be greater for those whose anxiety was raised by a stress condition. As the stress condition did not succeeed in raising any of the clients' anxieties substantially this hypothesis could not be investigated

## 4. Discussion

The purpose of this study was to assess the mentalization capabilities of antisocial male offenders. It was predicted that their ability to mentalize would diminish as their severity (number of symptoms) of ASPD increased. The sample included a significant proportion of offenders with ASPD: 65% with features of ASPD as measured by the PAI self-report; and, 52% with moderate or severe ASPD as measured by the Probation behavioural scale. The group of offenders in this study were impaired at mentalizing compared with control group performance in other studies across all the measures. In line with the main hypothesis, three of the

mentalization sub-scales were able to predict the severity of ASPD. The strongest predictor of ASPD as rated by the Probation measure was the *Perspectives* task error score (*p=.002*), although the *Mind in the Eyes* task was also significant (*p=.05*). The *MASC absence of mentalization* sub-scale predicted ASPD as self-reported on the PAI *(p=.037),* although the model was even stronger with the addition of Mental Health  severity and age *(p<.001).*

Whilst the predictive strength of the mentalization measures was modest, there are several lines of enquiry suggested by these results. Firstly, what are the reasons for the impaired mentalization found in this offender group? Secondly, what might be the reason for the relationship between ASPD and quite specific types of mentalizing impairment, that is, perspective-taking and non-mentalizing? Thirdly, what does this study contribute to the measurement and meaning of ASPD? Fourthly, what is the role of variables such as IQ, age and mental health in the findings?

The apparently impaired mentalization amongst the offender group cannot be validated without a control group. It is possible that this finding is better explained by other group differences such as IQ or socio-economic status. However, these results are consistent with other studies examining forensic populations with the *Mind in the Eyes* task (Richell et al., 2003; Elsegood et al., 2010). Thus, these findings should be viewed with caution.

In the absence of a recognised overall measure of mentalization, this study deployed a range of tasks. This is the first study using the *Perspectives* or *MASC* tests with this population and the relationships found between these tasks and ASPD are interesting in different ways.  *Perspectives* is cognitive in its orientation and therefore quite a narrow mentalization task. It requires participants to represent what another person can see and to use this information about their perspective when following instructions. In doing so, they need to inhibit their egocentric bias. The original study in a normal population found that performance improved with age

and the authors hypothesised that this might be due, not so much to an increased efficiency in perspective taking, but to a change with age in the propensity for people to take account of another person's perspective (Dumontheil et al., 2010). Our results found a close match with the adolescent group of previous studies. In the context of offence-related and antisocial behaviour, it may be helpful to formulate an element of this as linked to the delayed or absent development of a tendency to have regard for others' perspectives. The relatively young profile of this sample and their lack of education may be consistent with the delayed development of some mentalization strategies.

An alternative explanation might be the recognised impulsiveness of people with ASPD. This would account for the poor performance across both test types, but it does not explain the difference between the control and experimental conditions, which are both equally susceptible to impulsive responses. Moreover, the APQ breakdown of ASPD group showed that the *primary psychopath* group, which is characterised by high levels of impulsiveness, was no different from the *controlled* group (low in impulsiveness).

The MASC is a broader naturalistic test of mentalization, requiring more complex social judgements. The *absence of mentalizing* found in this study both adds to and contrasts with other research. People with ASPD have been found to have nuanced impairments in mentalization (Dolan et al., 2004) and to have difficulty with recognising certain emotions (Blair et al., 2001; Hastings et al., 2008). On the other hand, the MASC has discriminated between different types of mentalizing difficulties across varied psychopathologies: undermentalizing in bipolar disorder (Montag et al., 2010); under and hypermentalizing in depression (Wilbertz et al., 2010); and, hypermentalizing in BPD (Sharp et al., 2011). It raises the question as to how non-mentalizing might be different to not mentalizing very well.

There are possible explanations for non-mentalizing consistent with theories of antisocial behaviour. An absence of mentalizing may relate to a callous disregard

for others that is found in the psychopath phenotype of ASPD, that is, a deliberate strategy or unconscious defence to ignore the mental states of others. Alternatively, a tendency to select non-mentalizing explanations for social actions may reflect an inability to consider emotional or cognitive mental states. This could be considered a part of the empathy deficit found in the Violence Inhibition Model (Blair, 2001). Linked to this, a lack of emotional processing or inability to allocate attention to emotional cues is integral to the Response Modulation Model (Patterson et al., 1993). This would also fit with the trend identified in the results in which correct identification of cognitive and emotional mental states declined with increasing characteristics of ASPD. Furthermore, theories of aggression and antisocial behaviour suggest that deindividuation  - the reduction of markers of personality – makes such behaviour more likely in certain circumstances (Festinger, Pepitone, & Newcomb, 1952). Or, it may just be that the non-mentalizing answer was the easiest strategy, thus reducing the need to think about more nuanced differences in mentalizing answers; this would fit with the low boredom tolerance observed in people with ASPD. These are speculative ideas that might explain non-mentalizing; further research is required to consider this further.

The *Mind in the Eyes* task identified a significant inverse relationship with ASPD. In some respects this test taps into similar aspects of mentalization as the MASC by assessing ability to recognise mental states from explicit information. As mentioned, there have been contradictory studies on this point which may be a result of the breadth of the ASPD construct and the preponderance of studies focussing on the psychopathic end of the dimension.

It is suggested here that the range of measures enables an analysis of different types of mentalizing in people with ASPD. However, this is not to rule out the explanation that these measures are not showing a mentalizing impairment at all, but rather, separate cognitive deficits. For example, in developmental terms, ASPD shares pathways with ADHD and Autistic Spectrum disorders, which are

associated with attentional cognitive impairments, particularly in relation to emotional stimuli and missing social signals. However, Glass and Newman (2006) showed no differences in the performance of people with ASPD between affect recognition and attention (when directed to find a specific emotion). More broadly, some researchers suggest that mentalization cannot be separated from executive functioning, which is the ability to direct attention, comprehend and integrate information. The ongoing debate is represented by Frith and Happe (1994)  arguing for the separateness of mentalization and executive function versus others (Jarrold, Butler, Cottington, & Jimenez, 2000) suggesting that they are inextricably linked. A criteria for the measures used in this study was that demands for executive function were balanced across conditions. However, the challenge of achieving this in practice is acknowledged and possible interference from this factor was possible.

As well as the inconsistency between mentalization measures, there is a lack of correlation between the behavioural and self-report measures of ASPD, which, together with the contrasting predictive models, suggests these may be tapping  into different aspects of ASPD. It is interesting that the requirement of the *Perspectives Task* to consider another person's view of the world predicts the probation measure. This measure is based on interactive behaviours such as recognising the impact on the victim of an offence and manipulative, controlling or aggressive actions towards others. There is therefore some face validity in this task in relation to ASPD.

On the other hand, the PAI questionaire, self-rated by participants, is likely to under-report ASPD and this might explain the weaker relationship with mentalizing. The *absence of mentalizing* score predicted ASPD (PAI) and it may be that those who scored themselves highly on this questionnaire were simply demonstrating a lack of psychological insight as to how (negatively) they were representing themselves. Alternatively, a dimension of the PAI is *Stimulus-Seeking* which involves a tendency to seek thrills and excitement and is linked to an egocentric view of the self. Baumeister et al (1996) suggested that people with violent and

antisocial tendencies have unrealistically high and fragile self-esteem. It might be hypothesised that this reflects either an absence of mentalizing or hypermentalizing in respect of the self, which is likely to be extended to rating mental states in others. It appears that at least two different factors of ASPD are being measured by the behavioural and the self-report measures, although there can only be tentative suggestions as to what this might be at this stage.

Given the colinearity between the two self-report measures (the PAI and the APQ), it is surprising that the latter did not show any relationship with mentalization. There is a difference in the factors included in each of these scales, in that the APQ gives greater weight to aspects of resentment and aggression. The mean score for the APQ also indicated a slightly lower level of ASPD in the sample with less spread. It may be that these contrasts explain why the APQ did not replicate the finding for the other self-report measure.

The significant role of certain variables in explaining mentalization or ASPD demands attention. When controlled for, IQ and age reduced the correlation of certain mentalization measures with ASPD. IQ seems to positively influence performance on the *MASC* and the *Mind in the Eyes*, but not *Perspectives*. This is consistent with previous studies on the *MASC* (Dziobek et al., 2006), but contrary to conclusions that the *Mind in the Eyes* is not susceptible to IQ bias (Baron-Cohen et al., 2001). This finding supports the collection of IQ information so that it can be controlled and, where control groups are recruited, that they are matched. However, the poor literacy levels found in this sample meant the WTAR might not have been the best  measure of IQ and these observations should, therefore, be treated with caution.

Age contributed to the best model predicting ASPD (PAI) and also partially mediated some of the *MASC* sub-scores relationship to ASPD. It is possible that age is to an extent a proxy for mentalization in that it has been shown that mentalizing capability increases with age into early adulthood (Dumontheil et al.,

2010; Blakemore, 2008). The Mental Health Severity scale was the most significant predictor of ASPD (PAI). This scale is widely used clinically and includes some aspects of the DSM; given the known co-morbidity of ASPD with other Axis I mental disorders, this relationship was expected (Ullrich & Coid, 2009).

This study has several limitations. The lack of a control group has already been mentioned. It is also possible that the recruitment method which relied on cooperation and referrals from Offender Managers led to some sample bias. The measures of ASPD were brief and not based on an in-depth clinical diagnosis using DSM or ICD-10 criteria. The Probation measure of ASPD was artificial and therefore not generalisable. The measurement of such a broad construct as mentalizing is still in the early stages of development, although the discriminitative validity of the measures used was encouraging. These mentalizing measures have not been used with an offender sample before and there may be confounding aspects in their design. For example: the *Perspectives* task is based on an authority figure (the Director), which may motivate negative feelings and reactions in offenders; the *MASC* is based on a 'middle class' dinner party and this highly ethnically diverse sample are likely to vary in their ability to relate to the language and social rules presented in the story. The correlational design cannot infer the direction of relationships. Finally, the associations found were small and would need replicating before expanding on these conclusions.

This suggests certain avenues for further research. In replicating the design with a control group, it would be interesting to develop hypotheses around mentalizing and different types of offending behaviour as well as ASPD. The MASC has been developed for use with fMRI (Wolf, Dziobek, & Heekeren, 2010) and a study to examine the neural correlates of mentalizing in people with ASPD would add to neuroscience research in this area, particularly if the non-mentalizing pattern was repeated. Further factor analysis comparing the Probation and self-report measures of ASPD would be useful in supporting more effective risk assessment

tools in forensic services. The lack of support for the secondary hypothesis that a stress condition would lead to a temporary reduction in mentalizing may have been due to the stress condition not working. Although it was piloted, this was not with an offender population and only measured self-rated anxiety, not actual mentalizing performance. It would be helpful to repeat this hypothesis but based on a clearer understanding of what would raise anxiety in an offender population.

There are wider scientific and professional implications of this study. Firstly, national guidance (Bradley Report, 2009; NICE Clinical Guidelines 77, 2009) recommends joint work and responsiblity across the Criminal Justice System and the NHS for offenders with mental health problems. The combined use of probation and health measures in this study could contribute to the validation and improvement of risk assessment tools. Secondly, the types of mentalization impairments tentatively pointed to in this study could inform formulations and interventions in psychological therapies. This study adds to the broader body of research linking specific mentalizing difficulties with particular psychiatric disorders and specifically increases knowledge about the etiology of  ASPD. Fourthly, the study contributes to developing an effective measure of mentalization by showing how an integrated set of computerised tasks may assess a range of mentalizing processes.

In conclusion, this study used a computerised battery of mentalization measures to explore their relationship with ASPD in a sample of offenders. The results supported the hypothesis indicating that offenders appear to have specific mentalization impairments that are associated with the severity of ASPD. The specific mentalizing difficulties identified were perspective-taking, reading the mind in the 'eyes' and non-mentalizing. These need replicating to be more confident of their role and contribution to ASPD and/or offending. If these mentalization impairments are key processes in ASPD, these findings have the potential to improve clinical interventions and risk assessment for public safety.

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**Part 3: Critical Appraisal**

**Introduction**

The appraisal provides the opportunity to reflect on the experience of carrying out this study and recommends areas that could be improved for future research. The following areas were identified in the empirical paper and will be expanded on here. Firstly, research and service development across the NHS and the Criminal Justice System (CJS) is a policy imperative for people with ASPD, however, such collaboration faces the dilemmas of different priorities and contrasting organisational cultures – can these be integrated? Secondly, recruiting a sample of people with ASPD was challenging – what can be learnt from the experience? Thirdly, whilst psychometric measurement has a language and appearance that suggests clarity and coherence, the experience of using the various instruments raised questions about what was actually being assessed – what can be recommended for future research? Finally, a number of ethical and risk management issues are identified.

**Research across CJS and NHS**

The Bradley Report (Bradley Report, 2009) and NICE guidance for ASPD (NICE Clinical Guidelines 77, 2009) recommend partnership, joint pathways and assessment across the CJS and the NHS with joint responsiblity for this population. This research demonstrated some of the issues in achieving this alignment. In order to recruit the sample via local probation services, approval was required through the London Probation Trust (LPT) research governance processes. The research proposal needed to demonstrate how it would further their priorities of improved risk assessment and public protection. It was interesting to think about how possible mentalization impairments might on the one hand signpost potential avenues for improved clinical treatment and, on the other, indicate a screening measure for public protection.

Thinking about how to meet both these objectives was stimulating but also presented potential ethical dilemmas in integrating research agendas. The information provided to prospective offender participants had a clear clinical objective of investigating possible future therapies; the LPT aim of improving public safety was not so obvious. As in any organisation, priorities in the LPT are not uniform across all levels and departments. Whilst the national priority of public protection was recognised within local LPT offices, when the study was presented to Borough-based Offender Managers to agree the logistics of the research, they wanted the project to improve local access to mental health services for offenders. They were concerned about the lack of treatment available and their commitment to the research was increased by offering an aggregated (anonymous) mental health profile of offenders on license as a by-product of the study. This improved their willingness to take on the extra work involved in recruiting participants from their caseload as well as being consistent with the research aims of improving services for people with ASPD. However, I was also conscious that this information would be used with NHS commissioners as a proxy needs assessment to argue for investment.

There were other mutual benefits of establishing the research within the work programme of the LPT. For the LPT, they were able to access additional cost-effective research and to influence the output and dissemination of my findings. At the same time, apart from assistance with recruitment, my research was enhanced by having access to the LPT information system that improved my screening of participants to meet the inclusion criteria and provided an additional measure of ASPD.

The LPT has a data-set to identify possible ASPD, which is used to prioritise NHS referrals as well as public protection risk assessments. The research provided several interesting avenues for joint work with the LPT. I will be able to provide some psychometric assessment of the validity and reliability of this ASPD measure.

Secondly, the strongest model for predicting ASPD was the *Perspectives* task in relation to the LPT behavioural measure. It may be that this behavioural measure has something to offer the NHS in assessment of ASPD. It is hoped that further discussion and dissemination of the findings with LPT colleagues, ideally in joint fora with NHS staff, will consider service improvement from this study.

**Recruitment**

A possible contradiction in finding a sample of people with ASPD is that, if they are willing to participate, then perhaps they do not have strong antisocial characteristics. The purpose of recruiting from an offender population was the expectation that a large proportion would have an ASPD; epidemiological studies have found about 60% of male prisoners have ASPD (Moran, 1999). However, ASPD seems to be a broad diagnosis (Bornstein, 1998) and a constant challenge in recruitment was to avoid sample bias whilst, at the same time, maximising attendance. A lot was learned which may help similar studies in achieving these ends.

Recruitment depended on referrals from Offender Managers, who obtained the initial consent to participate. The original means of testing for bias was to collect information on those offenders who refused to participate, which could be compared with the actual participants to identify any key differences. However, concerns about Offender Manager workload meant that this was not implemented. Instead, the achieved sample was compared with the London-wide average for some key characteristics, gathered from the central information system: level of risk and use of aggression or violence in the convicted crime. These items were selected as a proxy for antisocial behaviour and the comparison showed a greater than average risk and use of violence in the actual sample compared with the overall London average. This confirmed that I was not just recruiting the lower risk, more acquiescent

offenders and the higher risk felt appropriate given the aim of finding people with prominent features of ASPD.

The experience of recruitment revealed factors which reduced willingness to participate. I had thought that clearly positioning myself as a Trainee Clinical Psychologist, outside and independent of the Probation service, would encourage involvement as offenders would not associate me with the CJS. However, whilst this may have been positive for some offenders, I also received feedback that, for example: *"I had enough people screwing with my head when inside".* Some were very wary of seeing anyone with the label of 'psychologist'. It became important to emphasise that no 'talking' was involved in the assessment and there would be no questions about their offence or past history. As well as reticence about a psychologist, there was also a concern that the assessment would be like a 'test' or would involve lots of writing. The average age for the sample leaving school was 16.7 years and there appeared to be a fear that the assessment would show them up academically. It has been suggested that shame can be a vulnerability of those who commit violent crime, particularly if there is a threat to their inflated but fragile self-esteem (Gilligan, 1996). To avoid a fear of failure, the assessment was emphasised as only requiring 'tick-box' or 'yes/no' answers and including computer games. For some, the computerised elements of the assessment were a problem as their license conditions stipulated that they were not allowed to use a computer. Usually this was resolved by the Offender Manager being briefed and giving an exclusion.

The recruitment strategy included reimbursing participants as a means of achieving a cross-section of offenders and minimising the possible confound of an altruistic bias in participants. This was also seen as good practice if people are going to provide about 2 hours of their time. A £15 supermarket voucher to cover time and transport costs was judged appropriate and accepted as reasonable in the ethics submission and by the LPT. It quickly became clear that this sort of

reimbursement was not appreciated by offenders with comments such as: *"it's not worth my time"*. Further discussion revealed that cash was regarded as substantially more attractive and would make a difference to the numbers willing to be involved. However, the ethical dilemma was a concern that cash would promote spending on illicit drugs. However, the LPT did not share this worry (stating that this concern was a reality but a cash incentive of this small size would not be a problem) and were supportive of cash being used. An amendment to the ethics submission was therefore agreed and the change made. This was greatly appreciated by offenders as was the practice of providing the money immediately after the assessment; many were ready to be upset that some "delaying" paperwork might be required. The lingering concern about the reimbursement process was that those offenders who most needed some extra income were more likely to come forward. Attempts were made to include those offenders who had found work or were in full-time education by offering evening appointments but no-one took up this opportunity.

Maximising attendance was vital if I was not going to waste time amongst a group who often had rather chaotic lives or who may decide to do something different on the spur of the moment. The cooperation and commitment of Offender Managers was instrumental in there being 2 DNAs (2.4%) during the study. Appointments were either linked to mandatory attendance at probation offices, or, sometimes stipulated as being one of the regular presentations that offenders needed to make at their local office. In the high risk hostels, offenders were on a behavioural programme which included reward points for beneficial activities; my research was designated as one of these recognised activities, which improved participation.

**Testing/Measures**

The research revealed a number of measurement issues. The reality of using measures can contrast with the expectation arising from the literature and

manual. In the study, this contrast was most obvious in the use of the Wechsler Test of Adult Reading (WTAR), the measures of ASPD and of mentalization.

The WTAR provides an estimate of an individual's premorbid intellectual functioning and is commonly used to assess cognitive changes since the onset of injury or illness (Wechsler, 2001). In this study, it was used as a brief assessment of IQ as it is the only reading test normed with the *Wechsler Adult Intelligence Scale - Third Edition* (WAIS–III). The intention was also to use it as a screen for the learning difficulties exclusion criterion using a cut-off of 70 (more than 2 standard deviations below the mean). However, 10 participants (12%) scored 70 or less. These low scores were not consistent with observation of their ability to comprehend task instructions or their performance. The low scores were particularly worrying as it has been found that the WTAR tends to over-estimate the scores of participants in the bottom IQ range (Mathias, Bowden, & Barret-Woodbridge, 2007)! Furthermore, this seemed to be a high proportion given that Offender Managers had been asked to screen out anyone with learning difficulties.

The WTAR assesses  stored knowledge and skills (Lezak, 2004) such as vocabulary knowledge (Yuspeh, Vanderploeg, & Kershaw, 1998) and reading pronunciation skill (Baddeley, Emslie, & Nimmo-Smith, 1992). These may be conceptualised as crystallised intelligence (Horn & Cattell, 1967), which depends on learning and tends to increase with age. It is probably no coincidence that those scoring less than 70 had all left school prior to the age of 16 and had probably opted out of involvement in lessons even earlier. The WTAR depends on the normal development of reading skills and, in this population, this could not be assumed. Although a concern about this measure was picked up quite early, after consultation with my academic supervisor, we decided it was too late to change measures. Instead, the LPT information system was found to include an assessment of *Learning Disability* and this was used as the exclusion measure. If I was carrying out this research again, I would look for a more visual measure of IQ, less reliant on

reading ability, such as the Quick Test (Ammons & Ammons, 1962) or Raven's Progressive Matrices (Raven, Styles, & Raven, 1998) based on perceptual-verbal performance.

Just as measuring intelligence threw up difficulties, so also did the measurement of ASPD. There is contention as to whether ASPD is dimensional or categorical. Hare (1991) appears to regard it as categorical and the DSM-IV guidelines (American Psychiatric Association, 2000) also follow this line of thinking. However, this view has been challenged (e.g., Bornstein, 1998) and the DSM-V conceptualisation for personality disorders is proposing change to a dimensional definition. Given this DSM-V thinking, it was felt appropriate to consider ASPD as a continuum. Furthermore, a review of research findings has found that differences tend to be at the higher end of performance and the effect sizes can be small: a continuous variable was likely to carry more statistical power (Marcus, Lilienfeld, Edens, & Poythress, 2006).

The other interesting issue in relation to the ASPD measures was the lack of co-variance between the self-report measures and the LPT behavioural measure. This can be looked at in relation to the different factors that have been identified in ASPD. For example, a development from Hare's (1991) two-factor model of psychopathy is Cooke and Michie's (2001) three factor hierarchy, which has been extensively validated. This suggests that psychopathy is underpinned by: an *Arrogant and Deceitful Interpersonal Style*, *Deficient Affective Experience*, and an *Irresponsible Behavioural Style*. The advantage of this classification in relation to my findings is the possibility that the LPT measure particularly represents the *Impulsive and Irresponsible Behavioural Style* with the 6 items: offence involving threat or violence; over-reliance on others for financial support; manipulative or predatatory lifestyle; reckless/risk taking behaviour; impulsivity; and, aggressive or controlling behaviour. This might explain the difference with the Personality Assessment Inventory, which, as well as significant weight to self reported behaviours, also

covered aspects of the other two factors with items such as *Egocentricity,* including self-centredness and narcissism, and *Stimulus-Seeking* involving a tendency to seek thrills and excitement with low boredom tolerance. However, this analysis also shows that much more research has investigated the construct of psychopathy than ASPD and they are not synonomous with each other.

The extent to which the lack of agreement between the measures might also reflect the different viewpoints of offenders and Offender Managers should not be ruled out. It is possible that Offender Managers are particularly influenced by past records as the best predictor of the future but offenders are hopeful of improved behaviour in the future and/or are oblivious of the impact of their lifestyle on others. The profile of the person with ASPD does include an empathy deficit (Blair, 2005) or a lack of concern for others (Dolan & Fullam, 2004) or an impairment in the ability to take another (in this case, the victim's) perspective (*Perspectives* task). Whichever of these explanations is correct, the result is a likely disparity between the viewpoints of the offender and that of society, here represented by the Offender Manager.

The aim of the literature review that carried through to the empirical paper was to find effective ways of measuring mentalization. The breadth of the construct and the lack of a recognised test led to the strategy to bring together a battery of tests that would assess diverse but complementary aspects of mentalization. If all the tests are tapping into different elements of the mentalization construct, one would hypothesise that there would be significant correlations between the individual measures. There was a significant relationship between the *MASC "No mentalization"* and the *Mind in the Eyes* measures, but no relationship between either of these and the *Perspectives Task*.

The correlation in this sample observed for the *MASC* and the *Mind in the Eyes* contrasts with the results of the original study presenting the *MASC* which drew a distinction between the two (Dziobek et al., 2006). It was suggested that the

different stimuli (whole face v eye region) linked to different abilities. On the one hand, the ability to decode a whole face (as in the *MASC*) might use abstract and analytical thinking skills whereas the more limited information around the eye region prompts a more intuitive emotional response. It has also been suggested that the *Mind in the Eyes* makes relatively low demands on the executive function compared with more complex social cognition tasks such as the *MASC* (Bull, Phillips, & Conway, 2008). The latter requires the participant to coordinate multiple perspectives and integrate perceived mental states with behaviour. All this requires a constant updating of information and the ability to switch attention across a variety of stimuli. Whilst the *MASC* is more demanding, the covariance found in this study might suggest complementary mentalizing abilities are at the root of successful performance. Both require an appreciation of how another person might be seeing the world and to identify a mental state.

There was no correlational relationship between the *Perspectives* task and either the *MASC* or the *Mind in the Eyes*. This might be interpreted as mentalization not being a unified construct or that one or more of these tests was not measuring mentalization. The *Perspectives* task is labelled as a Theory of Mind (ToM) task and, although the literature review describes the significant overlap that ToM has with mentalization, this task seems to be more purely cognitive than other complex ToM tasks. The task requires participants to represent another person's perspective, but it does not necessitate putting oneself into the 'feeling' or 'intentions' part of their mind. The 'thinking about feeling' component of mentalization is missing. However, the task was the strongest predicter of ASPD and, if it isn't a mentalization test, what is it measuring?

Allen et al (2008) suggest that there are two important processes in mentalization – attention and imagination. Attention requires effortful control to be able to move away from one's natural egocentric inclination. Imagination is needed in order to wonder what is going on in the mind of oneself and other people. The

*Perspectives* task seems to demand attention but only a little imagination. Whilst the other tasks require much more imagination in relation to what others are thinking and feeling. Breaking down the complex processes involved in mentalization may be a better way of working out what the most appropriate measures should be.

A criteria for the selection of mentalization measures was their ecological validity, that is, their relevance to real world tasks. The *MASC* includes questions of social understanding that people would generally require in order to problem-solve in complex social situations. The *Perspectives* test, whilst a little artificial, mimics a real-life demand of following instructions from the viewpoint of another person. However, the idea that these tests are "real" in the same way for all people is debatable. It raises questions arising from a view of cognitive development as domain-specific (Karmiloff-Smith, 1994), that these measures may be more or less relevant for different groups of people depending on the social construction of their particular worlds (Vygotsky, 1978). For people with ASPD, the social challenge of a middle class dinner party (as in the *MASC*) may stimulate a different level of engagement to, for example, a violent street exchange or an encounter between people in a supermarket. Similarly, the picture of a white authority figure giving instructions in the *Perspectives* task may have a different meaning for men of various ages and different ethnic backgrounds. The challenge for naturalistic measures is to avoid environmental or cultural confounds. If I were to repeat this research, I would look at these measures representing social situations more consistent with the milieu of the participants.

**Ethical issues and risk management**

As a researcher directly administering the tests, there should be no unintended effect on the performance of participants. In being aware of this, I became unsure as to how to deal with variation in the motivation and interest of participants. I started with the expectation that I would inevitably play a motivating

role. The assessment battery lasted almost 2 hours and I was keen to maintain the effort and interest of participants so that they would do themselves equal justice in what they were individually capable of. However, I began to question this and wondered whether interest in the task and doing one's best were facets of mentalization (similar to Allen's effortful attention). Therefore, if my attention varied across participants dependent on a perception of their relative motivation, then I was possibly having an inappropriate influence on their results. In a sense, my mentalizing may be adding to theirs.

Even when aware of this possible confound, treating everyone exactly the same is probably impossible as individual participants will inevitably elicit different types of responses from the researcher. These are likely to have nuanced effects on performance. There is probably also a thin line between an assessment that picks up general aspects of antisocial behaviour, for example, a failure to conform to social norms and impulsivity, against a specific response that represents a disregard for, or impatience with, the assessment process.

Although all participants should have received the same information sheet in advance of their appointment, there was some variation in expectations. Many expressed surprise and then impatience at the amount of time the assessment would take. This could put pressure on the researcher to shortcut some of the standardised instruction. Others were curious about the research and were keen to discuss the direction of questions and their performance in the session. This was normally managed by allowing time at the end of the assessment for discussion and offering feedback at the end of the research process. It was tempting to consider using comments made by participants during the assessment for additional qualitative information but, on reflection, the spontaneous unstructured approach to this meant it felt inappropriate and possibly unethical. For example, one participant exclaimed at the beginning of the *Mind in the Eyes* task: *"how can you tell what*

*people are feeling from their eyes, you're not making sense, man".* This was a telling statement regarding the point of this task, but not representative of comments.

**Conclusion: research improvements**

There are a number of learning points for future studies. For multi-agency research, collaboration makes for more than the sum of the parts. By early involvement of partner organisations, the policy aims of all parties can be integrated and may add to the richness of what might arise from the research. By early involvement too, the logistical issues can be addressed so that recruitment can be maximised. In working with staff at the front-line, if day-to-day workload pressures can be considered and procedures adapted, this is more likely to maintain the working relationships that are needed to support the research. The recruitment logistics can be designed so that biases and differences in motivation are minimised and numbers of participants optimised.

The design of appropriate measures should ideally be piloted. In identifying a measure of IQ, the characteristics of the sample should be considered to ensure that other possibilities, such as the length of formal education, are not accounting for variance. The measurement of ASPD and mentalization are complex. Given the breadth of ASPD, it may be helpful to think about the underlying factors that make up the construct. The measurement of ASPD has been under-researched in contrast with psychopathy and there may be opportunities to address this in relation to the proposed DSM-V criteria. There is also scope for research to consider the reasons for differences in self-report versus observational assessment of ASPD. There is an opportunity for joint work across the NHS and CJS in developing effective assessment measures.

Mentalization is also complex and multi-dimensional as a construct. Using a battery of complementary tests seemed to be useful, but could have been improved on by: (a) being clearer as to what underlying aspect of mentalization each test was

assessing; and, (b) a rationale as to how the tests combine to represent the construct. In common with much psychological research the unwanted influence of the researcher needs to be controlled, however, the additional risk in a study of mentalization is the researcher's own mentalizing, which should be as neutral as possible.

From my personal perspective, the following issues arise from the study and could be on the joint NHS/CJS agenda. Firstly, the high level of mental health need as measured for Axis 1 conditions by the Brief Symptom Inventory (GSI T-score=59.5) and for ASPD and BPD as measured by the Personality Assessment Inventory (ASPD T-score=65; BPD T-score=63) suggests thought be given to treatment as part of rehabilitation plans. Secondly, a more integrated approach to risk assessment may produce improved tools for both services as well as helping to forge a common language. Thirdly, the main implications for therapy and rehabilitation programmes are to better target the two impairments suggested by this research to increase with severity of ASPD: (a) the 'non-mentalizing' way of thinking; and (b), the greater tendency to use one's own perspective at the cost of seeing other people's viewpoints.

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**Appendices**

**Part 1: Literature Search**

Appendix A1: Results from Literature Search: Identified Measures of Mentalization

**Part 2: Empirical Paper**

Appendix B1: Ethics Approval from NWLondon Rec2, 21$^{st}$ July 2010: 10/H0720/57.

Appendix B2: Information Sheet & Consent Form.

Appendix B3  Perspectives Instructions.

Appendix B4:  Meeting with Hounslow Probation Service: Research Summary.

Appendix B5:  Regression Analysis for Dependent Variable PAI ASPD
Model Summary.

**Appendix A1**

Results from Literature Search: Identified Measures of Mentalization (n=27)

| Measure | No: [16] | Studies by clinical condition & 1st author | Type of measure [17] |
|---|---|---|---|
| Facial Emotion recognition (Ekman et al., 1976) | 4 | Autism[18]: (Kleinman et al., 2001)<br>Autonomic Failure: (Heims et al, 2004)<br>Epilepsy: (Farrant et al., 2005)<br>Schizophrenia[19]: (Bommer & Brune, 2006) | Emotion |
| Interpersonal Reactivity Index (Davis, 1983a) | 5 | ASPD: (Dolan & Fullam, 2004)<br>Autism: (Shamay-Tsoory, 2008); (Kleinman et al., 2001)<br>Depression: (Wilbertz et al 2010)<br>Schizophrenia: (Shamay-Tsoory et al., 2007) | Empathy |
| False Belief Task (Perner et al., 1985) | 10 | Alzheimer's: (Fernandez-Duque et al, 2009); (Gregory et al., 2002)<br>Autism: (Umeda et al, 2010); (Frith & Happe, 1999)<br>Brain Damage: (Surian & Siegal, 2001); (Siegal, et al, 1996)<br>Dementia: (Lough et al., 2001)<br>Schizophrenia: (de Achaval et al., 2010); (Chung et al, 2008); (Tager-Flusberg et al, 1998) | ToM |
| Ice Cream False Belief task (Baron-Cohen, 1989) | 2 | Frontal leucotomy: (Bach et al., 1998)<br>Schizophrenia: (Drury et al 1998) | ToM |
| Strange Stories (Happe, 1994; Happe et al., 1999) | 16 | Autism: (Umeda et al., 2010); (Spek et al, 2010); (Happe, 1997)<br>Autonomic Failure: (Heims et al., 2004)<br>Bipolar Disorder: (Olley et al., 2005)<br>Brain damage: (Bibby & McDonald, 2005); (Bird et al, 2004)<br>Epilepsy: (Shaw et al., 2007); (Farrant et al., 2005)<br>Psychopathy: (Blair et al., 1996)<br>Schizophrenia: (Langdon & Ward, 2009); (Mazza et al, 2008); (Chung et al., 2008)<br>Frontal leucotomy: (Bach et al., 1998)<br>Huntingdon's: (Snowden et al., 2003)<br>Tourette's Syndrome: (Channon et al, 2004) | ToM |
| Hinting Task (Corcoran et al., 1995) | 6 | Autism: (Craig et al, 2004)<br>Bipolar Disorder: (Kerr et al, 2003);<br>Schizophrenia: (Stewart et al, 2008); (Fiszdon et al, | ToM |

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[16] **No:** The number of studies using the measure from the literature search. This does not add up to 27 as many studies used more than one measure.

[17] **Type of measure** is defined in line with the literature search: Theory of Mind (ToM); Emotional Intelligence (EI). Where the authors explicitly referred to a different construct, this is used, for example, emotion recognition or social cognition.

[18] Autism is used here to include studies referring to High Functioning Autism and Asperger's Syndrome.

[19] Schizophrenia is used here to include studies referring to paranoia, delusions, psychosis.

2007); (Corcoran & Frith, 2005); (Craig et al., 2004).

| | | | |
|---|---|---|---|
| Reading the mind in the eyes (Baron-Cohen et al., 1997; 2001) | 22 | Alzheimer's: (Gregory et al., 2002)<br>Anorexia: (Russell et al, 2009)<br>ASPD: (Dolan et al., 2004)<br>Autism: (Spek et al., 2010); (Craig et al., 2004); (Kleinman et al., 2001); (Jarrold et al., 2000)<br>Brain injury: (Havet-Thomassin et al, 2006); (Stone et al, 2003)<br>Dementia: (Torralva et al, 2009); (Lough et al., 2001)<br>Depression: (Harkness et al, 2005)<br>Epilepsy: (Farrant et al., 2005)<br>Sex Offenders: (Elsegood & Duff, 2010)<br>Schitzotypy: (Gooding et al, 2010)<br>Schizophrenia: (Schimansky et al, 2010); (de Achaval et al., 2010); (Couture et al, 2008); (Kettle et al, 2008); (Addy et al, 2007); (Craig et al., 2004)<br>Williams Syndrome: (Tager-Flusberg et al., 1998) | ToM |
| Bell Lysaker Emotion Recognition Test (Bell et al., 1997) | 2 | Schizophrenia: (Fiszdon et al., 2007)<br>Substance misuse | EI |
| Picture Sequencing Story-telling task (Langdon et al., 1997) | 5 | Alexithymia: (Wastell & Taylor, 2002)<br>Schizophrenia: (Langdon et al., 2009); (Brakoulias et al., 2008); (Addy et al., 2007); (Langdon et al 2010) | ToM |
| Picture Stories Inference Intention Task (Sarfati et al., 1997) | 4 | Brain Injury: (Havet-Thomassin et al., 2006)<br>Schizophrenia: (Chung et al., 2008); (Sarfati et al, 1999); (Benedetti et al., 2009) | ToM |
| Social Attribution Task (Klin, 2000) | 1 | Autism | Social Cognition |
| Abbreviated Trustworthiness Task (Adolphs et al., 1998; 2001) | 1 | Schizophrenia: (Couture et al., 2008) | ToM |
| Emotional Intelligence (Schutte et al., 1998) | 3 | BPD: (Gardner & Qualter, 2009)<br>Mood disorder: (Guastello et al, 2004)<br>Substance Misuse: (Riley & Schutte, 2003) | EI |
| Faux Pas (Stone et al., 1998) | 15 | Alzheimer's: (Gregory et al., 2002)<br>ASPD: (Dolan et al., 2004)<br>Autism: (Umeda et al., 2010); (Spek et al., 2010); (Zalla et al, 2009)<br>Brain damage: (Lee et al., 2010); (Bird et al., 2004); (Stone et al., 2003)<br>Dementia: (Torralva et al., 2009); (Lough et al., 2001)<br>Epilepsy: (Shaw et al., 2007); (Farrant et al., 2005) | ToM |

| | | Schizophrenia: (de Achaval et al., 2010); (Stewart et al., 2008); (Martino et al, 2007) | |
|---|---|---|---|
| Cartoon Task (Happe et al., 1999) | 7 | Anorexia: (Russell et al., 2009) Bipolar Disorder: (Olley et al., 2005) Brain Injury: (Bibby et al., 2005) Epilepsy: (Farrant et al., 2005) Huntingdon's: (Snowden et al., 2003) Schizophrenia: (Langdon et al., 2009); (Brakoulias et al., 2008) | ToM |
| Predicaments test (Channon et al., 1999) | 2 | Brain damage: (Channon & Crawford, 2000) Tourette's Syndrome: (Channon et al., 2004) | Problem-solving |
| MSC EIT (Mayer et al., 2003) | 12 | Alexythmia: (Lumley et al., 2005) BPD: (Gardner et al., 2009) Brain Injury: (Krueger et al., 2009) HIV: (Willard, 2006) Mental disorder (inc. depression, substance misuse, BPD): (Hertel et al, 2009) Schizophrenia: (Eack et al., 2010); (Lo et al., 2010); (Eack et al., 2009); (Kee et al., 2009) Schizotypy: (Aguirre et al, 2008) Sex Offenders: (Puglia et al, 2005) Social Anxiety: (Jacobs et al., 2008) | EI |
| Awkward Moments Test (Heavey et al., 2000) | 1 | Autism | ToM |
| Animations Task (Castelli et al, 2000) | 1 | Schizophrenia: (Horan et al., 2009) | ToM |
| Projective Imagination Test (Blackshaw et al., 2001) | 2 | Schizophrenia: (Stewart et al, 2009); (Moore et al., 2006) | ToM |
| Cartoon False Belief Task (Woolfe et al., 2002) | 2 | Aphasia: (Varley et al, 2001) Deafness: (Morgan & Kegl, 2006) | ToM |
| False Belief Stories Task (Corcoran et al., 2003) | 2 | Schizophrenia: (Addy et al., 2007); (Walston et al, 2000) | ToM |
| Cartoon Picture Stories (Brune et al., 2005). Described as a development of Langdon et al., 1997. | 2 | Schizophrenia: (Brune et al., 2008); (Bommer et al., 2006) | ToM |
| Sarcasm Comprehension Task (Channon et al., 2005) | 1 | Head Injury | ToM |
| Movie for Assessing | 1 | Autism: (Dziobek et al, 2006) | Social |

| | | | |
|---|---|---|---|
| Social Cognition (Dziobek et al., 2006) | | Bipolar: (Montag et al., 2010) BPD: (Sharp et al., 2011) Brain Study: (Wolf et al, 2010) Depression: (Wilbertz et al., 2010) Stress: (Smeets et al, 2009; Wolf et al., 2010) | cognition |
| Cambridge Face-Voice Battery (Golan et al., 2006) | 1 | Autism | ToM |
| Yoni Cartoon Eye gaze inference task (Shamay-Tsoory et al., 2007) [20] | 2 | Autism: (Shamay-Tsoory, 2008) Envy: (Shamay-Tsoory et al, 2007) | ToM |

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[20] This was developed from Baron-Cohen (1995).

**NHS**

## National Research Ethics Service
**North West London REC 2**
Royal Free Hospital NHS Trust
Royal Free Hospital
South House, Block A
Pond Street
London
NW3 2QG

23 August 2010

Mr John Helps
Freud Memorial Professor of Psychoanalysis
University College London
Research Department of Clinical,
Educational and Health Psychology
1-19 Torrington Place, London
WC1E 6BT

Dear Mr Helps

| | |
|---|---|
| **Study Title:** | **Identifying possible mentalisation impairments in people with Antisocial Personality Disorder (ASPD).NWLondon REC2; 21st July 2010.Reference: 10/H0720/57** |
| **REC reference number:** | **10/H0720/57** |

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

The further information has been considered on behalf of the Committee by the Chair.

**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**

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.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) 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.

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*Where the only involvement of the NHS organisation is as a Participant Identification Centre (PIC), management permission for research is not required but the R&D office should be notified of the study and agree to the organisation's involvement. Guidance on procedures for PICs is available in IRAS. Further advice should be sought from the R&D office where necessary.*

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

**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).**

**Approved documents**

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

| Document | Version | Date |
| --- | --- | --- |
| Investigator CV | | |
| Protocol | 1 | 18 June 2010 |
| Supervisor CV's | | |
| Research Screening Form | 2 | 03 May 2010 |
| REC application | | |
| Questionnaire: Antisocial Personality Questionnaire Personal Reaction Questionnaire (APQ) | 3 | 11 August 2010 |
| Letter of invitation to participant | 1 | 18 June 2010 |
| Participant Information Sheet | 4 | 11 August 2010 |
| Response to Request for Further Information | | |
| Participant Consent Form | 3 | 03 May 2010 |
| Questionnaire: Personality Assessment Inventory (PAI) Borderline Scale | 2 | 11 August 2010 |
| Questionnaire: Personality Assessment Inventory (PAI) AS Scale | 1 | 11 August 2010 |
| Questionnaire: Brief Symptom Inventory | 1 | 03 May 2010 |
| Evidence of insurance or indemnity | | 18 June 2010 |

**Statement of compliance**

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

**After ethical review**

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

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.

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
- 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.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

| 10/H0720/57 | Please quote this number on all correspondence |
|---|---|

Yours sincerely

Dr Michael Pegg
Chair
Email: Thomas.mcquillan@royalfree.nhs.uk

| Enclosures: | "After ethical review – guidance for researchers" *[SL-AR1 for CTIMPs, SL- AR2 for other studies]* |
|---|---|
| Copy to: | Mr David J Wilson |

**RESEARCH DEPARTMENT OF CLINICAL,
EDUCATIONAL AND HEALTH
PSYCHOLOGY**
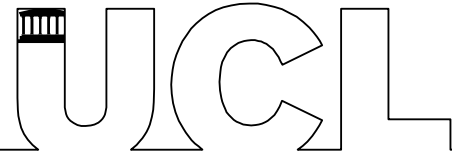
# Information Sheet & Consent Form
# Invitation to take part in a Research Project:

My name is John Helps. I am training as a Clinical Psychologist in the NHS, based at University College London.

I am inviting you to take part in the research study described below. Please take time to read the following information and ask me if there is anything that is not clear to you or if you would like further information. Take time to decide whether you would like to take part.

**Purpose:** To find out if people who have committed crimes, particularly antisocial or violent acts, think about other people differently to the rest of the population. The results may improve ways of helping offenders and professionals in their work

**Who we would like to take part:** You have been chosen because of your previous contact with the law. I have been given your name by a professional involved with your case.

**What will happen to me if I take part?**
If you agree to take part, an appointment will be arranged with you.
You will be able to discuss the project further and be asked to sign a consent form that you are willing to participate.
You will fill in a few forms with me and then do some computer tasks – most people find these enjoyable.
It will take about 2 hours.
To recognise your time, you will be given a **£10 voucher** (or **up to £15** if you have travelled for the appointment) for a local supermarket.
If you wish, you will be sent a summary of the findings.

**What are the risks of taking part?**
Any information collected about you during this study will only be used for the purposes of this study. Data will be confidential and will not include your name. It will not be possible to link your data results to you. It will not be passed onto the Probation Service (or any other organisation).
Your study data will not affect your probation conditions.
Apart from the Probation service, no other people will be informed of your participation in this study.

You will not be asked anything about your crime. However, if you do tell me about any offences that are not known, or suggest anything that is a risk to others, I will be obliged to disclose this information to a professional involved in your case.

**Do I have to take part?** No. You should only take part if you want to. Whether or not you take part will not disadvantage you in any way or affect your probation conditions or sentence. If you decide to take part, you will be free to withdraw during the task at any time without giving a reason; all information collected to that point will be deleted.

**What if I have any concerns or worries or wish to make a complaint?**
Please let me (John Helps) know, and I will do my best to answer your questions.
If you wish to complain about the conduct of me (the Researcher) or how you are treated in this study, you should write, setting out your concerns, to: Dr J. Feigenbaum, Senior Lecturer, Research Department of Clinical, Educational and Health Psychology, University College London, Gower Street, London WC1E 6BT.

**Contact Details of Chief Investigator:**
John Helps
Tel:    07979 770936
Email:  jnewburyhelps@yahoo.co.uk

**Notes:**
a) This study has been approved by the NWLondon Rec 2 Research Ethics Committee, a group of academics and Researchers to make sure your safety, rights, well-being and dignity are all protected (Project ID Number: 10/H0720/57).
b) This study has also been reviewed and given approval by the London Probation Service.
c) This research is funded by University College London, the University of London and the NHS.
d) The Chief Investigator is bound by strict professional guidelines on confidentiality by the British Psychological Society and University College London.
e) All data will be collected and stored in accordance with the Data Protection Act 1998.

Information Sheet Version 6 20/08/2010

**Informed Consent Form for Participants in Research Studies**

Please complete this form after you have read the Information Sheet and discussed any questions you might have about the research.

**Title of Project:**     Investigating impairments in mentalisation amongst people with offending behaviour.

This study has been approved by the NWLondon Rec 2 Research Ethics Committee (Project ID No: 10/H0720/57).

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part.

If you have any questions arising from the Information Sheet or explanation already given to you, please ask the Chief Investigator before you agree to join in.

You will be given a copy of this Consent Form together with the Information Sheet to keep and refer to at any time.

- I understand that if I decide during the research task that I no longer wish to participate in this project, I can notify the Chief Investigator and be withdrawn immediately.
- I consent to the processing of my personal information for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.
- I understand that the information I have submitted will be published as a report and I will be sent a copy, if requested. Confidentiality and anonymity will be maintained and it will not be possible to identify me from any publications.

**Participants Statement**

**I, ...........................................................................................(Name printed)**

Agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study, I have read both the notes written above and the Information Sheet about the project, and understand what the research involves.

**Signed: ………………………………….          Date: ………………………………**

**Chief Investigator's Statement**

**I, John Helps**

Confirm that I have carefully explained the purpose of the study to the participant and outlined any foreseeable risks or benefits (where applicable).

**Signed: ………………………………..**　　　　**Date: ………………………………**

CF Version 5. 24/08/2010

**Perspectives Instructions**

**First Part**

This experiment is investigating people's ability to follow instructions on the computer.

Here is an example of what you will see [showing picture example]. You will be presented with a grid with several objects located in the slots. The director, who is on the other side of the grid, will give you instructions on which objects to move and where to move them. As you can see, there are several covered slots. You are able to see the objects in these slots, but the director cannot.

This is how things look for the director [show slide of the array from director's point of view]. The director does not know what is behind the covered slots, so it will be important to take his point of view into account when you follow his instructions.

[Go back to the first screen] For example you can see the car, and because this slot is not covered, [Go to the director's point of view screen], the director can see the car too.

[Go back to the first screen] Let's do another one. You can see the red apple, but because this slot is covered, [Go to the director's point of view screen], the director cannot see the apple.

[Go back to the first screen] Can you show me another object which the director cannot see? [Wait for a response] … Yes that's right [Go to the director's point of view screen], the director cannot see the telephone/watch/nail varnish.

[Go back to the first screen] Now can you show me an object that the director can see? [Wait for a response]… [Go to the director's point of view screen], yes that's right the director can see the scissors/person/car/goose.

[Repeat until it seems the child understands].

So remember, when you follow the director's instructions, it's important to take his point of view into account.

Your task is to listen to the director's instructions and then "move" the object by clicking the mouse pointer on the object and sliding it to the correct slot. You will always be asked to move the object by one slot, for example one slot to the right, or one slot to the left.

The instructions given by the director should be taken from your point of view, [Go back to the first screen] so if the director asks you to move the scissors left for example, you need to move the scissors towards your left, i.e. this side. Can you see we wrote Left and Right on those pieces of paper? It is to help you.

[Demonstrate example of moving person up].

Can you try? What should do if the directory says "move the car right" ? [Check that the child click and drag the mouse pointer correctly].

You should do this as quickly and as accurately as possible. When you click on them, the objects won't actually move, but you should act and move the mouse as if they did.

If for some reason you don't respond quickly enough the experiment will move on automatically. If that happens, don't worry – you should just respond to the next instruction and not try to catch up.

**Second part**

Now you are going to do something similar to the task where you were moving objects earlier.

This time the director is not going to be there anymore.

As you can see, several of the slots have dark grey backgrounds, whereas most of them are clear. You are going to hear instructions to move the objects. These instructions only refer to items in the clear slots. They do not refer to objects in the grey slots.

So you have to ignore the objects in the grey slots. It will be important to take this into account when you follow the instructions.

Can you show me a slot with a grey background?  [Let them answer] And a slot with a clear background? [Let them answer]

Is it all clear ? [Show the next slide with relational trials]. If I said move the top truck right, what would you do ? [Check they do the correct thing and ignore the truck in the grey background. If not clear, explain again.]

Great, now we'll start this part of the experiment.

**Meeting with Hounslow Probation Service**
**Research Summary: "Are there mentalisation impairments in people
with Antisocial Personality Disorder?"**

**Overview**

There is little evidence for the effective treatment of people with Antisocial Personality Disorder (ASPD)(NICE,2009). The aim of this study is to explore possible mentalisation deficits in people with ASPD, which might support emerging clinical interventions.

Mentalisation is the ability to understand and take on what is going on in one's own and other people's minds, eg to judge their perspective or intentions; to read their emotional state; to understand social nuance such as irony or faux pas.

**Research Design**

1) **Sample:** 84 male clients being supervised by Probation services in West & NW London (Brent, Ealing, Harrow, Hillingdon and Hounslow), from the ages of 18 and whose first language is English. Exclusions: people with characteristics that have known associations with mentalisation impairments, that is: schizophrenia; severe depression or autistic spectrum disorders. Information will also be collected on participants in order to control for certain variables: brain injury, psychotropic medication; Axis I Mental Health disorders; illicit drug taking.

2) **Recruitment:**

   The Researcher linking with appointments being made with SPOs so that possible participants are asked at the time of a regular appointment whether they would like to take part. A research appointment could be made to take place according to available schedule.

   Participants will be offered a £15 supermarket voucher if they complete the assessment. This is felt to be an appropriate recognition of the time they will be giving up and in line with recognised good practice for user involvement. It will also optimise take-up for the study.

3) **Experiment:** an individualised battery of mentalisation tests to be administered to measure ability to understand others' emotional and cognitive states.
   a. 3 or 4 questionnaires;
   b. 4 tests/computer games;
   c. There is no discussion of previous history or offences;
   d. Overall time required is about 2 hours.

**Potential Benefits of Research**

The research is aiming to enhance understanding of the behaviour of people with ASPD, based on a hypothesis that there is an impairment in their ability to read and understand other people's intentions and/or emotional states. Such an analysis may help to:

- Develop evidence-based treatments. There is little evidence for the effective treatment of people with ASPD (NICE,2009). The Bradley report (2009) recommends further efforts are made to divert those with mental health difficulties out of the Criminal Justice System into treatment. Mentalisation-based Therapy has demonstrated benefits for people with Borderline Personality Disorder and there is reason to believe that some groups of people with ASPD have similar characteristics.
- Enhance risk assessment. Actuarial risk assessment tools are improving prediction of risk and this research may help improve definition of characteristics with associated measurement tools to build into these methods.
- A by-product for local probation services is the possibility of an aggregated and anonymous mental health profile of participants.

**Researcher: John Helps**
**Trainee Clinical Psychologist**
**07979 770936**
j.newbury-helps@nhs.net

20<sup>th</sup> September 2010

## Regression Analysis for Dependent Variable PAI ASPD
### Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics R Square Change | F Change | df1 | df2 | Sig. F Change |
|---|---|---|---|---|---|---|---|---|---|
| 1 | .389[a] | .151 | .140 | 9.110 | .151 | 13.528 | 1 | 76 | .000 |
| 2 | .470[b] | .221 | .201 | 8.784 | .070 | 6.759 | 1 | 75 | .011 |
| 3 | .516[c] | .266 | .237 | 8.584 | .045 | 4.535 | 1 | 74 | .037 |

a. Predictors: (Constant), BSI Global Severity Index

b. Predictors: (Constant), BSI Global Severity Index, Age in years

c. Predictors: (Constant), BSI Global Severity Index, Age in years, MASC None %

### ANOVA

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1122.850 | 1 | 1122.850 | 13.528 | .000[a] |
| | Residual | 6307.916 | 76 | 82.999 | | |
| | Total | 7430.767 | 77 | | | |
| 2 | Regression | 1644.339 | 2 | 822.170 | 10.656 | .000[b] |
| | Residual | 5786.427 | 75 | 77.152 | | |
| | Total | 7430.767 | 77 | | | |
| 3 | Regression | 1978.483 | 3 | 659.494 | 8.951 | .000[c] |
| | Residual | 5452.284 | 74 | 73.680 | | |
| | Total | 7430.767 | 77 | | | |

### Coefficients

| Model | | Unstandardized Coefficients B | Std. Error | Std'ized Coeff Beta | t | Sig. | 95.0% Confidence Interval for B Lower Bound | Upper Bound |
|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | 69.318 | 4.354 | | | .000 | 60.646 | 77.991 |
| | BSI GSI | .262 | .071 | .389 | 3.678 | .000 | .120 | .403 |
| 2 | (Constant) | 76.621 | 5.051 | | 15.169 | .000 | 66.558 | 86.683 |
| | BSI GSI | .272 | .069 | .404 | 3.956 | .000 | .135 | .409 |
| | Age in years | -.238 | .092 | -.265 | -2.600 | .011 | -.421 | -.056 |
| 3 | (Constant) | 73.640 | 5.131 | | 14.353 | .000 | 63.417 | 83.864 |
| | BSI GSI | .256 | .068 | .380 | 3.785 | .000 | .121 | .390 |
| | Age in years | -.200 | .091 | -.223 | -2.192 | .032 | -.382 | -.018 |
| | MASC None % | .338 | .159 | .217 | 2.130 | .037 | .022 | .654 |