

# **THE UNIVERSITY OF HULL**

*Investigating the role of age and affect on social cognition following  
traumatic brain injury*

**being a dissertation submitted in partial fulfilment of the requirements for the  
degree of Doctor of Clinical Psychology, in the University of Hull**

**by**

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## **A. Overview**

The portfolio has three parts:

Part One is a systematic literature review, in which the theoretical, conceptual and empirical literature relating to emotion and moral reasoning in offender populations is reviewed.

Part Two is an empirical paper, which explores the impact of age at injury on moral reasoning following a traumatic brain injury.

Part Three comprises the appendices.

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## **Part One: Systematic Literature Review**

*Exploring moral reasoning and emotion in offender populations: A systematic  
review*

This paper is written with the intention of submission to the journal Clinical Psychology  
Review<sup>1</sup>

Total word count<sup>2</sup>: 9131

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<sup>1</sup> Appendix B: Clinical Psychology Review 'Instructions to Authors'

<sup>2</sup> Word count excludes tables, figures and footnotes



# **Exploring moral reasoning and emotion in offender populations: A systematic review**

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## **Abstract**

Moral reasoning and emotion have consistently been linked in the literature; interactions between the two concepts are well-researched. Offenders have been studied in relation to moral reasoning as a population who have committed morally- or socially-deviant acts. The current review sought to understand how emotion and moral reasoning related to one another in this population; it also sought to understand whether this was linked to offending behaviours. A systematic search of four databases was conducted, resulting in seven papers which were reviewed in depth. Data were extracted from these, and studies were assessed for their quality. Empathy was a key area in the results, with mixed findings. Two studies found that poorer emotional empathy related to poor aspects of moral reasoning; two studies found no relationship. Impairments in emotional empathy, in psychopaths, only had an impact at a high threshold of impairment. Cognitive empathy and moral reasoning correlated in a positive linear relationship. Participants' own emotions also impacted upon their moral judgement; this was moderated by multiple factors. Offending was related to moral reasoning in adolescence, but not adulthood. Thus, in conclusion, emotion and moral reasoning had a complex relationship, with age moderating the relationship with delinquency. Future directions for research include more detailed exploration of these concepts, such as by examining empathy or psychopathy.

**Keywords:** *Moral reasoning; moral judgment; emotion; affect; offenders; delinquents*

## **Introduction**

Moral reasoning and its relationship with emotion has been the source of a great deal of research. Whilst there is some consensus that the two concepts are at least related, an interesting debate has emerged regarding the extent to which emotion has a role in our moral reasoning, and moral cognition as a whole (see Huebner, Dwyer & Hauser, 2009; Young & Koenigs, 2007). Some authors have found that the involvement of emotion varies according to ‘dilemma-type’ (Greene, Sommerville, Nystrom, Darley & Cohen, 2001); similarly, different elements of emotion, such as emotional state or empathy, have been implicated differently in moral reasoning (e.g. Valdesolo & DeSteno, 2006). The question has been asked of whether emotion influences our moral reasoning, or merely follows on from it, resulting in a ‘chicken or egg’ argument which is further complicated when distinguishing between moral judgement and moral action. A variety of populations have been explored, across the lifespan, between genders and in abnormal populations, such as those who have sustained a traumatic brain injury, who have been diagnosed with a learning disability, or who have committed a crime. Whilst the breadth of this research has undoubtedly led to a richer, more detailed understanding of this relationship, a clear consensus has yet to be reached on how emotion and moral reasoning interact (see Huebner et al., 2009); there is a clear need to explore and make sense of the present literature. The current systematic literature review seeks to review one part of the current literature, namely research exploring emotion and moral reasoning in offender populations.

### *Conceptualising moral reasoning*

What is moral reasoning? This simple question has been fiercely debated, again with no overall agreement; the concept of moral reasoning has been variously accused of being irrational, intuitive, subjective and culturally-constructed (for a review, see Levy, 2006). However, as a

rule, moral reasoning is defined in the literature as the way in which we weigh-up options and information when considering ethical dilemmas (e.g. Gibbs, 2010). Moral reasoning has varyingly been referred to as interchangeable with moral decision-making, moral judgement and ethical decision-making, but is not to be confused with other concepts which do not involve a reasoning process. Moll, Oliveira-Souza and Eslinger (2003) described the neural correlates of moral reasoning involving a distinct, albeit complicated, system. Detangling the research somewhat, Young and Koenigs (2007, p70) summarised the current empirical approach to moral reasoning as seeking to “determine how we do behave or how we do decide what is right and wrong”.

#### *Models of moral reasoning: The hypothesised role of emotion*

Emotion is often considered to play a key role in moral reasoning. Studies have found that individuals change the way in which they reason moral dilemmas when their mood is manipulated (Schnall, Haidt, Clore & Jordan, 2008; Valdesolo & DeSteno, 2006). Additionally, the emotional content of moral dilemmas can vary, between ‘utilitarian’, i.e. low in emotional salience (e.g. pulling a lever, to save runaway trolley with five passengers, but subsequently running over and killing one person on the new route) to ‘personal’, i.e. high in emotional salience (e.g. actively pushing someone in front of the runaway trolley, killing the one but saving the five); judgement of these can differ, even though the outcome is the same (Greene et al., 2001).

Much of the recent research attempting to untangle the complicated relationship between emotion and moral reasoning has used neuroimaging or neuropsychological methods. Moll et al. (2002, 2003) used neuroimaging to highlight the importance of several structures in moral reasoning, including those involved in emotional processing, such as the amygdala. Activation of the ventromedial prefrontal cortex (VMPFC) occurs more in emotionally-salient moral dilemmas when compared to emotionally-salient non-moral dilemmas (Moll et al.,

2002). Moll and colleagues (2003) consequently proposed that moral reasoning involves a sensory decoding of emotional reactions, followed by a “moral-emotional” attribution and finally subsequent implementation of control of moral actions. Moll et al. (2003) thus proposed that emotion is a primary part of moral reasoning, with cognitive control moderating these initial emotional responses. Greene, Nystrom, Darley and Cohen’s (2004) model of moral reasoning also places emphasis on “cognitive control and conflict” as the key process in moral reasoning, but here affect is a moderating factor, tempering our cognitive judgements. Hoffman (e.g. 2000, 2008), however, has argued that empathy in particular is the key to moral reasoning, with five different possible types of empathy which may impact upon moral reasoning; three ‘preverbal’ and two semantic. He proposed that the automatic, preverbal empathy modes are important because they “compel” people to respond to cues in the moral dilemma; the two semantic modes allow perspective-taking and context. Thus, from this perspective, the interpersonal aspects of emotion are seen as more complex than simply affective responses to moral dilemmas.

Therefore, across all three models, emotion as a key factor in our moral reasoning and subsequently our ability to navigate the ethical world. In contrast to this, several recent authors have discussed the possibility that emotion follows on from moral judgements (Huebner et al., 2009; Young, Koenigs, Kreupke & Newman, 2012), rather than occurring within it; this view therefore implies that emotion is not essential to moral reasoning. However, Damasio (1994) argued that emotion is integral to all cognition. In his somatic marker hypothesis, Damasio (1994) proposed that we attach emotional ‘tags’ to certain cognitive processes; thus we are discouraged from moral transgressions (e.g. hurting someone) by negative emotional responses (e.g. disgust or sadness). Emotion would therefore be hypothesised as important to moral reasoning, but moral reasoning would not be unique in this. However, injuries to the VMPFC result in ‘normal’ responses to impersonal moral scenarios, but ‘abnormal’ responses to

personal scenarios (Koenigs et al., 2007). Thus, the exact role of emotion in moral reasoning remains unclear, but appears to have some relationship.

#### *Moral reasoning and emotion in 'abnormal' groups*

As with the research conducted by Koenigs et al. (2007) described above, 'abnormal groups' have been studied to understand what occurs when moral reasoning is somehow impaired. Primarily, investigation has focussed upon individuals who have sustained damage to their brain, with much of the research focussing in particular on damage to the prefrontal cortex (see Young & Koenigs, 2007). Individuals with damage to the VMPFC have specific deficits in their ability to weigh-up personal dilemmas (Koenigs et al., 2007), and damage to communication pathways between the hemispheres has been implicated in impaired moral reasoning (Miller et al., 2010).

Similarly, whilst 'healthy' participants judged 'personal' harm to be less permissible than 'impersonal' harm (Cushman, Young & Hauser, 2006), individuals with fronto-temporal dementia evaluated them as equally permissible (Mendez, Anderson & Shapira, 2005). Thus the individuals with FTD in Mendez et al. (2005), and the individuals with VMPFC lesions in Koenigs et al. (2007) demonstrated a possible impairment in the relationship between cognitive abilities and emotive responses to the dilemmas, in line with Greene et al. (2004) or Moll et al. (2003).

Psychopathy is another phenomenon which has been studied extensively with regard to impaired moral and emotional processing; it has been conceptualised by Hart and Hare (1997) as a personality disorder involving impairments in behaviour (e.g. increased risk-taking), interpersonal skills (e.g. manipulation, egocentricity) and affect (e.g. blunted affect, shallow relationships). Blair (1995) found that both 'adult' and 'developmental' psychopaths show impaired moral reasoning, making no distinction between moral transgressions (e.g. hitting someone) and social transgressions (e.g. talking out of turn) in a moral/conventional distinction

task; ‘normal’ participants judge moral transgressions as less permissible, since moral transgressions involve potential victims. However, until recently, research into psychopathy neglected the affective and social characteristics, biasing research (Saltaris, 2002); recent studies have addressed this somewhat, particularly focussing on empathy, “a biologically and affectively based, cognitively mediated and socialized predisposition to connect emotionally with others” (Gibbs, 2010; p77). Thus, empathy is the ability to understand one another emotionally and cognitively; psychopaths are often discussed as having an impairment in this respect. Thus, a question arises of the role of emotion and moral reasoning in actual moral transgressions, such as among offender populations.

#### *Moral reasoning, emotion and offenders*

Kohlberg (1978) purported that less-developed moral reasoning may cause individuals to act inconsiderately towards others. Subsequent research amongst offenders has considered the role of moral reasoning from a number of angles, much of which has focussed upon psychopathy; however, research into non-psychopathic offenders has in many ways found few differences between the two groups. Harenski and Keihl (2011) conducted a review of literature on emotion and “morality” amongst psychopathy and non-psychopathic “paraphilias”; they concluded that the research implicated both groups as having impaired moral reasoning. These individuals may have impaired autonomic responses to moral transgressions, and so the deterrent present for other individuals may be absent (Damasio, 1994). This would suggest that, in order to commit some morally- or socially-inappropriate crimes, offenders might have impaired emotional processing. However, it would be naïve to assume all criminals are alike, or all crimes as involving identical cognitive processes.

As Cima, (2010) noted, whilst there is agreement on the components of moral judgement, “where the controversy emerges [is] in deciding which of these processes alone or in combination provide the source of our moral judgements”; thus, the decision-making process

prior to an actual moral transgression, or perhaps criminal act, may be influenced by many different factors. Part of the decision-making process involves emotion and moral reasoning; therefore, the current article sought to evaluate the role of emotion and moral reasoning amongst delinquents and offenders, and understand the interaction between these variables by systematically reviewing the current literature. In particular, the review aimed to understand:

1. What is the relationship between emotion and moral reasoning in this population?
2. Does this relationship and its constituent parts relate to actual offending behaviours?

## **Method**

### *Search strategy*

A systematic literature search was conducted on April 15<sup>th</sup> 2012, using the following four databases: PsycINFO, MEDLINE, PsycARTICLES and Cumulative Index to Nursing and Allied Health Literature (CINAHL). These databases were chosen in order to attract a wide range of literature from psychological, ethical and forensic areas as well as related areas. A search was carried out to ensure that an existing review of this literature did not exist; this search did not identify any systematic literature reviews investigating the interaction between emotion and moral reasoning in offending populations.

All articles generated by the initial searches were assessed according to the inclusion and exclusion criteria (n=128). Articles clearly failing the inclusion and exclusion criteria at this point were rejected (n=101); if it was unclear whether a study met the inclusion criteria from the abstract, it was retained at this point. Duplicates were then removed (n=27) and all remaining articles meeting the criteria were acquired in full-text version (n=19). These were fully assessed against the inclusion and exclusion criteria; those meeting the criteria were accepted for review (n=6). The reference lists of the accepted articles were hand-searched, providing one further study for inclusion (Blair & Cipolotti, 2000). Key authors were contacted to identify any possible additional papers; no further papers were included from this (n=0). The



final number of papers accepted for review was therefore seven. Key information from the accepted articles was acquired and was reported in a data-extraction table.

### *Search terms*

The following terms were used to search for the papers used in the review: (emotion\* OR affect\* OR feeling\*) AND ((moral\* OR ethic\* ) N3 ((reason OR reasons OR reasoned OR reasoning OR judge\* OR judgment OR (decision\* N2 mak\*) OR (problem\* N2 solv\*) OR dilemma\*)) AND (offender\* OR offence\* OR offense\* OR delinquent\* OR delinquency OR criminal\* OR forensic\* OR (break\* N3 law\*) OR inmate\* OR felon\* OR criminal\* OR prison\* OR convict\*). The terms for ‘moral’ and ‘reasoning’ were required to be within 3 words of one another, using the ‘N3’ Boolean operator. Additionally, the asterisk (\*) truncation was used in order to expand search results to those with plural endings or multiple possible endings. ‘Reason’ was not truncated but searched separately, in order to prevent hits for ‘reasonable’; similarly, offence, offense and offender were searched separately in order to avoid ‘offensive’. Specific conditions or crimes, e.g. psychopathy or murder, were not included, to avoid biasing the search results towards a particular population or crime.

### *Search limits*

Limits were applied to the database searches, in order to restrict the results of the searches. The limits applied were: 1) Studies available in the English language; 2) Studies published in peer-reviewed journals.

### *Inclusion criteria*

Papers were included if they met the following criteria:

- i. Studies which measure moral reasoning, either by:

- a. Using a commonly-used, standardised measure, (e.g. Sociomoral Reflection Measure – Short Form (SRM-SF; Gibbs, Basinger & Fuller, 1992); or,
  - b. Using (or adapting) moral dilemmas which are commonly used in published, peer-reviewed articles and have therefore been considered acceptable by the research community, e.g. Greene et al. (2001).
- ii. Studies which measure emotion, either by:
  - a. Measuring emotional response to moral dilemmas, e.g. positive or negative emotions ( i.e. using emotion as a dependent variable); or,
  - b. Manipulating emotional content of moral dilemmas and discussing them in this context, e.g. personal vs. impersonal moral dilemmas (i.e. using emotion as an independent variable).
- iii. Studies where the population includes at least one group of ‘offenders’, defined as:
  - a. Individuals who have been found guilty of at least one criminal offence; or,
  - b. Individuals who self-report to have committed at least one criminal offence.
- iv. Studies in peer-reviewed journals.
- v. Studies published in the English language.

#### *Exclusion criteria*

Papers were excluded from the review if they met any of the following criteria:

- i. Studies only measuring emotion in a way other than above, e.g. community non-offenders’ emotional reaction to criminal offences.
- ii. Studies measuring moral reasoning in a way other than above, e.g. idiosyncratic measures, unclear dilemmas, unvalidated measures.
- iii. Studies involving only non-offenders or which did not record delinquency.
- iv. Studies not published in peer-reviewed journals, or unpublished studies.
- v. Studies published in a language other than English.

- vi. Reports of a single case study.
- vii. Systematic literature reviews.

#### *Assessment of methodological quality*

The methodological quality of papers was assessed by two raters using a 20-item quality checklist<sup>3</sup>, adapted from the checklists of Downs and Black (1998) and the National Institute for Health and Clinical Excellence (NICE; 2006), both of which were originally developed to assess the quality of healthcare papers.

#### *Rating of interactions between variables*

Studies were assessed on whether they measured, and/or implied, a relationship between emotion, moral reasoning and offending in their populations. This is recorded as 'yes', 'no', 'unclear', 'partial' or 'N/A' (not applicable) in the data extraction table, and expanded below.

## **Results**

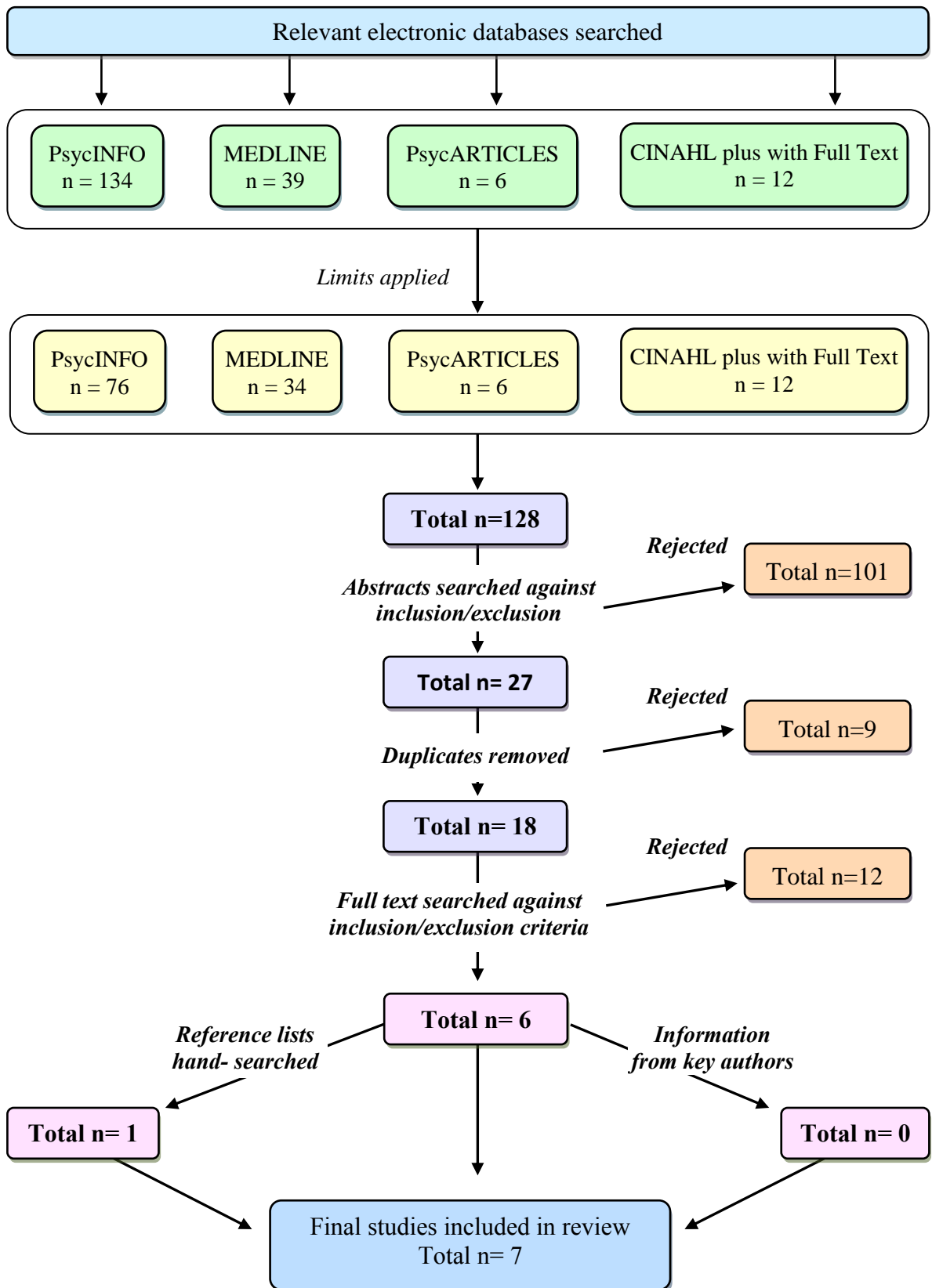
#### *Overview of search results*

The systematic review process is outlined in a flowchart, Figure 1 (overleaf). The reasons for excluding twelve articles at the full-text stage were: absence of a forensic or self-reported 'delinquent' sample (Astor & Behre, 1997; Cromby, Brown, Gross, Locke & Patterson, 2010; DeBrito et al., 2009), absence of any measure or manipulation of emotion (Raaijmakers, Engels & van Hoof, 2005; Link, Scherer & Byrne, 1977; Moody, 1997; Tavecchio, Stabrugman & Thomeer-Bouwens, 1999), absence of a moral reasoning measure which met inclusion standards (Sjoberg & Winroth, 1986), being a review paper (Harenski & Keihl, 2011; Kambam & Thompson, 2009; Knabb, Welsh, Ziebell & Reimer, 2009; Raine & Yang, 2006).

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<sup>3</sup> Appendix C: Quality Checklist

Figure 1. Outline of systematic review process



In total, seven studies were accepted for review: Blair and Cipolotti (2000); Cima et al. (2010); DeWolfe, Jackson and Winterberger (1988); Holmqvist (2008); Krettenauer and Eichler (2006); Lee and Prentice (1988); Young et al. (2012). Moral reasoning was assessed using a range of measures, including standardised measures (n=3), moral dilemmas taken from standardised measures (n=2), and moral dilemmas commonly used in the literature (n=3); one paper included both a standardised measure and a commonly-used moral reasoning measure. Emotion was also assessed using a range of measures; several studies included more than one measure of emotion. These included measures of empathy (n=5), emotion attribution (n=1), facial expression processing (n=2), affect consciousness (n=1) and emotional content of moral reasoning measures (n=3). Psychopathy was described as a manipulation of emotion in three studies.

### Quality

Two independent reviewers completed the quality ratings; quality was reported as an average score of the two. Percentage agreement ranged between 78.26% and 100% (Mean=87.43%). The studies included for review were of moderate- to high-quality, scoring between 18 and 22.5 out of a maximum of 24.

### Participants

Adult male prison inmates were the largest sampled population, included in four papers (Blair & Cipolotti, 2000; Cima et al., 2010; DeWolfe et al., 1988; Young et al., 2012). No two papers sampled exactly the same populations. Although four papers made a distinction between ‘psychopaths’ and ‘non-psychopaths’ (Blair & Cipolotti, 2000; Cima et al., 2010; Lee & Prentice, 1988; Young et al., 2012), only two defined these groups in the same way (Blair & Cipolotti, 2000; Young et al., 2012).

### Sample size

Study sample sizes ranged widely, from one paper which included a case study ( $n=1$ ) within the sample (Blair & Cipolotti, 2000), to another paper with 192 participants (Krettenauer & Eichler, 2006). Mean sample size was 76.71 ( $S.D=54.70$ ). Studies therefore had good statistical power, with the exception of one (Blair & Cipolotti, 2000), which compared two case studies, two small samples of prison inmates ( $n=5$  in each group) and a group of normal controls ( $n=10$ ); the small numbers were therefore part of the design.

### Age

Three papers sampled adolescents (Holmqvist, 2008; Krettenauer & Eichler, 2006; Lee & Prentice, 1988); adolescent samples ranged from 13.14 to 19.39 years old (group means, both in Krettenauer & Eichler, 2006). Four papers sampled adults; mean age ranged from 28.5 years old (group mean, Young et al., 2012) to 54 years old in the oldest group. One paper only described participants as “adults” (DeWolfe et al., 1988, p583); another paper reported whole-sample characteristics (Lee & Prentice, 1988). Only Young et al. (2012) reported an age cut-off, recruiting individuals under 45 years old. The average age of participants across all studies was 19.52 ( $S.D=0.76$ ), however Krettenauer and Eichler’s (2006) sample skewed this; excluding their participants, mean age was 27.75 ( $S.D=1.32$ ); medians were not available from the data.

### Gender

Two papers included male and female subjects (DeWolfe et al., 1988; Krettenauer & Eichler, 2006); all other papers included only male subjects. Whilst this limits the generalisability of the research and this review, this is a reflection of the gender bias in research into this population, and the gender split within forensic population as a whole; only 4.8% of prisoners are women (Berman, 2012).

### Ethnicity and country of origin

The largest ethnic group sampled was ‘white/Caucasian’ who constituted between 40% (Lee & Prentice, 1988) and 100% of the sample (Krettenauer & Eichler, 2006; Young et al., 2012). This is in line with UK prison statistics, which report that 74.3% of prisoners are white (Berman, 2012); however, it is important to note that the studies originated from different countries, as well as the United Kingdom (UK). Interestingly, Lee and Prentice (1988) alone sampled another ethnic group constituting more than 14% of the overall sample, with 60% of their sample being made up of equal numbers of black and “Mexican-American” subjects. Young et al. (2012) was unique in rationalising its choice of ethnic make-up for the study, stating that results in this area often did not generalise across ethnic groups. Three papers did not report ethnicity (Blair & Cipolotti, 2000; DeWolfe et al., 1998; Holmqvist 2008). The papers themselves originated from a wide range of countries, all of which were ‘Western’, including The UK (Blair & Cipolotti, 2000), The United States of America (DeWolfe et al. 1998; Lee & Prentice, 1988; Young et al., 2012), The Netherlands (Cima et al., 2010), Sweden (Holmqvist, 2008) and Germany (Krettenauer & Eichler, 2006).

### Offending

Only two papers reported complete offence statistics for their sample. In one, only participants who had committed murder or manslaughter were included (Blair & Cipolotti, 2000); another paper reported percentages for each group of “murder”, “sexual offence”, “theft” or “bodily harm” (Cima et al., 2010, p3). Of the other studies, one paper reported that offences were “primarily first offences... involving burglary, theft, assault, truancy, runaway, illegal trespass and illegal possession of drugs” (Lee & Prentice, 1988, p129) and one paper reported the percentage of the sample who had committed an offence “involving force” (DeWolfe et al., 1988; p587); three papers did not report the nature of offences or self-reported offences at all

(Holmqvist, 2008; Krettenauer & Eichler, 2006; Young et al., 2012). Six papers involved participants convicted of offences; the other paper recorded 'self-reported delinquency', justifying this as "the least biased procedure for the assessment of adolescents' problem behaviour", since offences are not always recorded by police (Krettenauer & Eichler, 2006, p496).

### Recruitment methods

Forensic samples were recruited from institutions for offenders; this included prisons (Blair & Cipolotti, 2000; DeWolfe et al. 1988, Young et al., 2012), a forensic psychiatric hospital (Cima et al. 2010) and institutions for young offenders (Holmqvist, 2008; Lee & Prentice, 1988). Non-forensic samples were recruited from schools (Lee & Prentice, 1988), and a long-term neurorehabilitation hospital (Blair & Cipolotti, 2000) or else recruitment source was not reported (Blair & Cipolotti, 2000; Cima et al., 2012). Krettenauer and Eichler (2006) recruited their mixed (self-reported delinquency) sample from local schools.

### Purpose of studies

The studies included for review could broadly be divided into two different types: 1) Studies where an interaction between psychopathy and moral reasoning were one focus (sometimes of many), measuring emotion as a variable (Cima et al., 2008; Holmqvist, 2008; Young et al., 2012); 2) Studies where an interaction between delinquency and moral reasoning were a main focus, measuring emotion as a variable (Krettenauer & Eichler, 2006; Lee & Prentice, 1988). However, two papers had a clearly different focus: One paper focussed on understanding differences in social cognition (including in moral reasoning and emotional processing), between 'acquired sociopathy' and 'developmental psychopathy' (Blair & Cipolotti, 2000); another paper focussed upon gender differences in moral reasoning and emotion amongst offenders (DeWolfe et al., 1988).



Table 1 (overleaf) reports key data from each paper, including key findings, quality rating, and interaction between emotion, moral reasoning and offending; information was gathered using a data extraction form.<sup>4</sup>

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<sup>4</sup> Appendix D: Data extraction form

*Table 1. Key data from included studies*

Authors (Date) Country	Design	Participants (n)	Allocation to groups	MR Measure	Emotion Measure	Other measures	Key Findings	Relationship? MR x E	Quality MR/E x Rating offending
Blair & Cipolotti (2000) UK	Between groups	1) JS: 'acquired sociopathy'; dysexecutive syndrome (1)	1) TBI and acquired sociopathy	i) Moral and conventional dilemmas from Blair et al. (1995)	ii) Emotion attribution task	v) Theory of Mind task	MR: JS and DP group failed moral/convention distinction task, even without prohibiting rules; CLA/non-DP passed.  Emotion: JS showed impaired emotion attribution (fear, anger, embarrassment) and expression recognition (happiness, anger, disgust, sadness) as well as impaired emotional response (fear, anger, disgust, sadness); sadness and fear same as DP group, lower than non-DP group. CLA showed sadness recognition deficit only. DP group demonstrated good emotion recognition and emotional attribution; however, showed selective emotional response deficit (sad, fearful). Non-DP group passed all emotion tasks.  Other: ToM intact in all participants. Only the DP group did not respond to negative feedback in role-reversal task. JS identified fewer norm violations than all other groups. Concluded that 'acquired sociopathy' and 'developmental psychopathy' are different, although both are emotionally impaired	Yes  No  E: No	18
		2) CLA: dysexecutive syndrome (1)	2) MND and dysexecutive syndrome		iii) Facial expression processing	vi) Social situations tasks			
		3) 'DP group': Offenders; 'developmental psychopathy' (5)	3) Prison inmates; PCL-R $\geq 30$		iv) Autonomic response to facial expressions	vii) Reversal learning tasks: risk avoidance and set-changing			
		4) 'Non-DP group': Offenders no psychopathy (5)	4) Prison inmates; PCL-R $\leq 20$						
		5) Controls (10)	5) Normal age- and IQ-matched controls						

Authors (Date) Country	Design	Participants (n)	Allocation to groups	MR Measure	Emotion Measure	Other measures	Key Findings	Relationship? MR x E	Quality MR/E x offending Rating
Cima et al. (2010) The Netherlands	Between groups	1) Healthy controls (35)  2) Psychopathic offenders (14)  3) Non-psychopathic offenders (23)	1) Community non-offenders  2) Forensic psychiatric inpatients; PCL-R $\geq 26$  3) Forensic psychiatric inpatients; PCL-R $< 26$	i) SRM-SF  ii) Moral dilemmas from Greene et al. (2001, 2004)	iii) TSST (cortisol levels)  iv) Personal content of moral dilemmas	v) PCL-R (psychoathy)	MR: No between groups difference. Psychopaths gave more 'permissible' ratings (non-significant). No group or case-by-case difference in MR stage. Crime-type and MR not correlated.  Emotion: Personal dilemmas judged less permissible than impersonal. No group difference in utilitarian judgement. Psychopathic group showed no change in cortisol under stress; all others did.  Other: No relationship between psychopathy factor and MR.	Yes MR: No  E: No	22
DeWolfe et al. (1988) USA	Between groups	1) Male prison inmates (43)  2) Female prison inmates (43)	1) Male  2) Female	i) SORM	ii) HES (cognitive empathy)  iii) QMEE (emotive empathy)	iv) Autonomy Scale  v) CPI Socialization Scale  vi) Locus of control scale	MR: Significant correlation between MR and HES empathy. No correlation between MR and QMEE empathy. Males higher MR stage than females.  Emotion: Males higher HES empathy; females higher QMEE empathy. Weak correlation between HES and QMEE.  Other: More males than females convicted for crimes involving force. 76% of sample poor at socialization; women better than men. Men more internal locus of control. No difference in autonomy.	Partial MR: Unclear  E: Unclear	20

Authors (Date) Country	Design	Participants (n)	Allocation to groups	MR Measure	Emotion Measure	Other measures	Key Findings	Relationship? MR x E	MR/E x offending	Quality Rating
Holmqvist (2008) Sweden	Within group	Male adolescent juvenile offenders (47)	Resident in young offender institutions	i) SRM- SF	ii) ACI (affect conscious- ness)	iv) HCR- 20 (risk)	<i>MR:</i> Not correlated to psychopathy, or “any measures”.  <i>Emotion:</i> Psychopathy related to low empathy and low consciousness of shame, but psychopathy and overall affect consciousness not linked.  <i>Other:</i> Psychopathy not related to cognitive distortion level or self- reported attachment problems. Relationship between empathy and moral reasoning not analysed.	No	<i>MR</i> Unclear  <i>E</i> Unclear	22
Krettenauer & Eichler (2006) Germany	Mixed design	Male and female German adolescents (192)	Recruited from German high- schools	i) Adapted moral dilemmas from happy victimiser paradigm	ii) Personal content of moral dilemmas : participants asked how they would feel as the protagonist	iii) Self- reported delinquen- cy  iv) Social desirability  v) Meta- ethical stance	<i>MR:</i> ‘Moral emotions’ predicted delinquent behaviour. Significant (weak) age-related change in ‘moral emotions’; older participants considered context. Confidence in moral judgement related to stronger moral emotions.  <i>Emotions:</i> Stronger emotional reactions correlated to less delinquent behaviour; moderated by gender, age, confidence in moral judgement and meta-ethical stance but remained significant overall.  <i>Other:</i> Significant social desirability bias. Significant effect of ‘story’.	Yes	<i>MR</i> Yes  <i>E</i> Yes	20.5

Authors (Date) Country	Design	Participants (n)	Allocation to groups	MR Measure	Emotion Measure	Other measures	Key Findings	Relationship? MR x E	MR/E x offending	Quality Rating
Lee & Prentice (1988) USA	Between groups	1) Psychopathic delinquents (12) 2) Neurotic delinquents (12) 3) 'Other' delinquents (12) 4) Non-delinquent (18)	Grouped according to delinquent behaviour, 'problem' behaviours and personal opinions	i) Moral dilemmas from Kohlberg (1963)	ii) IRI (empathy) iii) QMEE (emotive empathy)	iv) Role-taking task v) Logical cognition vi) Locus of control scale	<i>MR:</i> Delinquents significantly less mature MR, controlling for age and verbal skills (which both correlated with MR). MR significantly correlated with logical cognition and role-taking. No MR difference in delinquent groups. <i>Emotion:</i> Empathy measures correlated. No significant group differences in empathy. No correlations between empathy and moral reasoning.	No	<i>MR:</i> Yes <i>E:</i> No	20
Young, Koenigs, Kruepke & Newman (2012) USA	Between groups	1) Criminal psychopaths (20) 2) Criminal non-psychopaths (25) 3) Criminal 'intermediate' (19)	1) PCL-R $\geq 30$ 2) PCL-R $\leq 20$ 3) PCL-R = 21-29	i) Moral dilemmas from Young & Saxe (2008)	ii) Moral dilemmas: a) accidental harm, b) attempted harm, c) intentional harm, d) neutral act	None	<i>MR:</i> Accidents judged more morally permissible by psychopaths than other groups; attributed to poor emotional response to victims. All groups judged harmful intentions less morally. All groups judged harmful outcomes less morally permissible than neutral outcomes. <i>Emotion:</i> No group differences, despite hypothesised deficit in psychopaths.	Yes	N/A	22.5

**KEY Acronyms:** MR: Moral reasoning; E: Emotion; MND: Motor neurone disease; TBI: Traumatic Brain Injury. **Moral reasoning measures:** Moral/conventional distinction Blair et al., (1995); Sociomoral Reflection Measure–Short Form (SRM-SF; Gibbs, Basinger & Fuller, 1992); Sociomoral Objective Reflection Measure (SORM; Gibbs & Widaman, 1982); Kohlberg's moral dilemmas (Kohlberg, 1963); Moral dilemmas from Young & Saxe (2008). **Emotion measures:** Hogan Empathy Scale (HES; Hogan, 1969); Trier Social Stress Test (TSST; Kirschbaum, Pirke & Hellhammer, 1993); Questionnaire Measure of Emotional Empathy (QMEE; Mehrabian & Epstein, 1972); Facial expression processing (Calder et al., 1996); Emotion attribution (Blair et al., 1995); Autonomic responses (Blair et al., 1997); Affect Consciousness Interview (ACI; Monsen et al., 1996); Empathy Index (EI; Bryant, 1982); Davis Interpersonal Reactivity Index (IRI; Davis, 1983). **Other measures:** Hare Psychopathy Checklist–Revised (PCL-R; Hare, 1991); Autonomy Scale (Kurtines, 1978); Internal-External Locus of Control Scale (Rotter, 1966); CPI Socialization Scale (Gough, 1960); Theory of Mind task (Happé, 1994); Social situations (Dewey, 1991); Reversal learning tasks (Bechara et al., 1994); Historical Clinical Risk-20 (HCR-20; Webster et al., 1997); Psychopathy Checklist–Short Version (PCL-SV; Hare et al., 1994); Attachment Scale Questionnaire (ASQ; Feeney et al., 1994); German Social Desirability Scale (Stöber, 2001); Behaviour Problems, Personal Opinions (both Quay & Parsons, 1971); Role-taking task (Flavell et al., 1968).

### *Relationship between emotion and moral reasoning*

Whilst all studies discussed the role of emotion and moral reasoning, two did not statistically compare moral reasoning measures and emotion measures (Blair & Cipolotti, 2000; Holmqvist, 2008). However, Blair and Cipolotti (2000) discussed their findings on emotion and moral reasoning in terms of their relationship, and Holmqvist (2008) discussed the relationship between psychopathy and moral reasoning in the context of an empathy deficit.

Of the seven studies reviewed, five found some form of relationship between moral reasoning and emotion (Blair & Cipolotti, 2000; Cima et al., 2010; DeWolfe et al., 1988; Krettenauer & Eichler, 2008; Young et al., 2012). Two studies found no significant relationship (Holmqvist, 2008; Lee & Prentice, 1988). Of the papers which did find a relationship, findings were often mixed. Key results are divided into those regarding interpersonal emotion, i.e. participant responses relating to others' experience and those regarding participants' own emotions. Measures of empathy were included within results, as empathy pertains to an emotional process within moral reasoning, and has often been cited as a key affective element of moral reasoning (e.g. Hoffman, 2008).

#### Interpersonal emotion: Empathy and understanding others' emotions

Five studies discussed moral reasoning in relation to either empathy or perceptions of others' emotions (all except Krettenauer & Eichler, 2006 and Cima et al., 2010); the results were mixed. Empathy was the most commonly-assessed element of emotion, measured in three studies. Interestingly, empathy as an overall concept was not consistently found to have a relationship with moral reasoning. A clearer picture was formed once empathy was broken down into two more specific elements, in line with Shamay-Tsoory (2011): firstly 'emotive empathy', an affective understanding of others' emotional experience; secondly 'cognitive empathy', a logical appreciation of another's experience. Baron-Cohen and Wheelwright (2004) discussed the difference between the two, stating that the affective

approach to empathy requires one's emotion "to be a consequence of their emotion" (p164), whereas the cognitive approach to empathy involves "understanding the other's feelings", such as through theory of mind (p164).

A clear example of this distinction was found in DeWolfe et al. (1988), who measured both types of empathy. One empathy measure was described as placing a heavier emphasis on cognitive empathy (the Hogan Empathy Scale, HES; Hogan, 1969), defined as "the ability of an individual to put oneself in the place of others" (DeWolfe et al., 1988, p585); the other empathy measure had an affective focus (the Mehrabian Empathy Scale, QMEE; Mehrabian and Epstein, 1972), measuring "emotional responsiveness to the feelings of others" (DeWolfe et al., 1988, p590). DeWolfe and colleagues (1988) found that moral reasoning had a moderate positive correlation with cognitive empathy ( $r=.35$ ,  $p<0.001$ ), but not emotional empathy ( $r=.04$ ;  $p>0.05$ ). The two measures were described by the authors as demonstrating a weak but significant correlation ( $r=.19$ ;  $p<0.04$ ); however such a small correlation is often considered to be a negligible relationship. The results thus indicate that amongst both male and female prison inmates, more mature moral reasoning is associated with cognitive empathy, but not emotive empathy.

However, moral reasoning was not always found to relate to empathy at all. Lee and Prentice (1988) found that empathy, as measured by the QMEE and the IRI (Davis Interpersonal Reactivity Index; Davis, 1979) did not correlate with moral reasoning. The IRI was described as measuring perceptions of one's own empathy, but correlated strongly with the QMEE ( $r=.52$ ,  $p<0.001$ ), suggesting an emphasis on emotive empathy. Thus, emotive empathy again did not correlate with moral reasoning in this population. Similarly, Holmqvist (2008) found that whilst psychopathy and emotive empathy as measured by the Empathy Index (EI; Bryant, 1982) showed a strong negative correlation ( $r=-.47$ ,  $p<0.05$ ), moral reasoning did not correlate with psychopathy ( $r=-0.06$ ,  $p<0.05$ ); moral reasoning was not directly compared with empathy. Thus moral reasoning did not *qualitatively* appear to

be related to emotive empathy in this study, although this is unclear and should not be concluded as it was not statistically compared.

Two papers did not measure empathy, but interpreted their results in the context of emotional empathy. In Blair and Cipolotti's (2000) study, participants were asked to rate the seriousness of moral transgressions (which result in victims, e.g. "hitting another individual") and conventional transgressions (which result in 'social disorder', e.g. "talking in class"). Failure of the task involved judging the two as equally serious, thus failing to respond emotionally to the victims' experience of harm in the moral transgressions i.e. failing to *emotionally* empathise. This task was failed by a brain injury patient with 'acquired sociopathy' ('JS') and a group of offenders with 'developmental psychopathy'; however, a brain injury patient with dysexecutive syndrome ('CLA') and a group of 'non-psychopathic' offenders passed. Thus, emotional empathy appeared to be required to *begin* moral reasoning, that is, to identify moral dilemmas as different to conventional dilemmas; a partial link between emotive empathy and one element of moral reasoning was therefore apparent. Similarly, Young et al. (2012) reported that criminals with 'high' psychopathy judged accidental harm to be morally permissible more than other criminal groups; again, this was discussed as showing emotional empathy deficits in the psychopath group, since they failed to judge that accidents hurt the victim and as such 'normal' participants judge them seriously, despite lack of intent. Thus, those with impaired emotive empathy were poorer at moral reasoning, but not all criminals were. However, in both studies, moral reasoning was not measured separately to emotive empathy. Therefore, a split is apparent between studies which measured emotive empathy separately from moral reasoning, and those which manipulated the empathic content of their moral dilemmas: separate measures revealed no relationship, but manipulation of empathic content did.

One paper explored interpersonal emotion in terms of emotional attribution and facial expression processing, or participants' ability to autonomically respond to and infer how others are feeling from their facial expressions (Blair & Cipolotti, 2000). 'JS', the



patient with 'acquired sociopathy', demonstrated impaired naming of fear, anger and embarrassment, but both 'offender' groups were successful at emotion attribution. However, both JS and the psychopathic offenders showed selective deficits in facial expression processing, or autonomic responses to facial expressions, specifically regarding sadness and fear. Since both JS and the psychopathic offenders failed the moral/convention distinction task, it seems that whilst descriptive recognition of facial expressions is not needed for the task, facial expression processing may be linked to it. However, since the two were not analysed, conclusions cannot be drawn and should be treated with caution.

#### Self: Participants' emotions and self-awareness of emotions

Two papers included measures of participants' own emotions (Holmqvist, 2008; Krettenauer & Eichler, 2006); another paper discussed results in the context of dilemmas' emotional content (Cima et al., 2010). Again, results were mixed.

One paper found a strong positive correlation between confidence in moral judgement and maturity of 'moral emotions' ( $r=.53$ ,  $p<0.01$ ; Krettenauer & Eichler, 2008). Moral emotions were measured as participants' description of how they would feel as the protagonist (measured after recording seriousness of moral dilemma). Therefore, participants who had more confidence in their moral reasoning also reported stronger emotional reactions. This relationship was moderated by 'meta-ethical' development; several variables also moderated this relationship, including gender, age and 'dilemma-type', although the relationship remained significant when controlling for these. Furthermore, they found that emotions were more important in the 'early' levels of moral reasoning, but less so in more mature moral reasoning (as adolescents developed both in age and meta-ethical stance). The relationship therefore appears to be complicated, but robust, reducing with age.

Cima et al. (2010) did not use an emotion measure; instead they manipulated the emotional content of their moral dilemmas. They found that moral dilemmas involving

‘personal’ harms were judged as less permissible than those involving ‘impersonal’ harms; therefore, emotionally salient (personal) moral dilemmas were deemed to be less permissible, even when outcomes were similar or the same. Thus here, lower levels of emotion were linked to more lenient moral judgements, and vice versa. Interestingly, there were no differences between groups; that is, individuals were able to judge moral dilemmas ‘normally’, regardless of whether or not they had ‘normal’ emotional processing (i.e. psychopaths versus non-psychopaths). Since group differences therefore only occurred at the ‘action’ level, in terms of risk and offending, the authors concluded that one’s own emotions were more important in the *actioning* of moral reasoning.

One paper measured consciousness of joy, anger, sadness, fright, shame and guilt (Holmqvist, 2008); however, no analyses comparing affect consciousness to moral reasoning were undertaken and so conclusions could not be drawn.

#### *Offending and the relationship between emotion and moral reasoning*

The relationship between moral reasoning, emotion and offending (or delinquency) was not straight forward. Investigation into this appeared to follow three lines: 1) Offenders versus non-offenders; 2) Level of delinquency; 3) Actual offence. Two papers did not discuss the relationship between moral reasoning and offending behaviours (Holmqvist, 2008; Young et al., 2012).

#### Offenders versus non-offenders

Blair and Cipolotti (2000) found no differences in moral reasoning when comparing across the two case studies (non-offenders who had sustained neurological damage) with the two offender groups; emotion also did not differ across the groups. Therefore, offenders did not appear to be different to non-offenders. However, the absence of group differences may be due to cognitive factors regardless of offending patterns; for example, possible executive functioning deficits or low intellectual functioning across all participants. Since Blair and

Cipolotti (2000) did not include a 'neurologically normal' control group in most measures, conclusions about the role of offending cannot be confidently drawn. Indeed, another paper which did not include neurologically abnormal participants found a link between moral reasoning, empathy and offending. Lee and Prentice (1988) found that adolescent 'delinquents' had less-mature moral reasoning than non-delinquents, and found that there were differences in empathy between delinquents and non-delinquents. However, they did not further explore the nature of the interaction between empathy and moral reasoning; therefore, the groups appeared to differ in both elements, but the way in which they interact is unclear, particularly since Lee and Prentice (1988) found no relationship between emotive empathy and moral reasoning overall. However, Cima et al. (2010) found no differences between groups in moral reasoning, suggesting that moral reasoning was not different between offenders and non-offenders, despite differences in emotional processing.

#### Level of delinquency

Krettenauer and Eichler (2008) concluded that, for adolescents, delinquency was related to both emotional impairments and delayed socio-moral development. Delinquency occurred less among adolescents with stronger moral emotions, in a graded trend, rather than a 'delinquent'/'non-delinquent' split. Furthermore, moral emotions were discussed as a key predictor of adolescent delinquency, with a higher level of emotion after moral transgressions linked to a lower level of delinquency.

#### Actual offence

No papers found a clear relationship between actual offence and moral reasoning or emotion. One paper found a broad, possible link: DeWolfe et al. (1988) found that male felons performed at a significantly higher moral reasoning level than females, and committed significantly more crimes involving force; the authors attributed the difference in both moral reasoning and crime-type to "more calculating, better rationalized criminal

behaviour” amongst male felons due to poorer emotional empathy (DeWolfe et al., 1988; p591). However, this conclusion appears to rely heavily on untested assumptions, based on group differences, and so requires cautious interpretation. In contrast, Cima et al. (2010) found no relationship between actual offence and moral reasoning.

### *Psychopathy vs. Non-psychopathy*

One major dividing point between the reviewed papers was whether or not they included psychopathy, either as a group-defining characteristic or as a measure. As Holmqvist (2008) noted, psychopathy is an important area for investigation. Of the seven papers reviewed, four included ‘psychopathic’ groups, and one within-group study measured it as a continuous variable. Interestingly, all but one of these (Lee & Prentice, 1988) discussed psychopaths in terms of specific emotion impairments. However, only two (Blair & Cipolotti, 2000; Cima et al., 2010) also measured actual emotional processing to corroborate this.

In two papers, a difference was found between psychopaths and non-psychopaths in their moral reasoning. Blair and Cipolotti (2000) found that ‘acquired sociopathy’ patient and ‘developmental psychopathy’ offenders differed, as described above, from non-psychopathic participants in their moral/conventional distinction and emotional processing. Similarly, Young et al. (2012) found that psychopaths were poorer at judging one type of moral dilemmas (accidents), compared to other criminal groups; however, they performed equally on three other types of moral dilemmas (attempted harm, intentional harm and neutral acts).

Three papers found no relationship between psychopathy and moral reasoning (Cima et al., 2010; Holmqvist, 2008; Lee & Prentice, 1988). Cima et al. (2010) explained this by proposing that psychopaths’ impairments may only be evident at certain times, when under pressure or acting on impulse, and not under the relatively easy testing conditions. Lee and Prentice (1988) discussed potential methodological flaws, as well as the

inconsistencies of adolescents as a population. Holmqvist (2008) discussed that psychopathy is more emotional, whereas moral reasoning is more cognitive.

### *Design and analysis issues*

There was considerable variation in the measures and methods used within the studies; similarly, they were published across a 25-year time period, during which time moral reasoning theory has changed, along with the tools to measure it and the differentiation of types of moral reasoning. As such, there were a number of design and analysis issues in the studies that are discussed here.

### Theoretical underpinnings

Theoretical underpinnings varied across the studies; the moral reasoning measures were chosen based upon the theoretical leanings of the authors, and the models of the time. In general, these were distinguishable as either using a Kohlbergian, cognitive-developmental moral theory or else an empathy-based moral theory, such as Hogan (1969). Whilst the different theories did not vary greatly, they did make different assumptions in their understanding of moral reasoning as a whole concept; therefore interpretation of results also varied. However, it added variation in the methods used, and overall, the papers were open about their theoretical underpinnings, making it comparable in context.

### Measures

Theoretical variation unsurprisingly corresponds with variation in choice of measure; measures of crime, emotion and moral reasoning all varied across studies. Some studies did not use moral reasoning measures, but their own dilemmas (Krettenauer & Eichler, 2006); other studies manipulated emotional content by including psychopathic group or by manipulating personal content of dilemmas, but did not then use emotion measures to corroborate this distinction (Young et al., 2012). This makes direct comparison

complicated, but reflects the variability of measurement in the field of moral reasoning as a whole, and the different purposes of the studies.

Two papers were particularly thorough in their validation of measures. Cima et al. (2010) used a second moral reasoning measure to corroborate the findings of the first; Krettenauer and Eichler (2006) measured social desirability to account for possible untruthful responses.

#### Sampling and group characteristics:

Several studies did not report thorough group characteristics. Cima et al (2010) were the most comprehensive in this respect, reporting that no group differences were found in educational level, age, drug history and diagnosis; the authors also noted that none of these characteristics correlated with moral reasoning. They also supported their psychopath/non-psychopath group distinction by measuring autonomic responses to stress, in order to highlight group differences in emotional processing. Only Blair and Cipolotti (2000) also measured emotional processing; all others made an assumption of emotional processing deficits in group selection. Furthermore, whilst most studies used the PCL-R or a variant of it, the actual cut-offs varied quite considerably, and so psychopathy was rarely classified in exactly the same way between studies.

Sampling methods were relatively consistent across the studies; participants were selected from similar places, namely secure sites, which were representative for the population. However, community and non-forensic samples were often described in little detail, being recruited from “the South of the Netherlands” (Cima et al., 2010) or “a public high-school in a high-delinquency area” (Lee & Prentice, 1988), or not specified at all (Blair & Cipolotti, 2000).

Studies originated from a wide range of countries, making generalisability across the papers somewhat problematic. Furthermore, none explicitly discussed culture or

ethnicity with regards to their results, although two described it in their selection criteria (Lee & Prentice, 1988; Young et al., 2012).

Three papers studied adolescents and four studied adults. The three papers studying adolescents (Holmqvist, 2008; Krettenauer & Eichler, 2006; Lee & Prentice, 1988) did not appear to demonstrate categorically different results to the other papers. Krettenauer and Eichler (2006) measured the impact of age, finding an effect across adolescence that they concluded requires further exploration; this implies that further analysis of the impact of age may have been required in the other studies, particularly the other adolescent studies.

### Additional variables

Whilst every paper discussed emotion, moral reasoning and offending (or delinquency), the other variables measured were rarely the same between studies. This again highlights the different theoretical slants of the studies reviewed. Some of these variables were, perhaps unsurprisingly, found to correlate with moral reasoning; therefore, studies neglected variables found to be relevant by others, which may result in a testing bias potentially affecting the validity of conclusions.

## **Discussion**

### *Summary of findings*

This systematic literature review aimed to conduct a comprehensive review of the literature around emotion and moral reasoning amongst offender populations. Overall, emotion and moral reasoning were found to be linked within this population, but this varied according to the type of emotion, and how moral reasoning was assessed. Interpersonal emotion (empathy and understanding others' emotions) was found to relate to moral reasoning as a whole, but differed according to the component measured. Participants' own emotions were also related to moral reasoning, but not in a linear fashion, and related to several variables. Finally, in these samples, adult offenders were not found to demonstrate a different

relationship between moral reasoning and emotion than adult non-offenders; however, in the adolescent samples, a link was found between higher levels of delinquency and less-mature moral reasoning. Notably, psychopathy was measured in a high proportion of papers; often this was in relation to a hypothesised impairment in emotional processing, but results in this group were not consistent, and impairments were highly specific.

For ‘interpersonal’ emotion, empathy was widely assessed across the studies; when treated as an overarching concept, it was not consistently found to have a relationship with moral reasoning, and so it was divided into ‘emotive empathy’ and ‘cognitive empathy’ in line with Shamay-Tsoory (2011). Emotive empathy was not found to relate to moral reasoning at all when measured separately in a questionnaire, but when used as a manipulation of one element of moral reasoning, higher empathy was found to relate to more sophisticated judgement. Therefore, emotive empathy appeared to have a mixed relationship with moral reasoning in this population. However, the validity of measuring emotive empathy using a questionnaire is questionable, since individuals may not always be conscious at a verbal level of their level of emotive empathy, or may provide socially-desirable responses (Krettenauer & Eichler, 2006); similarly, measures have often been accused of not truly measuring empathy (Baron-Cohen and Wheelwright, 2004) potentially obscuring results. The relationship, where present, was related to ‘psychopathy’; thus, this finding is perhaps not generalisable to the offender population as a whole. However, these were also the papers which used manipulation of moral task to measure empathy, as opposed to a questionnaire. Therefore, untangling between the role of psychopathy or measure of emotion is made more difficult. Similarly, impaired autonomic responses to facial expressions were found amongst people who also failed a moral/conventional distinction task, implying that impaired interpersonal emotional processing may be linked to poorer understanding of victims’ experience of harm in moral dilemmas. These findings can be explained by the concept that these individuals are perhaps lacking in the negative affective ‘tags’ attached to moral transgressions, in line with the somatic marker hypothesis



(Damasio, 1994); this may also be explained in terms of impairments in one or more of the preverbal empathy 'modes' discussed by Hoffman (2000), which included automatic, preverbal responses. Once this hypothesised impairment was removed from the process, i.e. when *cognitive* empathy was measured, a linear relationship between emotion and moral reasoning appeared to be reliably found in psychopathic and non-psychopathic groups alike. Cognitive empathy was positively correlated with moral reasoning; higher levels of cognitive empathy were linked to more mature moral reasoning. This may be discussed in the context of Hoffman's (e.g. 2000) theory of empathy's role in moral reasoning; cognitive empathy may be seen as relating to the two 'higher-order' modes of empathy; thus, more mature moral reasoning draws upon these higher modes of empathy, but those who have not developed this level of empathy may not be able to reason at more mature levels related to a lack of empathic perspective-taking.

There was a clearer link between participants' own emotional processing and moral reasoning; less-developed 'moral emotions' were related to less confidence in moral judgement. Emotions were also found to be more important earlier in moral and meta-ethical development, and less so later on; however, the developmental trend was dependent upon story itself. The inclusion of meta-ethical stance as a variable highlights the relevance of cognitive elements to moral reasoning alongside emotions (Greene et al., 2004; Moll et al., 2003). The authors argued that these results were potentially due to older adolescents taking situational context into account more than others; this would also be in line with Gibbs' (2010) theory that moral reasoning matures with greater perspective-taking. In adulthood, regardless of emotional impairments, all participants rated moral dilemmas with lower emotional content as more permissible than highly-emotional ones, suggesting that emotional content of dilemmas is relevant across participants. Therefore, emotion remained important in moderating judgements.

Psychopathy was related to moral reasoning, but only in two specific ways; firstly, psychopaths judged accidents as more permissible than their peers, and secondly they failed

to distinguish between moral and conventional dilemmas. However, interestingly, this did not appear to correspond to offending behaviours. However, studies with a lower threshold for inclusion into the psychopath group were less likely to find group differences. A high threshold of emotional impairment therefore appeared to be required for moral reasoning to be affected. Furthermore, when impairments were present, they appeared to specifically relate to dilemmas requiring an understanding of victims' experience of harm. Indeed, autonomic responses to others' facial expressions, namely fear and sadness, were impaired in both developmental and adult psychopaths; this supports the idea that 'decoding' others' emotional responses may be linked to good moral reasoning, and may have been impaired in psychopaths. Thus, perhaps the bold claim that, "psychopaths know right from wrong, but simply don't care (Cima et al., 2010, p8) may neglect the influence of 'autonomic' elements of empathy, considering only the cognitive. Cima et al. (2010) had measured cortisol levels; they therefore had evidence that an autonomic impairment was present in their sample. Again, this relates to Hoffman's (2000) five modes of empathy, differentiating between automatic empathy and cognitive; interestingly, it appears that the impairment in empathy exhibited by psychopaths here was a very specific one.

Offending behaviours were not consistently related to the relationship between emotion and moral reasoning. In two studies with adult samples, no clear differences were found between offenders compared to non-offenders; however, in another paper, adolescent 'delinquents' were found to be poorer at moral reasoning than non-delinquents, and another paper found a graded relationship between self-reported delinquency and poorer moral emotions in adolescents. Thus, perhaps moral reasoning is more related to delinquency in adolescence, but is reduced in adulthood by other factors perhaps relating to offending. Similarly, in two adult samples, actual offence had no conclusive relationship with moral reasoning, although one paper hypothesised a link between moral reasoning and motivation to a commit crime involving force. As Krettenauer and Eichler (2006) discussed, moral action and moral judgment are not always comparable without considering the role of

‘moral emotions’. Thus, the finding that the adolescent samples had a stronger relationship between moral reasoning and delinquency than the adults may be unsurprising, given that they also appeared to draw slightly more upon moral emotions than adults. In summary, whilst impaired interpersonal emotional processing was found to relate to poorer moral distinction and moral reasoning, other elements must be important in leading to offending behaviours.

#### *Limitations of the studies reviewed*

There were several limitations within the studies being reviewed. Firstly, the measurement of moral reasoning within secure settings is open to the influence of social desirability; indeed, Krettenauer and Eichler (2006) found that social desirability was related to several measures in their community study, including the relationship between delinquency and moral emotions. Whilst one paper sought to address the concern of social desirability by including two moral reasoning measures (Cima et al., 2010), other papers did not account for this.

Holmqvist (2008) discussed the possibility that some emotions are more relevant to moral reasoning than others; they proposed shame and guilt as being particularly relevant, and often overlooked. This highlights the difficulties with treating ‘emotion’ as a whole concept, and suggests that the literature may need to make this distinction; indeed, the null finding of some studies may be related to the emotions which their moral tasks drew upon. Similarly, Young et al.’s (2012) finding that emotional processing impairments were only related to one aspect of moral reasoning may indicate that treating moral reasoning as a whole concept may also result in trends being overlooked. This would be supported by Krettenauer and Eichler’s (2006) results, as their findings were non-linear and related to several factors. Thus, several papers reviewed may have missed potential relationships, by measuring in too broad a manner.

Similarly, the testing of empathy as a concept was clearly different across studies; since findings were different according to how empathy had been measured, there may be testing biases in the studies reviewed. Additionally, interpreting the results in terms of empathy without testing it directly could be assumptive, such as in those studies which categorised only using the PCL-R or similar. Therefore, results regarding empathy may need to be treated with caution; future research may need to combine methods to ensure validity in measurement. The absence of a measure of intellectual functioning in all studies is also a serious criticism of this body of literature, since there is evidence to suggest that intellectual functioning is strongly related to moral reasoning, and lower intellectual functioning has been linked to less-mature moral reasoning (e.g. Langdon, 2010).

Moral reasoning under experimental conditions may naturally vary from moral reasoning in action. Thus, the finding that moral reasoning had little or no relationship with offending behaviours is potentially unsurprising; this questions whether the results of some studies are generalisable. Krettenauer and Eichler (2006) attempted to overcome this by asking participants to describe moral emotions as the protagonist; however, this may be partially measuring empathy, or Theory of Mind concepts, and so is not an ideal solution. However, findings from studies such as these “may not tell us so much about what causes crime, but what differentiates persons who break the law and are sent to jail from the rest of the population” (DeWolfe et al., 1988; p592). Therefore, whilst studies such as this may need to consider the generalisability of their findings, they continue to be potentially informative as long as the correct context is adhered to.

The papers reviewed originated from a variety of cultures; as such, the variation between them may be representative of regional differences as opposed to emotion or moral reasoning differences. However, both moral reasoning and emotion are considered to be relatively universal in their development (e.g. Damasio, 1994; Kohlberg, 1984; Gibbs, 2010). Therefore, if culture has impacted upon the results, it is more likely to be in relation

to the interpretation of the results; however, since all were published in peer-reviewed journals, the cultural impact is likely to be small. Despite this, it remains a consideration.

The methodologies of certain papers were better able to answer the research questions posed by this review. Cima et al. (2010) was able to answer all three research questions, and included a number of additional variables to enable discussion of the wider context; similarly, their groups were better defined, such as including a measure of autonomic responses, supporting the validity of their conclusions. Those papers which measured empathy as a manipulation of moral dilemma were also better-able to conclude the influence of empathy, since their results were more likely to be a valid representation of responses. Thus, Cima et al. (2010) and Young et al. (2012) were better able to provide stronger evidence for the relationship between emotion and moral reasoning in this population. The use of control populations was also not consistent across the papers, and this made it difficult to conclude what between-group differences could be attributed to. No paper appeared truly able to fully answer the research questions, and this remains a criticism of the reviewed literature. Further studies could include of a measure of intellectual functioning, and should include a control group to account for variables such as neurological damage and cognitive deficits.

#### *Limitations of the review*

Moral reasoning and emotion were related to many factors between the studies; this made comparing across the studies difficult, and also highlights that studies may sometimes find the results for the items they are testing, but they may be inadvertently neglecting different variables that could also be related. Since this review was focussing on the relationship between two variables, it too may have neglected other variables; however, further reviews could be conducted on the relationship between particular variables individually, as the literature is too broad to be contained within one review otherwise.

Similarly, moral reasoning measures varied across the studies reviewed; the two older papers (DeWolfe et al., 1988; Lee & Prentice, 1988) used measures which are not used in current literature, although both were based on relevant theory. Similarly, some papers measured moral reasoning, others measured confidence in moral judgements and others measured moral/conventional distinction. Whilst these are all highly important to moral reasoning as a concept, a greater body of literature is required to state with confidence the effects described above; again, future reviews may seek to untangle one particular element of the greater process of moral reasoning, e.g. only moral/conventional distinction.

One potential limitation of the review is that the initial search did not glean a large number of papers (n=128); whilst this highlights that the review targeted a relatively specific area within the broad body of literature, there is the possibility that papers were missed since the literature as a whole is large. Papers focussing on one element of emotion may not have included the search terms, although papers describing emotions are unlikely not to use a variation of affect words at some point within the paper. Additionally, hand-searching reference lists and contacting key authors helped to reduce the likelihood.

Conversely, the scope of the current review was relatively broad, in terms of seeking to understand the general role of emotion in moral reasoning amongst this population. This is a limitation in that it may have spread too thin; however, it was specific in that it did not focus on specific emotions, e.g. sadness or shame, but the concept of 'emotion'. Since no review into this exact area had been undertaken, it was felt that the review should begin broadly; future reviews may be more specific, as discussed below.

The large number of papers using psychopaths as a group may have reduced the generalisability of these findings to offender populations as a whole. Since each of these studies also included a control group of either non-psychopathic offenders or 'healthy' controls, the studies themselves accounted for this; however, the use of other offenders is also imperfect, as this excludes psychopathy. Thus, interpretive caution is suggested.

Participants were almost exclusively male subjects; whilst this does reflect the larger number of male offenders, the relationship between emotion and moral reasoning was found to be different between genders in DeWolfe et al. (1988) and so this is clearly a potential consideration for future reviews, as well as a limitation of the current one.

#### *Areas for future research*

The relationship between emotion and moral reasoning remains a focus of research within offender populations, particularly psychopathic offenders. The current review found that there is a relationship between emotion and moral reasoning in this group, that appears to be related to offending in adolescence, but less so in adulthood. There are many areas that future research may seek to explore the relationship further.

Future research may in particular seek to further understand the models discussed here, such as Greene et al. (2004), Moll et al. (2003) and Hoffman (2000) which incorporate emotion and moral reasoning. In particular, future research may seek to explore these models in offender populations, perhaps distinguishing between adolescents and adults, exploring whether the models remain applicable in these populations as in the ‘normal’ population, or require adaptation.

Additionally, future research may need to make clear distinctions between exact elements of emotion and moral reasoning. Current research is often no longer as broad as overall ‘moral reasoning’; instead, it focuses on the myriad different parts of both emotion and moral reasoning that may interact together. Future research may need to take this into account.

Regarding future reviews, two particular areas were dominant in the results of the reviewed studies: empathy and psychopathy. Thus, future reviews may seek to explore either of these concepts in their own right. Another area highlighted by the results of the current review is the apparent dichotomy between moral judgement of offenders, and moral

action; the current results were unable to explain this, and so future research or reviews may seek to understand this better.

### *Summary and conclusions*

In conclusion, the relationship between emotion and moral reasoning in offender populations is complex, and in need of further exploration. Interpersonal emotion in particular appeared to be related to moral reasoning. Whilst cognitive empathy had a clear relationship, impairments to emotive empathy appeared to only impact upon moral reasoning once they had reached a relatively high threshold, and results were inconsistent. Participants' own emotions were linked to moral judgement, but in complex relationship; similarly, participants made more severe moral judgements when emotions were involved than when not, regardless of offending. Indeed, offending was found to relate to moral reasoning in adolescence, but not in adulthood, and actual offence had no relationship with moral reasoning and emotion.

There were several limitations to the review, the main one being the breadth of the data gathered, resulting in difficulties in comparing across studies. This also limited the conclusions that can be drawn from this review. The studies themselves measured very different variables, and so may have neglected key variables assessed by other studies. Psychopathy was measured in many studies, limiting the generalisability of these results to offender populations as a whole. Areas for future research include exploring how moral reasoning and emotions are involved in moral action or actual offending behaviours. Similarly, future reviews may explore the current evidence for this, and could focus on empathy or psychopathy, rather than emotion as a whole; alternatively they may explore specific components of moral reasoning in this population.

In conclusion, emotion and moral reasoning have a complex relationship within offender populations, which was not found to consistently translate to offending behaviours in adults, but related in adolescence. However, the variation in the current review highlights



that more experimental research understanding the relationship between emotions, moral reasoning and offending behaviours is needed, and this remains an important area for investigation.

## References

- Astor, R. A., & Behre, W. J. (1997). Violent and nonviolent children's and parents' reasoning about family and peer violence. *Behavioral Disorders*, 22(4), 231-245.
- Baron-Cohen, S. & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with Asperger Syndrome or High Functioning Autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, 34(2), 163-175.
- Bechara, A., Damasio, A. R., Damasio, H., & Anderson, S. W. (1994). Insensitivity to future consequences following damage to human prefrontal cortex. *Cognition*, 50(1-3), 7-15.
- Berman, G. (2012). *Prison population statistics*. London: House of Commons.
- Blair, R. J., Jones, L., Clark, F., & Smith, M. (1997). The psychopathic individual: A lack of responsiveness to distress cues? *Psychophysiology*, 34(2), 192-198.
- Blair, R. J. R. (1995). A cognitive developmental approach to morality: Investigating the psychopath. *Cognition*, 57(1), 1-29.
- Blair, R. J. R., & Cipolotti, L. (2000). Impaired social response reversal. A case of 'acquired sociopathy'. *Brain: A Journal of Neurology*, 123(6), 1122-1141.
- Blair, R. J. R., Sellars, C., Strickland, I., & Clark, F. (1995). Emotion attributions in the psychopath. *Personality and Individual Differences*, 19(4), 431-437.
- Bryant, B. K. (1982). An index of empathy for children and adolescents. *Child Development*, 53(2), 413-425.
- Calder, A. J., Young, A. W., Rowland, D., Perrett, D. I., Hodges, J. R., & Etcoff, N. L. (1996). Facial emotion recognition after bilateral amygdala damage: Differentially severe impairment of fear. *Cognitive Neuropsychology*, 13(5), 699-745.
- Cima, M., Tonnaer, F., & Hauser, M. D. (2010). Psychopaths know right from wrong but don't care. *Social Cognitive and Affective Neuroscience*, 5(1), 59-67.
- Cromby, J., Brown, S. D., Gross, H., Locke, A., & Patterson, A. E. (2010). Constructing crime, enacting morality: Emotion, crime and anti-social behaviour in an inner-city community. *British Journal of Criminology*, 50(5), 873-895.
- Cushman, F., Young, L., & Hauser, M. (2006). The role of conscious reasoning and intuition in moral judgment: Testing three principles of harm. *Psychological Science*, 17(12), 1082-1089.

- Damasio, A. (1994). *Descartes' error: Emotion, reason and the human brain*. New York: G.P. Putnam's Sons.
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44(1), 113-126.
- De Brito, S. A., Mechelli, A., Wilke, M., Laurens, K. R., Jones, A. P., Barker, G. J., et al. (2009). Size matters: Increased grey matter in boys with conduct problems and callous-unemotional traits. *Brain*, 132(4), 843-852.
- Dewey, M. (1991). Living with asperger's syndrome. In U. Frith (Ed.), *Autism and asperger syndrome*. (pp. 184-206). New York, NY US: Cambridge University Press.
- DeWolfe, T. E., Jackson, L. A., & Winterberger, P. (1988). A comparison of moral reasoning and moral character in male and female incarcerated felons. *Sex Roles*, 18(9-10), 583-593.
- Downs, S. H., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology & Community Health*, 52(6), 377-384.
- Feeney, J. A., Noller, P., & Hanrahan, M. (1994). Assessing adult attachment. In M. B. Sperling, & W. H. Berman (Eds.), *Attachment in adults: Clinical and developmental perspectives*. (pp. 128-152). New York, NY US: Guilford Press.
- Flavell, J. H. (1968). *The development of role-taking and communication skills in children*. Oxford England: John Wiley & Sons.
- Gibbs, J. C., & Widaman, K. F. (1982). *Social intelligence: Measuring the development of sociomoral reflection*. Englewood Cliffs, New Jersey: Prentice-Hall.
- Gibbs, J. C. (2010). In Gibbs J. C. (Ed.), *Moral development and reality* (2nd ed.). Boston: Allyn & Bacon.
- Gibbs, J. C., Basinger, K. S., & Fuller, D. (1992). *Moral maturity: Measuring the development of sociomoral reflection*. New York: Routledge.
- Gough, H. B. (1960). *Manual for the california psychological inventory (rev. ed)*. Palo Alto, California: Consulting Psychologists Press.

- Greene, J. D., Nystrom, L. E., Engell, A. D., Darley, J. M., & Cohen, J. D. (2004). The neural bases of cognitive conflict and control in moral judgment. *Neuron*, 44(2), 389-400.
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, 293(5537), 2105-2108.
- Happe, F. G. (1994). An advanced test of theory of mind: Understanding by story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism & Developmental Disorders*, 24(2), 129-154.
- Hare, R. D. (1991). *The hare psychopathy checklist - revised (PCL-R)*. Toronto, Ontario: Multi-Healthy Systems.
- Harenski, C. L., & Kiehl, K. A. (2011). Emotion and morality in psychopathy and paraphilias. *Emotion Review*, 3(3), 299-301.
- Hart, S. D., & Hare, R. D. (1997). Psychopathy: Assessment and association with criminal conduct. In D. M. Stoff, J. Breiling & J. D. Maser (Eds.), *Handbook of antisocial behavior*. (pp. 22-35). Hoboken, NJ US: John Wiley & Sons Inc.
- Hart, S. D., Hare, R. D., & Forth, A. E. (1994). Psychopathy as a risk marker for violence: Development and validation of a screening version of the revised psychopathy checklist. In J. Monahan, & H. J. Steadman (Eds.), *Violence and mental disorder: Developments in risk assessment*. (pp. 81-98). Chicago, IL US: University of Chicago Press.
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge: Cambridge University Press.
- Hoffman, M. L. (2008). Empathy and prosocial behaviour. In M. Lewis, J. Haviland-Jones & L. F. Barrett (Eds.), *Handbook of emotions* (3rd ed., pp. 440--455). New York: Guildford Press.
- Hogan, R. (1969). Development of an empathy scale. *Journal of Consulting and Clinical Psychology*, 33(3), 307-316.
- Holmqvist, R. (2008). Psychopathy and affect consciousness in young criminal offenders. *Journal of Interpersonal Violence*, 23(2), 209-224.

- Huebner, B., Dwyer, S., & Hauser, M. (2009). The role of emotion in moral psychology. *Trends in Cognitive Sciences*, 13(1), 1-6.
- Kambam, P., & Thompson, C. (2009). The development of decision-making capacities in children and adolescents: Psychological and neurological perspectives and their implications for juvenile defendants. *Behavioral Sciences & the Law*, 27(2), 173-190.
- Kirschbaum, C., Pirke, K. M., & Hellhammer, D. H. (1993). The 'trier social stress test'--a tool for investigating psychobiological stress responses in a laboratory setting. *Neuropsychobiology*, 28(1-2), 76-81.
- Knabb, J. J., Welsh, R. K., Ziebell, J. G., & Reimer, K. S. (2009). Neuroscience, moral reasoning, and the law. *Behavioral Sciences & the Law*, 27(2), 219-236.
- Koenigs, M., Young, L., Adolphs, R., Tranel, D., Cushman, F., Hauser, M., et al. (2007). Damage to the prefrontal cortex increases utilitarian moral judgements. *Nature*, 446(7138), 908-911.
- Kohlberg, L. (1963). The development of children's orientation toward a mental order: 1. sequence in the development of moral thought. *Vita Humana*, 6, 11--13.
- Kohlberg, L. (1978). Revisions in the theory and practice of moral development. *New Directions Fo Child and Adolescent Development*, 1978(2), 83--87.
- Krettenauer, T., & Eichler, D. (2006). Adolescents' self-attributed moral emotions following a moral transgression: Relations with delinquency, confidence in moral judgment and age. *British Journal of Developmental Psychology*, 24(3), 489-506.
- Kurtines, W. M. (1978). A measure of autonomy. *Journal of Personality Assessment*, 42(3), 253-257.
- Langdon, P. E., Murphy, G. H., Clare, I. C. H., & Palmer, E. J. (2010). The psychometric properties of the socio-moral reflection measure-short form and the moral theme inventory for men with and without intellectual disabilities. *Research in Developmental Disabilities: A Multidisciplinary Journal*, 31(6-), 1204-1215.
- Lee, M., & Prentice, N. M. (1988). Interrelations of empathy, cognition, and moral reasoning with dimensions of juvenile delinquency. *Journal of Abnormal Child Psychology*, 16(2), 127-139.
- Levy, N. (2006). Cognitive scientific challenges to morality. *Philosophical Psychology*, 19(5), 567-587.

- Link, N. F., Sherer, S. E., & Byrne, P. N. (1977). Moral judgment and moral conduct in the psychopath. *The Canadian Psychiatric Association Journal / La Revue De l'Association Des Psychiatres Du Canada*, 22(7), 341-346.
- Mehrabian, A., & Epstein, N. (1972). A measure of emotional empathy. *Journal of Personality*, 40(4), 525-543.
- Mendez, M. F., Anderson, E., & Shapira, J. S. (2005). An investigation of moral judgement in frontotemporal dementia. *Cognitive and Behavioral Neurology*, 18(4), 193-197.
- Miller, M. B., Sinnott-Armstrong, W., Young, L., King, D., Paggi, A., Fabri, M., et al. (2010). Abnormal moral reasoning in complete and partial callosotomy patients. *Neuropsychologia*, 48, 2215-2220.
- Moll, J., de Oliveira-Souza, R., Eslinger, P. J., Bramati, I. E., Mourão-Miranda, J., Andreiuolo, P. A., et al. (2002). The neural correlates of moral sensitivity: A functional magnetic resonance imaging investigation of basic and moral emotions. *The Journal of Neuroscience*, 22(7), 2730-2736.
- Moll, J., Oliveira-Souza, R., & Eslinger, P. J. (2003). Morals and the human brain: A working model. *Neuroreport*, 14, 299-305.
- Moll, J., Zahn, R., De Oliveira-Souza, R., Krueger, F., & Grafman, J. (2005). The neural basis of human moral cognition. *Nature Reviews Neuroscience*, 6(10), 799-809.
- Monsen, J. T., Eilertsen, D. E., Melgård, T., & Ødegård, P. (1996). Affects and affect consciousness: Initial experiences with the assessment of affect integration. *Journal of Psychotherapy Practice & Research*, 5(3), 238-249.
- Moody, E. E., Jr. (1997). Lessons from pair counseling with incarcerated juvenile delinquents. *Journal of Addictions & Offender Counseling*, 18(1), 10-25.
- National Institute for Health and Clinical Excellence. (2006). *Methods for development of NICE public health guidance*. London: National Institute for Health and Clinical Excellence.
- Quay, H. C., & Parsons, L. B. (1971). *The differential behavioral classification of the juvenile offender*. Washington, D.C.: U.S. Bureau of Prisons.
- Raaijmakers, Q. A. W., Engels, R. C. M. E., & Van Hoof, A. (2005). Delinquency and moral reasoning in adolescence and young adulthood. *International Journal of Behavioral Development*, 29(3), 247-258.

- Raine, A., & Yang, Y. (2006). Neural foundations to moral reasoning and antisocial behavior. *Social Cognitive and Affective Neuroscience*, 1(3), 203-213.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1-28.
- Saltaris, C. (2002). Psychopathy in juvenile offenders: Can temperament and attachment be considered as robust developmental precursors? *Clinical Psychology Review*, 22(5), 729-752.
- Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as embodied moral judgment. *Personality & Social Psychology Bulletin*, 34(8), 1096-1109.
- Shamay-Tsoory, S. (2011). The neural bases for empathy. *The Neuroscientist*, 17(1), 18-24.
- Sjöberg, L., & Winroth, E. (1986). Risk, moral value of actions, and mood. *Scandinavian Journal of Psychology*, 27(3), 191-208.
- Stöber, J. (2001). The social desirability scale-17 (SDS-17): Convergent validity, discriminant validity, and relationship with age. *European Journal of Psychological Assessment*, 17(3), 222-232.
- Tavecchio, L. W. C., Stams, G. J. J. M., Brugman, D., & Thomeer-Bouwens, M. (1999). Moral judgement and delinquency in homeless youth. *Journal of Moral Education*, 28(1), 63-79.
- Valdesolo, P., & DeSteno, D. (2006). Manipulations of emotional context shape moral judgment. *Psychological Science (Wiley-Blackwell)*, 17(6), 476-477.
- Webster, C. D., Douglas, K. S., Eaves, D., & Hart, S. D. (1997). Assessing risk of violence to others. In C. D. Webster, & M. A. Jackson (Eds.), *Impulsivity: Theory, assessment, and treatment*. (pp. 251-277). New York, NY US: Guilford Press.
- Young, L., & Koenigs, M. (2007). Investigating emotion in moral cognition: A review of evidence from functional neuroimaging and neuropsychology. *British Medical Bulletin*, 84, 69-79.
- Young, L., Koenigs, M., Kruepke, M., & Newman, J. P. (2012). Psychopathy increases perceived moral permissibility of accidents. *Journal of Abnormal Psychology*,
- Young, L., & Saxe, R. (2008). The neural basis of belief encoding and integration in moral judgment. *NeuroImage*, 40, 1912-1920.

## **Part Two: Empirical Paper**

*Moral reasoning after traumatic brain injury (TBI): Exploring the influence of  
age at injury*

This paper is written with the intention of submission to the Journal of the International  
Neuropsychological Society<sup>5</sup>

Total word count<sup>6</sup>: 4998

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<sup>5</sup> Appendix E: Journal of the International Neuropsychological Society: 'Instructions to Authors'

<sup>6</sup> Word count excludes tables and figures



**Moral reasoning after traumatic brain injury (TBI): Exploring the influence of age at injury**

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## **Abstract**

Traumatic brain injury (TBI) can have a wide range of consequences; previous studies have found a relationship between younger age at TBI and more severe cognitive consequences. Moral reasoning can be impaired by TBI; it also has a key transition between ‘immature’ and ‘mature’ reasoning in early adolescence. The current study aimed to investigate differences in adults’ moral reasoning, depending upon whether a brain injury was sustained in middle-childhood (prior to development of mature moral reasoning) or adulthood. It was hypothesised that moral reasoning would differ between adult participants, according to age at TBI, moderated by affect during testing and intellectual functioning. Fourteen adult participants were recruited into two groups; childhood-TBI (n=5; aged 5-10 at injury) and adulthood-TBI (n=9; aged 25-53 at injury). One battery of tests was administered, including measures of moral reasoning, affect during testing and current intellectual functioning. Results were unreliable due to the small sample size; firm conclusions could not be drawn. However, preliminary results demonstrated group differences in moral reasoning; the childhood-TBI group demonstrated significantly less-mature moral reasoning. This was moderated by negative affect during testing and intellectual functioning, and negated when accounting for both variables. It was tentatively concluded that whilst further research was needed, age at injury *may* impact upon moral reasoning, moderated by impairments to intellectual functioning and negative affect. Implications of findings and areas for future research were discussed.

**Keywords:** *Moral reasoning; brain injury; affect; emotion; intellectual functioning; paediatric TBI*

## **Introduction**

Traumatic brain injury (TBI) is a leading cause of death and disability worldwide (Basso, Previgiano, Duarte & Ferrari, 2001), defined as “an alteration in brain function, or other evidence of brain pathology, caused by an external force” (Menon, Schwab, Wright & Maas, 2010, p1637). Road traffic accidents (RTAs, 40%) and falls (37%) remain the two main causes of TBI in Europe, followed by assaults (7%; Tagliaferri, Compagnone, Korsic, Servadei & Kraus, 2005). TBI can have devastating consequences in cognitive, physical, social and functional domains, accounting for high levels of “disability-adjusted life years” lost (Fleminger & Ponsford, 2005; Murray & Lopez, 1997).

The nature of TBI is changing; better road safety is decreasing TBIs from RTAs, but fall-related TBI is increasing as the population ages (Centres for Disease Control and Prevention, 1999; Gillespie et al., 2004). Similarly, fewer brain injuries are proving fatal, with reduced ‘secondary injuries’, due to improved health and safety, public awareness campaigns (e.g. cycle-helmets) and medical advancements (Critchley & Memon, 2009; Lux, 2007; Park, Bell & Baker, 2008; Thompson, Rivara & Thompson, 1999). Healthcare focus is therefore now shifting towards rehabilitation, maximizing recovery potential and quality of life (British Society of Rehabilitation Medicine, BSRM, 2003; Neurological Alliance, 2003). However, rehabilitation can be challenging, with many brain areas potentially affected (BSRM, 2003). Research therefore explores the causes and consequences of TBI; a better understanding of consequences can help maximize rehabilitation potential. The current research sought to explore one consequence of TBI within the field of social cognition; namely, moral reasoning.

### *Moral reasoning: Development and conceptualization*

Moral reasoning, whilst debated as a concept (see Bucciarelli, Khemlani & Johnson-Laird, 2008; Levy, 2006), is generally defined as the process of considering information and weighing-up options within ethical dilemmas; thus moral reasoning is a cognitive process. One classic ethical dilemma asks, “Should ‘Heinz’ steal an overpriced drug he cannot

afford to save his dying wife?” (Kohlberg, 1981); here, moral reasoning involves considering factors pertaining to Heinz’s decision, for example illness gravity versus laws regarding theft. Psychological approaches to this commonly describe the cognitive process of our reasoning and its application (Young & Koenigs, 2007). As noted, moral reasoning is a part of our social cognition, with an interpersonal focus (Smetana & Braeges, 1990). Because of this interpersonal focus, moral reasoning is important to our social lives; indeed, as Casebeer (2003) noted, well-developed moral reasoning provides socially-appropriate decisions, and subsequently a greater likelihood of success in life.

Models of moral development acknowledge both social and cognitive aspects. Indeed, Kohlberg’s (e.g. 1963, 1976) definitive model proposed that moral development draws upon both cognitive development and social learning. In brief, Kohlberg’s model consists of six invariant stages on three levels, primarily developing in childhood but continuing into adulthood. Kohlberg’s model is briefly summarized in Table 1 overleaf, alongside Piaget’s (1936/1952) stages of cognitive development.

Table 1. Kohlberg's (1963) theory of moral development and Piaget's (1936/1952) stages of cognitive development.

Approximate age (years)		Moral Stage/Level	Cognitive-Developmental Stage
0	Preconventional	<b>1) Punishment-obedience</b> The expected presence or absence of pleasure or pain for self, and/or immediate others	<b>Sensorimotor:</b> Limited knowledge of the world learned through senses; develop object permanence.
6		<b>2) Instrumental-relativist:</b> Reciprocity is considered on a reward/punishment basis in moral reasoning - consider immediate others.	<b>Preoperational:</b> Able to construct some representations of the world through language; imagination develops, non-logical thinking.
7	Conventional	<b>3) Good-boy-nice-girl:</b> Aim to please others; group needs are prioritized, despite consequences.	<b>Concrete Operational:</b> Logic, conservation, rules and sequencing develop; able to understand others' perspectives; operational thinking develops
12		<b>4) Law and order:</b> Aim to maintain social order; group needs are prioritized	
13+	Postconventional	<b>5) Social contract, legalistic:</b> Universal principle: Rules should be maintained except in exceptional circumstances <b>6) Universal-ethical principle:</b> Follows universal ethical principles that are logical, thorough, without exception	<b>Formal Operational:</b> Abstract thought develops; development of logical and symbolic reasoning; able to generate and test hypotheses

In reality, development varies; most people do not progress beyond the conventional stage and development progresses idiosyncratically (Carpendale, 2000; Kohlberg, 1976). Kohlberg's model has been critiqued and revised extensively (e.g. Levine & Hower, 1983; Kohlberg, 1984; Kohlberg & Ryncarz, 1990) but remains highly influential (Carpendale, 2000; Gibbs, 2010; Lapsley, 2006). Gibbs (2010) described a modern adaptation of Kohlberg's work, accommodating critiques and revisions. Gibbs' model comprises four stages on two levels: "immature" (Stage 1 and 2) and "mature" (Stage 3 and 4); some

individuals also later develop “existential” moral reasoning (Gibbs, 2010; pp72-73); the four stages are shown in Table 2.

*Table 2. Gibbs’ (2010) four moral stages, adapted from Kohlberg (1963).*

Age (approximate)		Gibbs’ moral stage
Childhood	Immature level	<p><i>Stage 1: ‘Centrations’</i></p> <p>At this stage, moral perspective is highly egocentric. Emphasis is placed on “here-and-now” factors (e.g. physical strength and size) and immediate self-centred wants. General cognition is egocentric and present-focussed.</p>
		<p><i>Stage 2: ‘Pragmatic exchanges’</i></p> <p>In Stage 2, individuals develop an understanding of others’ perspectives and can reason using logic. However, overall focus remains self-orientated.</p>
Adolescence	Mature level	<p><i>Stage 3: ‘Mutualities’</i></p> <p>The first ‘mature’ stage; perspective-taking expands, considering people outside the immediate dilemma. Individuals describe “reciprocity”, “trust” and/or “intimate sharing” as an important foundation for relationships.</p>
Adulthood		<p><i>Stage 4: ‘Systems’</i></p> <p>At Stage 4, societal implications and considerations are deliberated, such as the importance to society of laws, shared values and moral standards.</p>

In Gibbs’ (2010) model, most adults will usually reach Stage 3, but not all reach Stage 4; the developmental process involves increased perspective-taking referred to as “decentration” (Gibbs, Basinger & Fuller, 1992; pp7-10), sometimes discussed in terms of processes such as Theory of Mind (Young, Cushman, Hauser & Saxe, 2007). However, decentration is idiosyncratic (Carpendale, 2000) and individuals do not always reason at their highest-developed level (Chapman, 1988). Furthermore, adulthood moral reasoning fluctuates slightly, such as with “existential” development (Gibbs, 2010, p73).

Current researchers therefore generally accept that moral reasoning stages are somewhat flexible, reflecting idiosyncrasies of a multi-faceted construct. However, whilst multiple factors are related to moral reasoning, two in particular have been consistently implicated: intellectual functioning and emotion.

### *Moral reasoning: Models and related concepts*

Emotion has been discussed as key to moral reasoning; a particular focus has been on empathy, “a biologically and affectively based, cognitively mediated, and socialized predisposition to connect emotionally with others” (Gibbs, 2010; p77). Hoffman (2008, p449) described empathy as “the bedrock of prosocial morality” and empathy features heavily in his moral developmental theory (Hoffman, 2000, 2008). However, affect during reasoning also affects judgements: inducing a happy state increases the permissiveness of moral judgements (Valdesolo & DeSteno, 2006), inducing disgust increases the severity of moral judgements (Schnall, Haidt, Clore & Jordan, 2008) and emotion-related brain regions activate during moral dilemmas (e.g. Greene, 2003; Greene, Nystrom, Engell, Darley & Cohen, 2004; Moll et al., 2002). In the somatic marker hypothesis, our attention is focussed in decision-making by negative autonomic responses ‘tagged’ to socially- or morally-deviant behaviours, acting as a deterrent (Damasio, 1994).

Thus, affect and empathy are vital in the moral reasoning process; however, research consistently indicates that emotion’s role is moderated by intellectual functioning and logic (Gibbs, 2010). Indeed, men with lower intellectual functioning demonstrate less-mature moral reasoning than ‘normal’ peers (Langdon, Murphy, Clare & Palmer, 2010), and neuroscientific evidence highlights the role of cognitive control and logical processes in moral reasoning (e.g. Moll, Oliveira-Souza & Eslinger, 2003; Moll, Zahn, Oliviera-Souza, Krueger & Grafman, 2007). Moll and colleagues (2003) proposed a model of moral reasoning whereby initial emotional responses to moral issues are ‘decoded’, giving a “moral-emotional” attribution guiding subsequent moral judgement. Greene et al. (2004) proposed a slightly different model, where “cognitive control and conflict” are central, with affect now as a moderating factor. In both models, interplay between affect and intellect is vital; thus, considering the somatic marker hypothesis, the challenge is to acknowledge information from affective tags but make decisions with cognitive reasoning, including the wider context (Damasio, 1994).

### *Moral reasoning in the brain*

Moral reasoning has been linked to multiple brain areas (Sommer et al., 2010), being described as a “whole brain affair” Casebeer (2003, p841); there is no ‘moral reasoning area’. Elements of moral reasoning draw upon different brain structures; for example, belief attribution activates the right temporo-parietal junction (Ciaramelli, Muccioli, Ladavas & diPelligrino, 2007; Young et al., 2007). Several areas are implicated in moral reasoning, particularly the prefrontal cortex (Sommer et al., 2010), but also including the temporal lobes (superior temporal sulcus, anterior temporal cortex, amygdala, insula, precuneus), thalamus, midbrain and basal forebrain (Moll et al., 2003). Damage to the prefrontal cortex can result in impaired moral reasoning (e.g. Anderson, Bechara, Damasio, Tranel & Damasio, 1999; Blair & Cipolotti, 2000). However, damage to other areas can impair moral reasoning, including partial or complete callosotomies damaging pathways (Miller et al., 2010).

Given that the prefrontal cortex does not mature until aged 25 (Samango-Sprouse, 2007), it is perhaps unsurprising that multiple cases have been described of ‘early’ frontal lobe injuries causing moral reasoning deficits (Ackerley & Benton, 1948; Anderson et al., 1999; Eslinger, Damasio, Damasio & Grattan, 1989). Anderson et al. (1999) described two individuals who had sustained acquired brain injuries in early childhood (before 18 months). There were subtle differences between them and ‘comparable’ adulthood-TBI patients; the infancy-TBI cases were less able to retrieve complex, socially-relevant facts, and demonstrated poorer moral reasoning. Another study described two individuals with childhood brain injuries (7 days and 4 years) of both frontal and non-frontal regions with “arrested” moral reasoning (Price, Daffner, Stowe & Mesulam, 1990; p1383). Additionally, younger age at TBI correlated with poorer social-behavioural regulation abilities in children (Dennis, Guger, Roncadin, Barnes & Scachar, 2001); here, whilst frontal lobe lesions caused the greatest deficits, non-frontal lesions also caused impairments *and* showed effect of age at TBI. As Dennis and colleagues (2001) noted, childhood head injury appeared to interrupt development of partially-developed skills. As noted, adolescence is a time of



transition in moral development, with individuals developing from ‘immature’ moral reasoning to ‘mature’ moral reasoning (Gibbs, 2010). At this time, the brain is progressing through an extremely active process of “rewiring” (Lebel, Walker, Leemans, Phillips & Beaulieu, 2008; p1045), including structures involved in neural communication, and the frontal lobes, which do not reach maturation until adulthood (Lebel et al., 2008). Immature moral reasoning pre-adolescence is therefore to be expected, given that the brain has not yet developed the capacity to undertake more complex cognitive processes.

Thus, the literature highlights that moral reasoning is multi-faceted, relying upon affect (Greene, 2003; Greene et al., 2004; Moll et al., 2002) and intellect (Langdon et al., 2010); it develops throughout childhood, extending into adulthood (e.g. Gibbs, 2010; Kohlberg, 1976). Injuries to the brain have been implicated in impaired moral reasoning (Blair & Cipolotti, 2000; Miller et al., 2010). Earlier injuries appeared to cause greater deficits, both in moral reasoning (Anderson et al., 1999) and social cognition (Dennis et al., 2001). However, Anderson et al.’s (1999) participants were too young to have developed beyond very basic ‘immature’ moral reasoning. Additionally, whilst moral reasoning is considered to develop across the lifespan (see Gibbs, 2010), a key transition occurs around early adolescence between ‘immature’ and ‘mature’ moral reasoning. As noted, adolescence is also a key time of brain development, including “a key period of brain rewiring” through adolescence (Lebel, et al., 2008; p1045). A question therefore arises of whether similar interruptions in moral development would be evident if a brain injury occurred just before this transitional point, in ‘middle childhood’, compared with adult-onset TBI, when the brain has matured and ‘mature’ moral reasoning has developed. Damage to the brain at this time, before adolescence (around 13 years of age), may prevent ‘normal’ moral development, potentially resulting in partially-developed, ‘interrupted’ moral reasoning, similar to Dennis et al. (2001).

The current research therefore aimed to understand whether a brain injury in ‘middle-childhood’ resulted in less-mature moral reasoning than sustaining a brain injury in

adulthood, considering the key correlates of affect during testing and intellectual functioning. It was hypothesised that:

- 1) A difference would be found in moral reasoning (exact score and stage), between adult participants who had sustained a brain injury in either adulthood or childhood.
- 2) This difference would be moderated by emotion (i.e. affect during testing).
- 3) This difference would be moderated by intellectual functioning.

## **Method:**

### *Design*

A between-groups cross-sectional design was used. Participants were grouped according to the age they sustained a TBI, childhood or adulthood. The three dependent variables were moral reasoning, affect during testing and current intellectual functioning.

### *Participants*

This method was approved by the appropriate BIRT<sup>7</sup> and NHS<sup>8</sup> Research Ethics Committees. Participants were identified and recruited through local NHS learning disability services (n=1) and nationwide Brain Injury Rehabilitation Trust (BIRT) community services (n=7) and rehabilitation units (n=6)<sup>9</sup>. All participants were identified and first contacted by members of their care team assessing them against an inclusion/exclusion criteria flowchart<sup>10</sup>, described in Table 3 overleaf.

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<sup>7</sup> Appendix F: BIRT ethical approval

<sup>8</sup> Appendix G: NHS Research Ethics Committee approval and Research & Development approval

<sup>9</sup> Although local NHS brain injury services were accessed, no participants were successfully recruited.

<sup>10</sup> Appendix H: Inclusion/exclusion flowchart

*Table 3. Inclusion and exclusion criteria for participation*

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**Inclusion Criteria**

- 1) Aged between 25 and 65 at testing
  - 2) First language is English
  - 3) Sustained a traumatic brain injury (TBI), either:
    - i. Aged between 5 and 13 years old, inclusive ('childhood-TBI' group)
    - ii. Aged 25 years old or older, with a minimum of 24 months since the injury ('adulthood-TBI' group)
- 

**Exclusion Criteria**

- 1) Diagnosed with a pervasive developmental disorder (or autism)
  - 2) Diagnosed with schizophrenia or psychosis
  - 3) Unable to read to the level required for the WAIS-IV and TOPF
  - 4) Unable to see to the level required for the WAIS-IV and TOPF
- 

Twenty-three potential participants were identified and given a participant information sheet outlining the study<sup>11</sup> and provided opportunities to contact the researcher with questions; interested participants were invited to organise a testing session. Fourteen participants subsequently consented to take part (60.9% of those asked); five 'childhood-TBI' participants and nine 'adulthood-TBI' participants. Written consent<sup>12</sup> was sought on the day of testing, which was at least one week occurred after providing verbal consent (arranging testing), allowing time to consider participation. Before providing written consent, participants read and discussed the information sheet with the researcher again.

*Sample Size Calculation*

Two sample size calculations were based upon Langdon et al. (2010). 'Childhood-TBI' participants were estimated at an equivalent level to men with IDs; 'adulthood-TBI' participants were estimated at a level halfway between men with IDs and men without IDs. A power calculation using PASS software yielded that with thirty participants per group,

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<sup>11</sup> Appendix I : Participant information sheet

<sup>12</sup> Appendix J: Participant consent form

using multivariate Analysis of Variance (MANOVA) at 5% significance, an effect size of 1.05 could be detected with 80% power. In order to undertake univariate analyses, a power calculation using PASS software yielded that with seven participants per group, using one-way Analysis of Variance (ANOVA) at 5% significance, an effect size of 3.37 could be detected with 80% power. This is a large effect size (Heinrich-Heine-Universität, 2009); considering previous research (Langdon et al., 2010), this was plausible. It was originally intended that multivariate analyses of variance would be undertaken, with 30 participants recruited to each group; however, in light of recruitment difficulties, the smaller group sizes and univariate analyses were undertaken. Implications of this are discussed below.

### *Measures*

#### Sociomoral Reflection Measure–Short Form (SRM-SF; Gibbs et al., 1992)

Moral reasoning was measured using the SRM-SF, a measure based upon Gibbs' (2010) Kohlbergian model of moral development. It comprises eleven moral issues (e.g. “how important is it for people to keep promises, if they can, to friends?”) across five domains: contract and truth, affiliation, life, property and law, and legal justice. Participants rate moral issues on a 3-point Likert scale (‘very important’, ‘important’ or ‘not important’) and describe in detail *why* they chose responses; answers are recorded verbatim. Highest moral stage demonstrated for ‘why’ is scored per item; average score across all items is converted to a Sociomoral Reflection Maturity Score (SRMS), reflecting moral reasoning maturity and stage; for example, 300 SRMS denotes Stage 3 reasoning.

The SRM-SF has been extensively used, including cross-culturally and amongst ‘abnormal’ populations (Gibbs, Basinger, Grime & Snarey, 2007; Langdon et al., 2010). Gibbs et al. (1992) report good concurrent validity with another measure of moral reasoning ( $r(43) = .69, p < 0.001$ ), and no correlation with a social desirability measure. Independent researchers validated the SRM-SF amongst British and Irish samples (Ferguson, McLernon & Cairns, 1994) and with men with IDs (Langdon et al., 2010). Reliability is also acceptable, with good test-retest reliability ( $r = .88, p < 0.001$ ; Gibbs et al., 1992). Langdon-et

al. (2010) found good test-retest reliability in men with IDs ( $r=.74$ ,  $p<0.001$ ), without IDs ( $r=.78$ ,  $p<0.001$ ), and overall ( $r=.96$ ).

#### Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988)

The PANAS was administered to assess affect during testing; it consists of 20 words describing emotions (e.g. “interested” nervous”) on two scales: positive and negative affect. Participants rate each item on a 5-point Likert scale, regarding how much they feel that emotion *at that moment*, with options, ‘very slightly/not at all’(1); ‘a little’(2), ‘moderately’(3), ‘quite a bit’(4) or ‘extremely’(5). Item scores are summed per scale to describe overall positive and negative affect at the time. Watson et al. (1988) reported acceptable reliability, with Chronbach’s alpha of 0.86-0.90 for positive affect, and 0.84-0.87 for negative affect, with good test-retest reliability for both scales.

#### Wechsler Adult Intelligence Scales 3<sup>rd</sup>/4<sup>th</sup> Edition (WAIS-III/IV; Wechsler, 1997/2008)

The WAIS-IV was administered as a measure of current intellectual functioning; it comprises 10 core subtests assessing four domains: Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Speed. Scores on the four domains are analysed together, providing a full-scale IQ score (FSIQ), reflecting participants’ overall performance; the current study only used FSIQ. Participants who had recently ( $\leq 12$  months) undertaken a WAIS-III ( $n=3$ ) or WAIS-IV ( $n=5$ ) were not administered the WAIS-IV; instead their previous FSIQ score was recorded.

Good test-retest correlations are reported between WAIS-III and WAIS-IV FSIQ for individuals of “borderline intellectual functioning” ( $r_{12}=0.82$ ; Wechsler, 2009; pp79-80). Mean WAIS-IV FSIQ scores for individuals with TBI were 83.9 (S.D=18.4; Wechsler, 2009; p112). WAIS-IV FSIQ scores showed good test-retest reliability (corrected  $r=.96$ ) and internal consistency ( $r=.98$ ). Indices also showed strong construct validity (Wechsler, 2009; see Lichtenberger & Kaufman, 2009).

### Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983)

The HADS was administered to measure levels of anxiety and depression, controlling for possible influence on PANAS and other results. The HADS is a 14-item questionnaire, widely used in clinical and research settings; participants judge applicability of a sentence (e.g. “I feel cheerful”) to them for the past week on a 4-point Likert scale (e.g. “never”(0), “not often”(1), “sometimes”(2) “most of the time”(3)). The HADS has acceptable internal consistency; Chronbach’s alpha was good for both Anxiety (0.80-0.93) and Depression (0.81-0.90) subscales.

### Test of Premorbid Functioning–UK Edition (TOPF<sup>UK</sup>; Wechsler, 2011)

The TOPF<sup>UK</sup> was administered to estimate participants’ intellectual functioning prior to their TBI; it comprises 70 atypical words, often less-affected by injury. Overall TOPF<sup>UK</sup> reliability is high, with good internal consistency (Chronbach’s alpha = 0.95). Test-retest reliability of the TOPF<sup>UK</sup> is also good (corrected correlations between  $r=.89$  and  $r=.95$ ; Wechsler, 2011). The TOPF<sup>UK</sup> also correlates to WAIS-IV FSIQ scores ( $R=.72$ ,  $p<0.001$ ;  $R^2=0.52$ ,  $p<0.001$ ). Again, TOPF<sup>UK</sup> results were recorded, not re-administered, if a participant had recently undertaken a TOPF<sup>UK</sup>. Premorbid estimates are imperfect with paediatric TBI, but acceptable (see Yeates, 2012; Yeates & Taylor, 1997).

### Demographic information questionnaire<sup>13</sup>

A questionnaire gathered basic demographic information, recording: 1) Age; 2) Gender; 3) Years in education; 4) Qualifications; 5) Employment; 6) Medications; 7) Past and 8) Present mental health difficulties; 9) Criminal convictions.

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<sup>13</sup> Appendix K: Demographic information questionnaire.

### ‘Information about the TBI’ questionnaire<sup>14</sup>

A questionnaire gathered basic information about participants’ TBIs; participants could consent information being gathered from medical records and/or staff. The questionnaire recorded: 1) Age at TBI (or date of TBI); 2) Cause of TBI; 3) Glasgow Coma Scale (GCS) score, or length of coma; 4) Length of Post-Traumatic Amnesia (PTA); 5) Perceived problems from the TBI; 6) Location of TBI or brain regions affected.

### *Procedure*

Participants were identified and recruited as described. Testing lasted approximately 100 minutes (maximum 180 minutes); one session of questionnaires was administered by the researcher, in a quiet room.

The demographic information questionnaire was administered first, followed by the SRM-SF, PANAS, WAIS-IV, TOPF<sup>UK</sup>, HADS and ‘information about the TBI’ questionnaire. The testing procedure was not counterbalanced; firstly, the PANAS was presented immediately after the SRM-SF to best measure affect during reasoning, and secondly, potential fatigue effects from the WAIS-IV meant that it was presented after a break, and after the moral reasoning measure to avoid fatigue impacting upon the measure. Breaks were offered regularly and taken as required. Information about participants’ TBI and previous psychometric test results were gathered from medical notes and staff.

Finally, participants were debriefed<sup>15</sup>. Participants with high HADS scores were given a ‘sources of support sheet’<sup>16</sup> and offered the opportunity to inform their GP via a standard letter<sup>17</sup>; inpatients’ care team were informed. Participants were also offered the opportunity to be informed of study findings, via a standard summary sheet<sup>18</sup> upon completion of the research.

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<sup>14</sup> Appendix L: Information about the TBI questionnaire.

<sup>15</sup> Appendix M: Debriefing sheet

<sup>16</sup> Appendix N: Sources of support sheet

<sup>17</sup> Appendix O: High HADS GP letter

<sup>18</sup> Summary sheet will be written and sent to interested participants upon conclusion of the study.

## **Results**

### *Data Analysis*

SRM-SF responses were scored by one researcher and corroborated by a second self-trained rater as recommended by Gibbs et al. (1992). Highest apparent level of moral reasoning was awarded for each item; ambiguous answers were deemed ‘unscorable’. Gibbs et al. (1992) stipulate seven scorable answers per participant, minimum. Mean scores were calculated per participant and multiplied by 100, providing a Sociomoral Reflection Maturity Score (SRMS). SRMS were grouped to the corresponding Global Stage (or transition), to reflect theoretical groupings beyond scores.

Groups were compared on demographic variables, intellectual functioning, affect during testing and TBI characteristics, using independent t-tests and Fisher’s Exact Tests. The small sample (n=14) also resulted in the possibility of inaccurate p values; to account for this, bootstrapping was used and bootstrapped p-values reported where available; bootstrapping was selected as the theoretical distribution was unknown and the sample was small, as recommended by Adèr, Mellenbergh and Hand (2008), and due to the potentially low power using non-parametric tests.

Group means on SRMS and Global Stage were compared. SRMS difference between groups was assessed using an independent t-test; a series of Analyses of Covariance (ANCOVAs) were compared SRMS between groups, with FSIQ, affect during testing, demographic variables and TBI characteristics as covariates. Correlations between SRMS and variables were also undertaken to further understand possible relationships. Group differences in median moral stage were analysed using a Mann-Whitney U test.

Finally, Pearson’s correlations were undertaken to assess the relationship between actual age at injury and SRMS, carried out by group.

### *Participant characteristics*

An overview of demographic characteristics is reported in Table 4 overleaf, including differences between groups assessed by independent t-tests and Fisher’s exact tests.



Table 4. Participant characteristics

Variable	Adulthood TBI group n=9	Childhood TBI group n=5	Overall n=14
<i>Mean (S.D) age at TBI***</i>	35.7 (10.46)	7.5 (2.02)	N/A
<i>Mean (S.D) age at testing**</i>	47.7 (14.23)	32.1 (3.97)	42.1 (13.78)
<i>Cause of TBI<sup>+</sup></i>			
RTA	n=4	n=5	n=9
Assault	n=4	n=0	n=4
Fall	n=1	n=0	n=1
<i>Mean (S.D) years since TBI*</i>	12.1 (9.38)	24.6 (5.31)	16.6 (10.07)
<i>Gender</i>			
Male: Female ratio	8:1	3:2	11:3
% Male	88.9%	60%	78.6%
% Female	11.1%	40%	21.4%
<i>Current intellectual functioning* (FSIQ)</i>	83.5 (8.85)	67.0 (77.15)	77.2 (11.47)
<i>Estimated premorbid intellectual functioning* (FSIQ)</i>	104.1 (8.82)	91.4 (5.65)	100.2 (9.87)
<i>Mean (S.D) years in education**</i>	15.0 (2.19)	12.6 (0.89)	14.1 (2.15)
<i>Educational qualifications<sup>+</sup></i>			
None	n=1	n=2	n=3
COEA	n=0	n=1	n=1
GCSEs or NVQ 2	n=4	n=1	n=5
A Levels or NVQ 3	n=1	n=1	n=2
Degree	n=3	n=0	n=3
<i>Affect during testing</i>			
Positive Affect	34.9 (8.59)	34.8 (9.09)	14.8 (4.60)
Negative Affect	11.7 (1.73)	34.9 (8.41)	12.8 (3.29)
<i>Current mental health difficulty</i>			
Depression/Anxiety	n=0	n=2	n=2
None	n=9	n=3	n=12
<i>Past mental health difficulty</i>			
Depression/Anxiety	n=2	n=0	n=2
None	n=7	n=5	n=12
<i>HADS: Mean (S.D)</i>			
Anxiety	7.8 (5.85)	5.8 (3.27)	7.1 (5.03)
Depression	6.6 (5.62)	4.4 (3.21)	5.8 (4.87)
<i>Employment</i>			
Volunteer work	n=2	n=1	n=3
Not employed	n=7	n=4	n=11
<i>Criminal convictions</i>			
Yes	n=4	n=0	n=4
No	n=5	n=5	n=10

Group differences significant at \*p<0.05; \*\*p<0.01; \*\*\*p<0.001 (independent t-test); <sup>+</sup> not statistically compared (groups too small for >2 levels).

Fourteen participants were assessed; nine in the adulthood-TBI group and five in the childhood-TBI group. Overall, childhood-TBI participants were significantly younger at

testing than adulthood-TBI participants, as shown by an independent t-test (equal variances not assumed), however bootstrap analysis was non-significant ( $t(9.15)=2.44$ , conventional  $p\text{-value}=0.037$ , bootstrapped  $p\text{-value}=0.068$ ). Gender did not differ significantly between groups ( $p=.505$ , Fisher's exact test), although the small sample makes likelihood of a Type II error possible, encouraging interpretive caution.

#### TBI characteristics

Cause of TBI differed between groups, but groups were too small to compare statistically. Participants reported significantly more years since their TBI amongst the childhood-TBI group than the adulthood-TBI group, as shown by an independent t-test ( $t(12)=-2.78$ , conventional  $p\text{-value}=0.017$ , bootstrapped  $p\text{-value}=0.023$ ). Some information about participants' TBI was unavailable; subsequently TBI brain region, length of PTA and GCS score could not be included in analyses.

#### Intellectual functioning and education

Overall, participants' current intellectual functioning was in the low-average range. The childhood-TBI group scored significantly lower than the adulthood-TBI group, as demonstrated by an independent samples t-test ( $t(10)=2.93$ , conventional  $p\text{-value}=0.015$ , bootstrapped  $p\text{-value}=0.011$ ). Estimated premorbid intellectual functioning was similar, again significantly different between groups ( $t(10)=3.73$ , conventional  $p\text{-value}=0.004$ , bootstrapped  $p\text{-value}=0.007$ ). Unsurprisingly, measures of intellectual functioning were highly correlated ( $r=.846$ ,  $p=0.001$ ).

The adulthood-TBI group were educated significantly longer than the childhood-TBI group ( $t(8.20)=3.37$ , conventional  $p\text{-value}=0.010$ ; bootstrapped  $p\text{-value}=0.036$ ; equal variances not assumed). Educational level varied considerably, the sample was too small to compare groups directly.

### Affect during testing

Affect during testing was not significantly different between groups; overall, participants reported more positive affect than negative. No relationship was found between PANAS Negative Affect and HADS Anxiety ( $r=-.06$ ,  $p=0.822$ ) or Depression ( $r=-.186$ ,  $p=0.525$ ). The two PANAS scales did not correlate ( $r=.349$ ,  $p=0.221$ ).

### Mental health status

Few participants reported either previous or current mental health difficulties. Self-reported mental health status was not statistically different between groups, either for past difficulties ( $p=.505$ , Fisher's exact test), or current ones ( $p=.110$ , Fisher's exact test). However, again the small sample increases likelihood of a Type II error. Few participants scored at clinical levels in HADS Anxiety or Depression; groups were not significantly different for Anxiety ( $t(12)=0.691$ , conventional  $p\text{-value}=0.503$ , bootstrapped  $p\text{-value}=0.082$ ) or Depression ( $t(12)=0.782$ , conventional  $p\text{-value}=0.450$ , bootstrapped  $p\text{-value}=0.079$ ). HADS Anxiety and Depression were highly correlated ( $r=.773$ ,  $p=0.001$ ).

### Employment and criminal convictions

Participants were either unemployed or working on a volunteer basis; groups did not differ significantly ( $p=1.00$ , Fisher's exact test). Groups did not differ on self-reported convictions ( $p=.221$ , Fisher's exact test), although again interpretive caution is encouraged.

### *Moral reasoning*

#### SRM-SF scoring

All participants provided at least seven scorable answers; none were excluded from analysis. Interrater reliability for SRMS was high ( $r=.957$ ,  $p=0.043$ ); global stage agreement met 'minimal standards' criteria (see Gibbs et al., 1992; p57).

### Group comparison

Moral reasoning, measured by the SRM-SF, was compared across the two groups. Moral reasoning scores and stages (including group differences) are shown in Table 5.

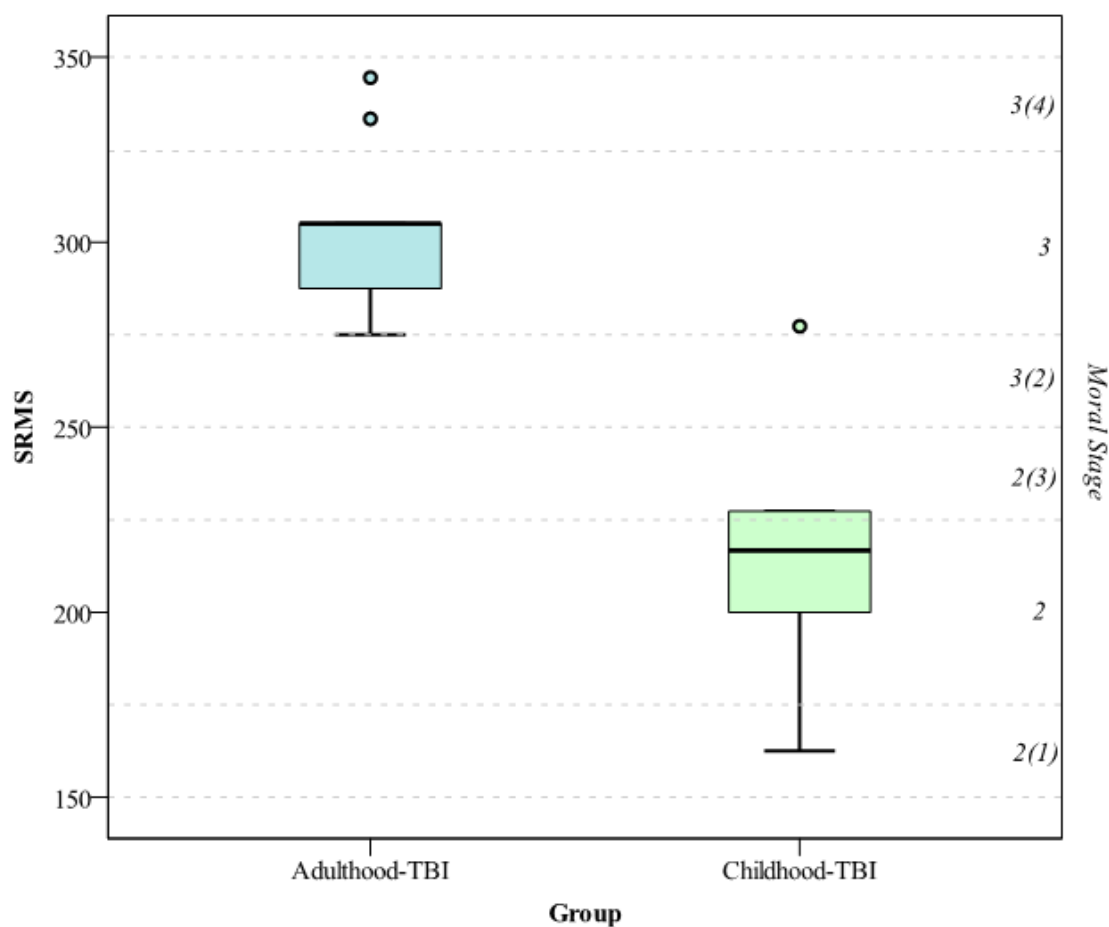
*Table 5. Moral reasoning score and stage*

Variable	Adulthood TBI group n=9	Childhood TBI group n=5	Overall
<i>SRMS***</i>			
Mean (SD) SRMS	305.1 (22.11)	216.7 (41.83)	273.6 (52.64)
Minimum	275.0	162.5	162.5
Maximum	344.4	277.3	344.4
<i>Global moral reasoning stage**</i>			
Stage 2(1)	n=0	n=1	n=1
Stage 2	n=0	n=2	n=2
Stage 2(3)	n=0	n=1	n=1
Stage 3(2)	n=0	n=0	n=0
Stage 3	n=7	n=1	n=8
Stage 3(4)	n=2	n=0	n=2

Group differences significant at \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$  (independent t-test).

The adulthood-TBI group scored significantly higher on average than the childhood-TBI group as assessed by an independent samples t-test ( $t(12)=5.256$ , conventional  $p\text{-value} < 0.001$ , bootstrapped  $p\text{-value} = 0.004$ ). The distribution of moral stages was also significantly different between the two groups according to a Mann Whitney  $U=3.5$ ,  $p=0.007$ ). Figure 1 overleaf shows SRMS distribution and Global Stage thresholds by group.

Figure 1. Boxplot of moral reasoning (SRMS) distribution between groups. Dotted lines represent moral stage thresholds, described to the right side of the figure.



To understand the relationship between SRMS and group variables, correlations were undertaken, shown in Table 6 overleaf.

Table 6. Correlations between variables

SRMS	Age at testing	Age at TBI	Years since TBI	Years in Education	Current FSIQ	Premorbid FSIQ	Negative Affect	Positive Affect	
SRMS	1.00								
Age at testing	.215	1.00							
Age at TBI	.670*	.771**	1.00						
Years since TBI	-.788**	.048	.598*	1.00					
Years in Education	.275	.565	.655*	-.320	1.00				
Current FSIQ	.736**	.624*	.741**	-.379	.431	1.00			
Estimated Premorbid FSIQ	.594*	.736**	.765**	-.276	.706*	.846**	1.00		
Negative Affect	-.782**	-.097	-.444	.579*	-.182	-.419	-.316	1.00	
Positive Affect	-.233	-.096	-.152	.119	-.354	-.047	-.242	-.292	1.00

Group differences significant at \* $p < 0.05$ ; \*\* $p < 0.01$ ; (independent t-test).

SRMS was significantly correlated with age at TBI (bootstrapped  $p$ -value=0.017), years since TBI (bootstrapped  $p$ -value=0.002), current FSIQ (bootstrapped  $p$ -value=0.006), estimated premorbid FSIQ (bootstrapped  $p$ -value =0.042) and negative affect (bootstrapped  $p$ -value =0.003).

A series of ANCOVAs were undertaken to assess whether the relationship between SRMS and group (age at injury) could be explained by variance caused by other variables, including the two main covariates; a bootstrap analysis was included on account of the small sample size, which also limited the number of covariates per analysis. Results are shown in Table 7 overleaf.

Table 7. Analyses of Covariance in SRMS vs. Group (Age at TBI)

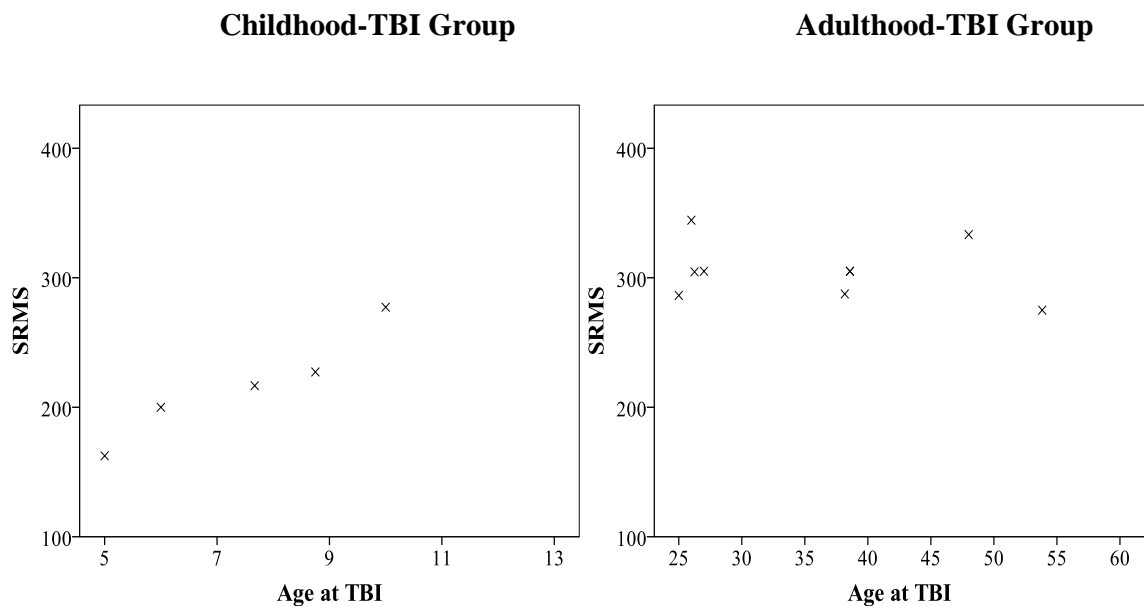
Covariates included	Reported values	Effect of group remains significant?	Significance level for effect of group
None	F(1,12)=27.621	N/A	p<0.001
Age at testing	F(1,11)=28.028	Yes***	p<0.001
Years since TBI	F(1,11)=11.095	Yes**	p=0.007
Years in education	F(1,11)=31.409	Yes***	p<0.001
Current FSIQ	F(1,11)=6.704	Yes*	p=0.027
Estimated premorbid FSIQ	F(1,11)=10.623	Yes**	p=0.009
Positive affect during testing	F(1,11)=26.338	Yes***	p<0.001
Negative affect during testing	F(1,11)=17.235	Yes**	p=0.002
Positive Affect, Current FSIQ	F(1,10)=6.564	Yes*	p=0.031
Negative Affect, Current FSIQ	F(1,10)=3.329	No	p=0.101
Group differences significant at *p<0.05; **p<0.01; ***p<0.001.			

Relationship between group and SRMS remained significant when controlling for each variable included alone. Current intellectual functioning had the largest impact; however, group effect remained significant. Affect during testing had a slight effect on SRMS, more so for negative affect than positive affect. Interestingly, when both negative affect and current FSIQ were included as covariates, the effect of group was negated, but not for positive affect and current FSIQ.

#### Exact age at TBI and SRMS

Relationship between exact age at injury and SRMS was analysed across participants; two scatterplots showing the relationship by group are shown in Figure 2, overleaf.

Figure 2. Scatterplots showing the relationship between exact age at TBI and moral reasoning (SRMS) by group. Please note: X-axis scales differ between the two scatterplots.



The two groups were analysed separately due to sampling methods leaving a gap for adolescence/young-adulthood. Pearson's correlations revealed a very strong positive relationship between SRMS and age at TBI ( $r=.962$ ,  $p=0.009$ ) in the childhood-TBI group, but no relationship in the adulthood group ( $r=-.225$ ,  $p=0.560$ ).

## Discussion

### *Discussion of findings*

The current study explored the relationship between moral reasoning and age at TBI. The main hypothesis, that moral reasoning would differ between childhood- and adulthood-TBI participants, was supported by results; the two groups significantly differed on both moral reasoning score and stage. The second hypothesis, that this difference would be moderated by affect during testing, was partially supported; moral reasoning negatively only correlated with negative affect, which slightly moderated the relationship between SRMS and age at injury. The third hypothesis, that group differences in moral reasoning would be moderated by current intellectual functioning, was supported by results; moral reasoning and current



intellectual functioning were significantly correlated. Intellectual functioning significantly moderated group moral reasoning differences; however, group effect remained significant.

As hypothesised, moral reasoning differed significantly between groups; the childhood-TBI group demonstrated less-mature moral reasoning than the adulthood-TBI group. Moral stage was also lower in the childhood-TBI group, at an 'immature' level (Stage 2). This suggests that sustaining a childhood TBI, before mature moral reasoning develops, may 'interrupt' normal moral development in line with previous, similar studies (Anderson et al., 1999; Dennis et al., 2001). This finding can be accounted for by combination of factors. Firstly, the brain develops rapidly through adolescence (Lebel et al., 2008); sustaining an injury prior to this may significantly impact upon the subsequent development of structures and networks essential to moral reasoning, such as the frontal lobes. This could impact upon the development of moral reasoning itself, as damage to the structures involved would result in abnormal moral development. However, with adulthood TBI, mature moral reasoning has already developed, and so damage to the brain is less likely to have such a significant impact beyond the effect of any impaired intellectual functioning sustained. Secondly, moral reasoning develops as a social process, involving feedback from others about appropriate moral conduct; following a brain injury one's social world changes dramatically, through such media as parental interactions, peer relationships and life experiences. In childhood brain injury, this social world is changed at an earlier stage, and so the potential impact is exponentially increased. Thus childhood brain injury has the potential to hinder moral development both from a neural and social perspective.

The second hypothesis, that group differences in moral reasoning would be moderated by affect during testing, was partially supported; only negative affect moderated effect of group, and only slightly. The two affect scales had no relationship, supporting them as independent constructs (Watson et al., 1988). Lower negative affect correlated with more mature moral reasoning as might be expected (Damasio, 1994; Greene et al., 2004; Moll et al. 2003, 2007). However, the effect was small; there are several possible reasons for this. Firstly, administering the PANAS *after* the SRM-SF may have obscured 'moral'

affect; similarly, PANAS items may have obscured one another, or the small sample may have reduced the effect size. Furthermore, the SRM-SF is not dilemma-based; subsequently perhaps affect was only slightly involved, or may have occurred at an unconscious level. However, Krettenauer and Eichler (2006) found that in adolescents, self-reported “moral-emotions” varied developmentally in a complex, non-linear relationship, highlighting that emotion should perhaps be measured more comprehensively than here.

The third hypothesis, that current intellectual functioning would moderate group differences in moral reasoning, was supported by results. Group effect was greatly reduced when accounting for current intellectual functioning, but remained significant. Thus, impaired cognitive reasoning skills affect moral reasoning, in line with Langdon et al. (2010), but cannot exclusively explain group differences. In the childhood-TBI group, current and premorbid estimates of intellectual functioning were significantly different, casting doubt over the validity of using only the TOPF<sup>UK</sup> here, since childhood TBI occurs prior to fully developing the language level assessed by the TOPF<sup>UK</sup>.

Group differences in moral reasoning were non-significant when accounting for variance caused by negative affect and current intellectual functioning *together*; alone, neither construct fully explained the variance. Impaired current intellectual functioning had more impact than negative affect; this may support Greene et al. (2004), where cognitive control and conflict are central, but moderated by affect in actual moral judgement. These two factors appeared to moderate, rather than mediate, the relationship between moral reasoning and age at injury. This is because they affected the strength of the relationship, but did not account for the relationship itself. Hypothetically, participants with more mature moral reasoning may have better-controlled their negative affective responses to dilemmas (Damasio, 1994); better intellectual functioning may have enabled this, resulting in potentially emotionally unpleasant decisions which are considerate of context in more mature moral reasoning. However, this is hypothetical as ‘affective tags’ were not measured.

Exact age at TBI and moral reasoning were also compared by group<sup>19</sup>. Moral reasoning and age at TBI correlated strongly in the childhood-TBI group. Interestingly, this suggests a less-idiosyncratic trend than expected (Gibbs, 2010); however, the small sample dictates very tentative interpretation of this finding, indeed idiosyncrasy may have been present between domains, but obscured by overall SRMS. In the adulthood group, no relationship was found between moral reasoning and age at TBI, supporting the idea that having developed pre-TBI, mature moral reasoning may be preserved in these participants. This is in line with the literature proposing that moral reasoning develops primarily in childhood, fluctuating in adulthood (e.g. Kohlberg, 1976, 1984; Gibbs, 2010); however, again this preliminary finding requires further investigation with larger samples.

### *Limitations*

There are several limitations to the study necessitating interpretive caution. Primarily, the samples were small, and the childhood-TBI group was underpowered, requiring an adjustment in proposed data analysis and limiting possible analyses; results are therefore not generalisable. Despite this, effect sizes within the data were large, with highly significant group differences; indeed the large effect sizes are in line with those required within the power calculations undertaken. Therefore, results should not entirely be discounted, although caution is encouraged. Recruitment was problematic; some adults who sustained childhood-TBI are no longer involved with services, thus missing recruitment methods and potentially skewing included participants to those who are less-able. However, both groups would have experienced this sampling bias. Future research could use website advertisements via charitable organisations (e.g. Headway) to improve access.

Groups differed on several variables, potentially affecting moral reasoning differences. Whilst analyses of demographic variables did not reveal large effects, results cannot exclusively be attributed to current intellectual functioning and affect during testing.

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<sup>19</sup> Conducting an overall correlation was considered to be misleading (sampling had left a 'gap' for TBIs in adolescence/young adulthood).

Matching participants across groups may reduce this in future. However, moral reasoning was clearly related to both current intellectual functioning and negative affect; therefore, discounting the relationship risks ignoring a promising finding. Furthermore, some group differences, e.g. education level, may differ as social effects of TBI. Similarly, cause of TBI varies with age, reflected by the sample; primary cause of TBI in childhood is pedestrian RTA, and in adulthood is RTA or assaults (Basso et al., 2001; Tagliaferri et al., 2005).

Another key limitation of the current study is the incomplete data regarding participants' TBI. Severe-TBI and frontal damage may relate to stronger impairments (e.g. Dennis et al., 2001). Therefore, results should be interpreted with caution and again, future research must consider this, for example excluding participants with incomplete records. However, this may bias samples, since TBIs occurring many decades ago were often not recorded in detail; childhood-TBI participants may be disproportionately affected, or only severe-TBI may have provide data for inclusion. A compromise may include bluntly describing brain injuries as mild, moderate or severe based upon coma data (where available) alongside level of functional impact, or even neuroimaging (e.g. Anderson et al., 1999).

Whilst the PANAS was deemed an appropriate measure of affect within this study's scope, other methods (e.g. measuring affect within moral reasoning) may have been more accurate. Similarly, the use of both WAIS-IV and WAIS-III data is imperfect; however, it was in consideration of an already-long testing session and retest effects. Therefore, whilst limited, it was less-invasive, and comparison is acceptable (Wechsler, 2009).

Certain potentially-relevant demographic variables were not assessed, namely socio-economic status, culture and ethnicity. Whilst moral development involves social factors, they are only part of the process (Kohlberg, 1984; Gibbs, 2010); nonetheless, inclusion may provide insight into social aspects neglected here. Similarly, qualitative exploration of 'life experience' in the five domains may help understand idiosyncrasies potentially obscured here.

Finally, the SRM-SF is hypothetical; judgements have no consequences. Therefore, whilst the SRM-SF has been extensively used and is considered to be valid and reliable (Ferguson et al., 1994; Gibbs et al., 1992; Langdon et al., 2010), results may not translate to moral action; furthermore, emotion may be more important in moral action than found here, in line with Moll et al. (2003, 2007). Recent research has attempted to address this by developing more ecologically valid measures; an example of this are the So-Moral or So-Mature which, when piloted, were found to be reliable and valid amongst clinical populations and may be more appropriate measures for future research (Dooley, Beauchamp and Anderson, 2010).

#### *Clinical implications*

The current research has limited clinical implications due to its small sample size. However, the strong effect size does provide evidence for possible differences in moral reasoning according to age at TBI. This implies that sustaining a brain injury in childhood may set individuals at a disadvantage in their moral development, and subsequently result in less successful social worlds (Casebeer, 2003). This research therefore supports the need for consideration of moral reasoning within neuropsychological assessment, particularly for individuals who sustained brain injuries in childhood. Additionally, any difficulties identified may be aided using targeted interventions which aim to teach individuals about appropriate moral interactions, and encourage the use of feedback; the EQUIP program (Gibbs, Potter & Goldstein, 1995) is one such intervention.

#### *Areas for future research*

As well as those described above, initially, future research could address the small samples here, extending the current research. Larger samples would allow reliable analyses and conclusions, alongside more detailed analyses (e.g. individual PANAS items or SRM-SF domains). Additionally, the relationship between *exact* age at injury and moral reasoning requires further investigation, without grouping variables, further exploring the trend here.

Three potentially important variables may also be investigated, testing beyond ‘emotion’ and ‘intellect’ as broad concepts. Firstly, decision-making, measured by the Iowa Gambling Task (Bechara, Damasio, Damasio & Anderson, 1995), distinct from overall intellect, to understand relevant potential components of intellectual functioning beyond what was measured here. The second variable is social perspective-taking, or Theory of Mind, important as perspective-taking increases with moral development (Flavell, Miller & Miller, 2002; Gibbs, 2010;). Finally, empathy would be a potentially important variable to consider in future research, since several authors emphasise its importance beyond emotion (Gibbs, 2010; Hoffman, 2008); this may also address the current study’s theoretical slant towards Kohlbergian theory, considering others such as Hoffman (2000, 2008).

### *Conclusions*

The current study was underpowered, and as such results are not generalisable. However, results found a difference in moral reasoning maturity based upon age at TBI; the childhood-TBI group demonstrated significantly less-mature moral reasoning than the adulthood-TBI group. This effect may be explained by variance caused by current intellectual functioning alongside negative affect. Thus, childhood-TBI is hypothesised to interrupt moral development through damage to these variables; however in adulthood-TBI, after development of ‘mature’ moral reasoning, these impairments are less severe. Furthermore, age at TBI and moral reasoning strongly correlated in childhood-TBI participants but amongst adulthood-TBI participants. Findings were in line with models emphasising childhood as key to moral development (e.g. Kohlberg, 1976, 1984; Gibbs, 2010).

Intellectual functioning had a larger effect than affect during testing, suggesting that cognitive control and conflict were the key processes in moral reasoning, with negative affect possibly moderating responses (Damasio, 1994; Greene et al., 2004).

There were several limitations to the current study; recruitment was problematic, and the study was subsequently underpowered. Furthermore, key information regarding

participants' TBI was too inconsistent to analyse. The implications of this were discussed and future research can seek to address this, as well as exploring 'emotion' and 'intellectual functioning' in more depth regarding age at TBI. Furthermore, the trend between exact age at injury and moral development could be explored, and different variables may be included in future, e.g. empathy.

In conclusion, whilst this study has revealed some promising findings regarding differential impact of age at injury, firm conclusions cannot be drawn. However, the results relate well with current literature and highlight areas for future exploration. Future research may further illuminate the consequences of TBI on individuals' lives, in both their moral action and moral reasoning. However, from these results, age at injury does tentatively appear to impact upon moral reasoning, related to both intellectual functioning and negative affect, and further exploration is encouraged.

## References

- Ackerley, S. S., & Benton, A. L. (1948). Report of a case of bilateral frontal lobe defect. *Research Publications: Association for Research in Nervous and Mental Diseases*, 27, 479-504.
- Adèr, H. J., Mellenbergh, G. J. & Hand, D. J. (2008). *Advising on research methods: A consultant's companion*. Huizen, The Netherlands: Johannes van Kessel Publishing.
- Anderson, S. W., Bechara, A., Damasio, H., Tranel, D., & Damasio, A. R. (1999). Impairment of social and moral behavior related to early damage in human prefrontal cortex. *Nature Neuroscience*, 2(11), 1032.
- Basso, A., Previgliano, I., Duarte, J. M., & Ferrari, N. (2001). Advances in management of neurosurgical trauma in different continents. *World Journal of Surgery*, 25(9), 1174-1178.
- Bechara, A., Damasio, A. R., Damasio, H., & Anderson, S. W. (1995). Insensitivity to future consequences following damage to human prefrontal cortex. In J. Mehler, & S. Franck (Eds.), *Cognition on cognition*. (pp. 3-11). Cambridge, MA US: The MIT Press.
- Blair, R. J. R., & Cipolotti, L. (2000). Impaired social response reversal. A case of 'acquired sociopathy'. *Brain: A Journal of Neurology*, 123(6), 1122-1141.
- British Society of Rehabilitation Medicine. (2003). *Rehabilitation following acquired brain injury: National clinical guidelines*. London: Royal College of Psychiatrists.
- Bucciarelli, M., Khemlani, S., & Johnson-Laird, P. (2008). The psychology of moral reasoning. *Judgment and Decision Making*, 3(2), 121-139.
- Carpendale, J. I. M. (2000). Kohlberg and piaget on stages and moral reasoning. *Developmental Review*, 20(2), 181-205.
- Casebeer, W. D. (2003). Moral cognition and its neural constituents. *Nature Reviews Neuroscience*, 4, 840-847.
- Centres for Disease Control and Prevention. (1999). Motor vehicle safety: A 20th century public health achievement. *Morbidity and Mortality, Weekly Report*, 48, 369-374.
- Chapman, M. (1988). *Constructive evolution: Origins and development of piaget's thought*. New York: Cambridge University Press.
- Ciaramelli, E., Muccioli, M., Ladavas, E., & diPelligrino, G. (2007). Selective deficit in personal moral judgement following damage to the ventromedial prefrontal cortex. *Social Cognitive and Affective Neuroscience*, 2, 84-92.



- Critchley, G., & Memon, A. (2009). Epidemiology of head injury. In P. C. Whitfield, B. O. Thomas, F. Summers, M. Whyte & P. J. Hutchinson (Eds.), *Head injury: A multidisciplinary approach* (pp. 1-12). Cambridge: Cambridge University Press.
- Damasio, A. (1994). *Descartes' error: Emotion, reason and the human brain*. New York: G.P. Putnam's Sons.
- Dennis, M., Guger, S., Roncadin, C., Barnes, M., & Schachar, R. (2001). Attentional-inhibitory control and social-behavioral regulation after childhood closed head injury: Do biological, developmental, and recovery variables predict outcome? *Journal of the International Neuropsychological Society: JINS*, 7(6), 683-692.
- Dooley, J. J., Beauchamp, M. & Anderson, V. A. (2010). The measurement of sociomoral reasoning in adolescents with traumatic brain injury : A pilot investigation. *Brain Impairment*, 11(2), 152-161.
- Eslinger, P. J., Damasio, A. R., Damasio, H., & Grattan, L. (1989). Developmental consequences of early frontal lobe damage. *Journal of Clinical and Experimental Neuropsychology*, 11, 51.
- Ferguson, N., McLernon, F., & Cairns, E. (1994). The sociomoral reflection measure-short form: An examination of its reliability and validity in a northern Irish setting. *British Journal of Educational Psychology*, 64(3), 483-489.
- Flavell, J. H., Miller, P. H., & Miller, S. A. (2002). *Cognitive development (4th ed.)*. Upper Saddle River, New Jersey: Prentice-Hall, Inc.
- Fleminger, S., & Ponsford, J. (2005). Long term outcome after traumatic brain injury. *BMJ (Clinical Research Ed.)*, 331(7530), 1419-1420.
- Gibbs, J. C. (2010). In Gibbs J. C. (Ed.), *Moral development and reality* (2nd ed.). Boston: Allyn & Bacon.
- Gibbs, J. C., Basinger, K. S., & Fuller, D. (1992). *Moral maturity: Measuring the development of sociomoral reflection*. New York: Routledge.
- Gibbs, J. C., Basinger, K. S., Grime, R. L., & Snarey, J. R. (2007). Moral judgment across cultures: Revisiting Kohlberg's universality claims. *Developmental Review*, 27(4), 443--500.
- Gibbs, J. C., Potter, G. B. & Goldstein, A. P. (1995). *The EQUIP program: Teaching youth to think and act responsibly through a peer-helping approach*. Champaign, Illinois: Research Press.

- Gillespie, L. D., Gillespie, W. J., Robertson, M. C., Lamb, S. E., Cumming, R. G., & Rowe, B. H. (2009). WITHDRAWN: Interventions for preventing falls in elderly people. *Cochrane Database of Systematic Reviews (Online)*, (2), CD000340.
- Greene, J. (2003). From neural 'is' to moral 'ought': What are the moral implications of neuroscientific moral psychology? *Nature Reviews Neuroscience*, 4(10), 846-849.
- Greene, J. D., Nystrom, L. E., Engell, A. D., Darley, J. M., & Cohen, J. D. (2004). The neural bases of cognitive conflict and control in moral judgment. *Neuron*, 44(2), 389-400.
- Heinrich-Heine-Universität. (2009). *ANOVA: Fixed effects, omnibus, one-way*. Retrieved 05/30, 2012, from <[www.psych.uniduesseldorf.de/abteilungen/aap/gpower3/user-guide-by-distribution/f/anova\\_fixed\\_effects\\_omnibus](http://www.psych.uniduesseldorf.de/abteilungen/aap/gpower3/user-guide-by-distribution/f/anova_fixed_effects_omnibus)>
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge: Cambridge University Press.
- Hoffman, M. L. (2008). Empathy and prosocial behaviour. In M. Lewis, J. Haviland-Jones & L. F. Barrett (Eds.), *Handbook of emotions* (3rd ed., pp. 440--455). New York: Guildford Press.
- Kohlberg, L. (1963). The development of children's orientation toward a mental order: 1. sequence in the development of moral thought. *Vita Humana*, 6, 11--13.
- Kohlberg, L. (1976). Moral stages and moralization: The cognitive-developmental approach. In T. Lickona (Ed.), *Moral development and behaviour* (pp. 31--53). New York: Rinehart & Winston.
- Kohlberg, L. (1981). *Essays on moral development, vol 1: The philosophy of moral development*. San Francisco: Harper & Row.
- Kohlberg, L. (1984). *The psychology of moral development: The nature and validity of moral stages*. New York: Harper & Row.
- Kohlberg, L., & Ryncarz, R. A. (1990). Beyond justice reasoning: Moral development and consideration of a seventh stage. In C. N. Alexander, & E. J. Langer (Eds.), *Higher stages of human development: Perspectives on adult growth* (pp. 191--207). New York: Oxford University Press.
- Krettenauer, T., & Eichler, D. (2006). Adolescents' self-attributed moral emotions following a moral transgression: Relations with delinquency, confidence in moral judgment and age. *British Journal of Developmental Psychology*, 24(3), 489-506.
- Langdon, P. E., Murphy, G. H., Clare, I. C. H., & Palmer, E. J. (2010). The psychometric properties of the socio-moral reflection measure-short form and the moral theme inventory

- for men with and without intellectual disabilities. *Research in Developmental Disabilities: A Multidisciplinary Journal*, 31(6-), 1204-1215.
- Lapsley, D. K. (2006). Moral stage theory. In M. Killen, & J. Smetana (Eds.), *Handbook of moral development* (pp. 37--66). New Jersey: Lawrence Erlbaum Associates Inc.
- Lebel, C., Walker, L., Leemans, A., Phillips, L. & Beaulieu, C. (2008). Microstructural maturation of the human brain from childhood to adulthood. *NeuroImage*, 40, 1044-1055.
- Levine, C., & Hewer, A. (1983). Moral stages: A current statement and response to critics. In L. Kohlberg (Ed.), *Essays on moral development* (pp. 207--387). New York: Harper & Row.
- Levy, N. (2006). Cognitive scientific challenges to morality. *Philosophical Psychology*, 19(5), 567-587.
- Lichtenberger, E. O., & Kaufman, A. S. (2009). *Essentials of WAIS-IV assessment*. New Jersey: John Wiley & Sons.
- Lux, W. E. (2007). A neuropsychiatric perspective on traumatic brain injury. *Journal of Rehabilitation Research and Development*, 44(7), 951-962.
- Menon, D. K., Schwab, K., Wright, D. W., & Maas, A. I. (2010). Position statement: Definition of traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, 91(11), 1637-1640.
- Miller, M. B., Sinnott-Armstrong, W., Young, L., King, D., Paggi, A., Fabri, M., et al. (2010). Abnormal moral reasoning in complete and partial callosotomy patients. *Neuropsychologia*, 48, 2215-2220.
- Moll, J., de Oliveira-Souza, R., Eslinger, P. J., Bramati, I. E., Mourão-Miranda, J., Andreiuolo, P. A., et al. (2002). The neural correlates of moral sensitivity: A functional magnetic resonance imaging investigation of basic and moral emotions. *The Journal of Neuroscience*, 22(7), 2730-2736.
- Moll, J., Oliveira-Souza, R., & Eslinger, P. J. (2003). Morals and the human brain: A working model. *Neuroreport*, 14, 299-305.
- Moll, J., Zahn, R., De Oliveira-Souza, R., Krueger, F., & Grafman, J. (2005). The neural basis of human moral cognition. *Nature Reviews Neuroscience*, 6(10), 799-809.
- Murray, C. J. L., & Lopez, A. D. (1997). Global mortality, disability, and the contribution of risk factors: Global burden of disease study. *Lancet*, 349(9063), 1436.
- Neurological Alliance. (2003). *Neuro numbers: A brief review of the numbers of people in the UK with a neurological condition*. London: Neurological Alliance.
- Park, E., Bell, J. D., & Baker, A. J. (2008). Traumatic brain injury: Can the consequences be stopped? *Canadian Medical Association Journal*, 178(9), 1163-1170.

- Piaget, J. (1952). *The origins of intelligence in children* (M. Gabain Trans.). New York: International University Press.
- Price, B. H., Daffner, K. R., Stowe, R. M., & Mesulam, M. M. (1990). The compoartmental learning disabilities of early frontal lobe damage. *Brain: A Journal of Neurology*, 113 ( Pt 5), 1383-1393.
- Samango-Sprouse, C. (2007). Frontal lobe development in childhood. In B. L. Miller, & J. L. Cummings (Eds.), *The human frontal lobes: Functions and disorders* (pp. 576--593). New York: Guildford.
- Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as embodied moral judgment. *Personality & Social Psychology Bulletin*, 34(8), 1096-1109.
- Smetana, J. G., & Braeges, J. L. (1990). The development of toddlers' moral and conventional judgements. *Merrill-Palmer Quarterly*, 36, 329--346.
- Sommer, M., Rothmayr, C., Döhnel, K., Meinhardt, J., Schwerdtner, J., Sodian, B., et al. (2010). How should I decide? the neural correlates of everyday moral reasoning. *Neuropsychologia*, 48, 2018--2026.
- Tagliaferri, F., Compagnone, C., Korsic, M., Servadei, F., & Kraus, J. (2006). A systematic review of brain injury epidemiology in europe. *Acta Neurochirurgica*, 148(3), 255-268.
- Thompson, D. C., Rivara, F. P., & Thompson, R. (2000). Helmets for preventing head and facial injuries in bicyclists. *Cochrane Database of Systematic Reviews (Online)*, (2), CD001855.
- Valdesolo, P., & DeSteno, D. (2006). Manipulations of emotional context shape moral judgment. *Psychological Science (Wiley-Blackwell)*, 17(6), 476-477.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scale. *Journal of Personality and Social Psychology*, 54, 1063--1070.
- Wechsler, D. (1997). *Wechsler adult intelligence scale - third edition (WAIS-III)*. San Antonio: Pearson Assessment.
- Wechsler, D. (2008). *Wechsler adult intelligence scale - fourth edition (WAIS-IV)*. San Antonio: Pearson Assessment.
- Wechsler, D. (2009). *The test of premorbid functioning - UK version (ToPF<sup>UK</sup>)*. London: Pearson Assessment.

- Yeates, K. O. (2012). Independent neuropsychological evaluation of children with moderate to severe traumatic brain injury. In E. M. S. Sherman, & B. L. Brooks (Eds.), *Paediatric forensic neuroscience* (pp. 229--257). New York: Oxford University Press.
- Yeates, K. O., & Taylor, H. G. (1997). Predicting premorbid neuropsychological functioning following pediatric traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, 19(6), 825-837.
- Young, L., Cushman, F., Hauser, M., & Saxe, R. (2007). The neural basis of the interaction between theory of mind and moral judgment. *Proceedings of the National Academy of Sciences of the United States of America*, 104(20), 8235-8240.
- Young, L., & Koenigs, M. (2007). Investigating emotion in moral cognition: A review of evidence from functional neuroimaging and neuropsychology. *British Medical Bulletin*, 84, 69-79.
- Zigmond, A. S. & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, 361-370.

## **Part Three: Appendices**

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## **Appendix A: Reflective Statement**

In this reflective statement, I hope to recount my journey through this process, including what I've learned, and the processes that have lead to me learning them.

This research has certainly been eventful, with more 'bumps' in the road than I'd have liked. However, they have provided the biggest learning points from this research, and they have ultimately made this project better. After months of research and planning without a difficulty, I was ready to put my project into action. I fell at the first hurdle outside of the University - my first proposal to NHS Research Ethics was rejected on the grounds that my moral reasoning measure, the DIT-2, was considered inappropriate for a vulnerable population. This was a very big setback, and I found it difficult to cope with, since I was already anxious about my project and had chronic 'imposter syndrome'. This rejection seemed to confirm these anxieties, and the implication that I was willing to conduct unethical research was particularly difficult to overcome. I felt upset, and it took a while for me to feel positive about my project again. Reflecting back on it, the comments made about the measure were probably accurate, and I redesigned several parts of my study around the feedback I received. The first thing I learned from this was to set aside my emotions: swallow my self-doubt, my shame, because it wasn't personal, but was an opportunity to improve my project. I began contacting the previous REC panel to hear their thoughts on my ideas for a new measure. I put together a new application, which was approved despite my enormous nerves in the panel meeting. This episode in my research taught me many things. I learned that no matter how many angles you have considered your research from, you will have missed things. I also learned that people will disagree with you, and that you should take that as an opportunity to improve yourself and your research. Overall, I learned not to take it personally; in the words of the Godfather: "it's not personal, it's research".

However, I didn't adopt this mantra for quite a while, and whilst I knew I was still on track, I became quite avoidant of my research. I struggled to motivate myself, and still doubted my ability. The re-application to ethics meant that I fell rather behind the rest of my cohort, and had a lot to do; after the second ethical application came amendments, followed by BIRT ethical review, followed by the Research and Development process across Trusts. Motivation came from the simple knowledge that I *had* to keep going, and when that was lacking, my supervisor's unshakable optimism about the project was invaluable. However, the real turning point in this project was when I (finally) started testing. My first testing session was fairly eventful, and I learned that research is never going to be predictable! I also realised that flexibility in testing was important, along with being prepared to respond to things you'd not planned for. However, having data felt much more positive; it felt real, and this was a point from which the research became more positive.

After a steady stream of testing, participants were no longer forthcoming, and my research hit its second big stumbling block – getting enough participants. Whilst my initial proposal had included the possibility of using the SRM-SF as a multivariate measure, this was forgotten early on, when it was clear this was not possible in the time frame I had. However, I'd been certain that seven was easily achievable. It was not. Whilst the adulthood-TBI group were easily recruited, the childhood-TBI group was difficult to locate. I had initially not wanted to recruit through Learning Disability Services, for fear of skewing the sample; however, even including this, I was two participants under my minimum, and with only weeks until hand-in, I was still trying to recruit more participants to power my study. I had to request an extension, which was kindly given. From this experience I learned firstly, that not everyone who has participants when you're planning will still have them when you're recruiting! So overestimation of numbers needed is a good strategy that I'll take with me next time. I also learned that it is worth asking every possible avenue at the beginning of recruitment, and using every possible resource, even if it's not



ideal; it's better to later not need something, than to regret it with an underpowered study, even if it was for seemingly good reasons.

The final stages of my project were overall, very positive: choosing a journal was slightly difficult for my SLR, as it covered such a broad topic. However, Clinical Psychology Review managed to be relevant to all of them, and is well-regarded. The Journal of the International Neuropsychology was an obvious choice for my empirical, as they had published on neuropsychological aspects of moral reasoning previously, and the 'style' of the paper fit with mine. During my write-up, I had a good group of peers who were incredibly supportive, and then one of the most positive things of my entire research happened: my data looked good! This rekindled my initial love for the project, and left me finishing my research on a high, not minding that it was a week after my peers (and that my conclusions were not generalisable).

Alongside all of this, several things happened that made me develop a real sense of just how lucky I was to be doing this research. The generosity of my participants and their carers was overwhelming; they had trusted me to try to do what I'd said: improve understanding of one (slightly obscure) consequence of brain injury. I had a responsibility to do their trust justice, including seeking publication no matter my initial self-doubts. This was a real motivator. Other things in and around my life made me stop and think about how I had not been appreciating how fortunate I was to be able to conduct research on this level with so much support and encouragement. In fact, to be able to do it at all is amazing. My biggest regret from the process is that I often struggled to find perspective and passion for this project; a set-back was not the end of the world, and my clinical career – it was a set-back! If I were to take one thing from my research, it would be that keeping perspective is paramount – no matter the hurdles, you *can* do this. And when it gets difficult, then having some really good self-care is advisable – particularly wine, chocolate and friends. However, I would also say that I've learned how important research is, how much respect I have for the people who conduct it, and how lucky I was to have a go at it.

## Appendix B: Clinical Psychology Review Instructions to Authors

### GUIDE FOR AUTHORS

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## Appendix C: Quality Checklist and Scores

Item		Possible answers	Blair & Cipolotti (2000)		Cima et al. (2010)		DeWolfe et al. (1988)		Holmqvist (2008)		Krettenauer & Eichler (2006)		Lee & Prentice (1988)		Young et al. (2012)	
			A	B	A	B	A	B	A	B	A	B	A	B	A	B
1	Are hypotheses and aims of the study clear?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	0	0	1	1	1	1	1	1	1	1
2	Are the main outcomes in the introduction/method (not first in results)?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	Are demographic characteristics clearly described?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	0	1	0	1	1	1	1	1	1	1
4	Are groups defined & differentiated (between groups) <u>or</u> are issues of 'selection in' discussed (within group)?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	0	1	1	1
5	Were those approached to participate representative of the recruitment population?	Yes(1)/No(0)/Unclear(0)	0	0	1	0	1	1	1	1	0	1	1	1	0	1
6	Are the experimental tasks clearly described?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	0	1	1	1	1	1	1	1	1	1
7	Are the key concepts clearly defined?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	0	1	1	1
8	Are the main measures used reliable/valid?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	0	0	0	1
9	Are potential confounders clearly described?	Yes(1)/No(0)/Unclear(0)	1	1	0	1	1	1	1	1	0	1	1	1	1	1
10	Are the main findings clearly described?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	Does the study provide estimates of random data variability for the main outcomes? (i.e. confidence intervals, standard deviations)	Yes(1)/No(0)/Unclear(0)	0	0	1	1	1	1	1	1	0	1	1	1	1	1
12	Were the statistical tests used to assess the main outcomes appropriate?	Yes(1)/No(0)/Unclear(0)	0	0	1	1	0	1	1	1	1	1	1	1	1	1
13	Do the conclusions and interpretations logically follow from the data?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Was the impact of biases assessed?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Were the limitations of the study discussed?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	Have alternative explanations for results and subsequent analyses been described?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	0	1	0	1	0	1	1	1	1	1
17	Have exact p values been reported (e.g. not $p < 0.005$ , except $p < 0.001$ ) for main outcomes?	Yes(1)/No(0)/Unclear(0)	0	0	0	1	0	1	0	0	0	0	0	0	1	1
18	If unplanned data analyses were undertaken ("data dredging"), was this clear?	Yes(1)/No(0)/Unclear(0)	1	1	1	1	1	1	1	1	1	1	0	1	1	1
19	Did the study have sufficient power to detect a clinically important effect ( $p < 0.05$ )	Smallest: $n1=0$ ; $n1-2=1$ ; $n3-4=2$ ; $n5-6=3$ $n7-8=4$ ; $>n8=5$	1	1	5	5	5	5	5	5	5	5	5	5	5	5
20	Have future areas for research been described?	Yes(1)/No(0)/Unclear(0)	1	1	0	1	1	1	1	1	0	1	0	1	0	1
Quality rating Rater A			18		21		18		21		18		18		21	
Quality rating Rater B			18		23		22		23		23		22		24	
Mean quality rating			18		22		20		22		20.5		20		22.5	
% agreement			100%		91.3%		81.8%		91.3%		78.3%		81.8%		87.5%	

**Appendix D: Data Extraction Form**

Data Extraction Form

Paper title	
Author	
Year	
Country of Origin	
Design	
Participants (inc. allocation to groups)	
Measure of moral reasoning	
Measure of emotion	
Other measures	
Key findings	
Main conclusions	
Interaction between moral reasoning and emotion?	
Interaction between moral reasoning/emotion and offending/delinquency?	
Quality rating	

## Appendix E: Journal of the International Neuropsychological Society (JINS) Instructions to Authors

### JOURNAL OF THE INTERNATIONAL NEUROPSYCHOLOGICAL SOCIETY

#### Instructions for Contributors

##### Aims and Scope:

The *Journal of the International Neuropsychological Society* welcomes original, creative, high quality research papers covering all areas of neuropsychology. The focus of articles may be primarily experimental, more applied or clinical. Contributions will broadly reflect the interest of all areas of neuropsychology, including but not limited to: development of cognitive processes, brain-behavior relationships, adult and pediatric neuropsychology, neurobehavioral syndromes, such as aphasia or apraxia, and the interfaces of neuropsychology with related areas such as behavioral neurology, neuropsychiatry, and cognitive neuroscience. Papers that utilize behavioral, neuroimaging, and electrophysiological measures are appropriate. Book reviews will also be published.

To assure maximum flexibility and to promote diverse mechanisms of scholarly communication, the following formats are available in addition to *Regular Research Articles*: *Brief Communications* are shorter research articles; *Rapid Communications* are intended for "fast breaking" new work, that does not yet justify a full length article, and which are put on a fast review track; *Neurobehavioral Grand Rounds* are unique case studies, which are published in tandem with an introduction by an expert in the field to put the case into a more global perspective; *Critical Reviews* are thoughtful considerations of topics of importance to neuropsychology, including associated areas, such as functional brain imaging, neuroepidemiology, and ethical issues; *Dialogues* provide a forum for publishing two distinct positions on controversial issues in a point-counterpoint form; *Symposia* consist of several research articles that are thematically linked; *Letters to the Editor* respond to recent articles in the *Journal of the International Neuropsychological Society*; and *Book Reviews*.

*Critical Reviews*, *Dialogues*, and *Symposia* may be invited by the appropriate Department Editor or proposed by individual authors. Such proposals should be discussed with the Editor-in-Chief or the Department Editor before submission. *Book Reviews* are invited by the Book Review Editor.

##### Originality and Copyright

To be considered for publication in the *Journal of the International Neuropsychological Society*, a manuscript cannot have been published previously, nor can it be under review for publication elsewhere. Papers with multiple authors are reviewed with the assumption that all authors have approved the submitted manuscript and concur with its submission to the *Journal of the International Neuropsychological Society*. A **Copyright Transfer Agreement**, with certain specified rights reserved by the author, must be signed and returned to the Editor by the corresponding author of accepted manuscripts, prior to publication. This is necessary for the wide distribution of research findings, and the protection of both author and the society under copyright law.

If you plan to include material that has been published elsewhere and is under copyright of a third party, you will need to obtain permission to re-use this material in your article. A form is provided for this purpose. Alternatively, many publishers use an online system for such requests. It is the responsibility of the authors to obtain permissions to re-use material from elsewhere.

##### Disclosure Form

The **Author Disclosure Form** must be signed by the corresponding author for all the manuscript's authors at the time the manuscript is submitted. This form includes an attestation that the manuscript is original and not under review in another journal, research was conducted in compliance with institutional guidelines, and any potential conflicts of interest have been

reported. Such disclosure will not preclude publication, but it is critical because of the potential of negative or positive bias. Potential conflicts of interest include funding sources for the reported study (e.g., a test validation study financially supported by a test publisher, a study supported by an insurance company), personal or family financial interest in a test or product or with a company that publishes a test that is being investigated in the manuscript or competes with a test that is being investigated in the manuscript. Other conflicts include employment, consultancies, stock ownership or medicolegal work. For the latter, information about whether the author's medicolegal work is largely for one side should be reported. This list of potential conflicts is not all inclusive, and it is the responsibility of each author to ensure that all of their "potential conflicts" are reported in the Acknowledgment section of the paper. Authors should err on the side of full disclosure, and if authors are uncertain about what constitutes a relevant conflict, they should contact the editorial office (jins@unm.edu).

In addition to signing this attestation, compliance with institutional research standards for animal or human research (including a statement that the research was completed in accordance with the Helsinki Declaration [http://www.wma.net/e/policy/17-c\\_e.html](http://www.wma.net/e/policy/17-c_e.html)) should be included in the methods section of the manuscript, and funding sources and other potential conflicts of interest should be included in the acknowledgments.

Only the corresponding author's signature is required. This disclosure form pertains to all authors, and the corresponding author's signature documents that the corresponding author has obtained all pertinent information from all authors. It is the corresponding author's ethical responsibility to explicitly check with each of his/her co-authors to ensure that any real or apparent conflict of interest is appropriately disclosed. The intent of this disclosure is not to prevent an author with a significant financial or other relationship from publishing their work in JINS, but rather to provide readers with information on which they can make their own judgments.

##### Manuscript Submission and Review

The *Journal of the International Neuropsychological Society* uses online submission and peer review. Paper submissions are not accepted. Authors who are not able to submit their manuscripts online are asked to contact the editorial office at: jins@unm.edu. The website address for submissions is: <http://mc.manuscriptcentral.com/cup/jins>, and complete instructions are provided on the website. Prior to online submission, please consult <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=mesh> for 6 keywords or mesh terms that are different from words in the title. Accurate mesh terms will increase the probability that your manuscript will be identified in online searches. Please follow the instructions carefully to avoid delays. The menu will prompt the author to provide all necessary information, including the manuscript category, the corresponding author including phone number, fax number and e-mail address, and suggested reviewers.

The website will automatically acknowledge receipt of the manuscript and provide a manuscript reference number. The Editor-in-Chief will assign the manuscript for review to an Associate or Department Editor and at least two other reviewers. Every effort will be made to provide the author with a review within 6 to 10 weeks of manuscript assignment. *Rapid Communications* will be reviewed within 6 weeks. If the Editor requests that revisions be made to a manuscript before publication, a maximum of 3 months will be allowed for preparation of the revision, except in unusual circumstances.

##### Required Disclosure, Copyright Transfer, and Permissions Forms

Upon submission of your manuscript, you will be sent an e-mail requesting a signed Author Disclosure form. The Author Disclosure form will be included in the e-mail. Also included in this e-mail will be instructions on how to fax or e-mail the form to the JINS office.

Upon acceptance of your manuscript, you will be sent an e-mail requesting a signed Transfer of Copyright form and instructions on how to fax or e-mail the form will be included in the e-mail. You will also be requested to provide original copies of permissions to re-use material that has been published elsewhere. You may use the form, or the wording contained in it, to seek permission from other publishers, or use the publisher's online request system if this is preferred.

##### Rights and Permissions

For information regarding rights and permissions concerning JINS, contact Marc Anderson (manderson@cambridge.org), or Adam Hirschberg (ahirschberg@cambridge.org).

##### Manuscript Length

In order to increase the number of manuscripts that can be published in the JINS, please adhere to the following length requirements. Please provide a word count on the title page for abstract and for manuscript (not including abstract, tables, figures, or references). Manuscripts will be returned if they exceed length requirements.

**Regular Research Articles:** Maximum of 5,000 words (not including tables, figures, or references) and a 200 word abstract.

**Brief Communications:** Maximum of 2,500 words (not including abstract, tables, figures, or references) and a 150 word abstract, with a maximum of two tables or two figures, or one table and one figure, and 20 references.

**Rapid Communications:** Maximum of 1,000 words (not including abstract, tables, figures, or references) and a 150 word abstract, with a maximum of two tables or two figures, or one table and one figure, and 10 references.

**Critical Reviews:** Maximum of 7,000 words (not including abstract, tables, figures, or references) and a 200 word abstract. **Critical Reviews must be pre-approved by the Department Editor. Please e-mail your abstract to jins@unm.edu in order to receive prior approval.**

**Short Reviews:** Maximum of 2,500 words, a 100-word abstract, and 35 references. *Short Reviews* are conceptually-oriented snapshots of the current state of a research area rather than comprehensive reviews. We welcome descriptions of new or recent concepts and their applicability to neuropsychology, and proposals of novel ideas or approaches, particularly if they lead to testable hypotheses. Prose should be readily accessible to both students and seasoned scientists and clinicians. *Short Reviews* are written by recognized experts in their field. Generally, they are submitted by invitation only, but occasionally an invitation may be issued on the basis of an unsolicited proposal.

**Dialogues:** Maximum of 2,000 words for each segment (not including abstract, tables, figures, or references) and a 100 word abstract, with a maximum of two tables or two figures, or one table and one figure and 20 references. **Dialogues must be pre-approved by the Department Editor. Please e-mail your abstract to jins@unm.edu in order to receive prior approval.**

**Symposia:** Maximum of 5,000 words (not including abstract, tables, figures, or references) and a 200 word abstract. **Symposia must be pre-approved by the Department Editor. Please e-mail your abstract to jins@unm.edu in order to receive prior approval.**

**Neurobehavioral Grand Rounds:** Maximum of 5,000 words with an informative literature review (not including abstract, tables, figures, or references) and a 200 word abstract.

**Letters to the Editor:** Maximum of 500 words (not including table, figure, or references) with up to five references, one table, or one figure.

**Book Reviews:** Approximately 1,000 words.

#### Manuscript Preparation and Style

The entire manuscript should be typed double-spaced throughout using any word processing program. Unless otherwise specified, the guideline for preparation of manuscripts is the *Publication Manual of the American Psychological Association* (6th edition). This may be ordered from: APA Order Dept., 750 1st St. NE, Washington, DC 20002-4242, USA.

Pages should be numbered sequentially beginning with the Title Page. The Title Page should contain the full title of the manuscript, the full names and affiliations of all authors, a contact address with telephone and fax numbers and e-mail address, and the word count for abstract and for manuscript (excluding title page, abstract, references, tables, and figures). At the top right provide a short title of up to 45 characters preceded by the lead author's last name. Example: Smith-Memory in Parkinson's Disease. This running headline should be repeated at the top right of every following page.

**The Abstract and Mesh terms** (Keywords) on page 2 should include a brief statement of the problem, the method, the key findings, and the conclusions. Six mesh or key words should be provided (see <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=mesh> for list), and they should not duplicate words in the title.

The full text of the manuscript should begin on page 3. For scientific articles, including *Regular Research Articles*, *Brief Communications*, *Rapid Communications*, and *Symposia*, the format should include an Abstract, Introduction, Method, Results, and Discussion. This should be followed by References, Appendixes, Acknowledgments, Tables, Figures, and Figure Legends.

The use of abbreviations, except those that are widely used, is strongly discouraged. They should be used only if they contribute to better comprehension of the manuscript. Acronyms should be spelled out at first mention. Metric system (SI) units should be used.

#### Special Note Regarding Figures

Please upload your figure(s) in either a .doc or pdf format. When uploading figures (color or black and white), they need only be a high enough resolution for the reviewers and editors to identify the information you are trying to convey. However, if your

manuscript is accepted for publication, your figures must meet the following criteria:

High quality digital images (600 dpi or higher) should be provided in PDF, EPS, or TIFF formats. If a digital image is not available, please scan in the image. Figures should be numbered consecutively as they appear in the text. Any indication of features of special interest should also be included. Figures should be twice their intended final size and authors should do their best to construct figures with notation and data points of sufficient size to permit legible photo reduction to one column of a two-column format.

Color figures can be accepted. All color graphics must be formatted in CMYK and not in RGB, because 4-color separations cannot be done in RGB. However, the extra cost of printing these figures must be paid by the author: \$500 for the first color page, \$250 for each color page thereafter.

Tables and figures should be numbered in Arabic numerals. The approximate position of each table and figure should be provided in the manuscript: [INSERT TABLE 1 HERE]. Tables and figures should be on separate pages. Tables should have short titles and all figure legends should be on separate pages.

If you plan to use figures or tables that have been redrawn or modified from other publications, and you are not the copyright holder, please obtain permission for this re-use. Authors should err on the side of caution and seek advice from the editorial office if they are uncertain whether to seek permission.

#### Financial Support

Please provide details of the sources of financial support for all authors, including grant numbers. For example, "This work was supported by the National Institutes of Health (grant number XXXXXXXX)". Multiple grant numbers should be separated by a comma and space, and where research was funded by more than one agency the different agencies should be separated by a semi-colon, with "and" before the final funder. Grants held by different authors should be identified as belonging to individual authors by the authors' initials. For example, "This work was supported by the Wellcome Trust (A.B., grant numbers XXXX, YYYY), (C.D., grant number ZZZZ); the National Environment Research Council (E.F., grant number FFFF); and the National Institutes of Health (A.B., grant number GGGG), (E.F., grant number HHHH)." Where no specific funding has been provided for research, please provide the following statement "This research received no specific grant from any funding agency, commercial or not-for-profit sectors."

#### References

References should be in American Psychological Association, 6th Edition, style (see the examples presented below).

Text references should be cited as follows: "... Given the critical role of the prefrontal cortex (PFC) in working memory (Cohen et al., 1997; Goldman-Rakic, 1987; Perlstein et al., 2003a,

2003b) ... ." with multiple references in alphabetical order. Another example is: "For example, Cohen et al. (1994,1997), Braver et al. (1997), and Jonides and Smith (1997) demonstrated ... ." References cited in the text with two authors should list both names. References cited in the text with three, four, or five authors, list all authors at first mention; with subsequent citations, include only the first author's last name followed by et al. References cited in the text with six or more authors should list the first author et al. throughout. In the reference section, list all authors up to seven. For eight or more, list the first six, then three ellipses, and end with the last author's name. Examples of the APA reference style are as follows:

#### Online/Electronic Journal Article with DOI:

Dikmen, S., Machamer, J. Fann, J. & Temkin, N. (2010). Rates of Symptom Reporting Following Traumatic Brain Injury. *Journal of the International Neuropsychological Society*, 16, 401-411. doi: 10.1017/S1355617710000196

#### Scientific Article:

Haaland, K.Y., Price, L., & LaRue, A. (2003). What does the WMS-III tell us about memory changes with normal aging? *Journal of the International Neuropsychological Society*, 9, 89-96.

#### Book:

Lezak, M.D., Howieson, D.B., & Loring, D.W. (2004). *Neuropsychological Assessment*. New York: Oxford University Press.

#### Book Chapter:

Knopman, D. & Selnes, O. (2003). Neuropsychology of Dementia. In K.M. Heilman & E.E. Valenstein (Eds.), *Clinical Neuropsychology*. New York: Oxford University Press.

#### Report at a Scientific Meeting:

Rothi, L.J.G. (2003, February). Use-dependent learning and neural plasticity: A revision of the pessimism surrounding neurorehabilitation. International Neuropsychological Society, Honolulu, Hawaii.

#### Manual, Diagnostic Scheme, etc.:

American Psychiatric Association (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). Washington, DC: American Psychiatric Association Press.

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The publisher reserves the right to copyedit manuscripts. The corresponding author will receive PDFs for final proofreading. These should be checked and corrections returned within 2 days of receipt. The publisher reserves the right to charge authors for excessive corrections.

#### Offprints and PDF Files

The corresponding author will receive a free pdf. This pdf can also be mounted on the authors' web pages. Offprints must be ordered when page proofs are returned. The offprint order form with the price list will be sent with your PDF.

**Appendix F: Brain Injury Rehabilitation Trust Ethical Approval**

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**Appendix G: NHS Research Ethics Committee (REC) Approval; Research and Development (R&D) Approval**

**i. REC Conditional Ethical Approval**

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Removed for hard binding



Removed for hard binding



ii: Acknowledgement of Conditions Met

Removed for hard binding

Removed for hard binding

iii. R&D Approval: Tees, Esk and Wear Valleys

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Removed for hard binding

Removed for hard binding

Removed for hard binding

iv. R&D Approval: Hull and East Yorkshire Hospitals NHS Trust

Removed for hard binding

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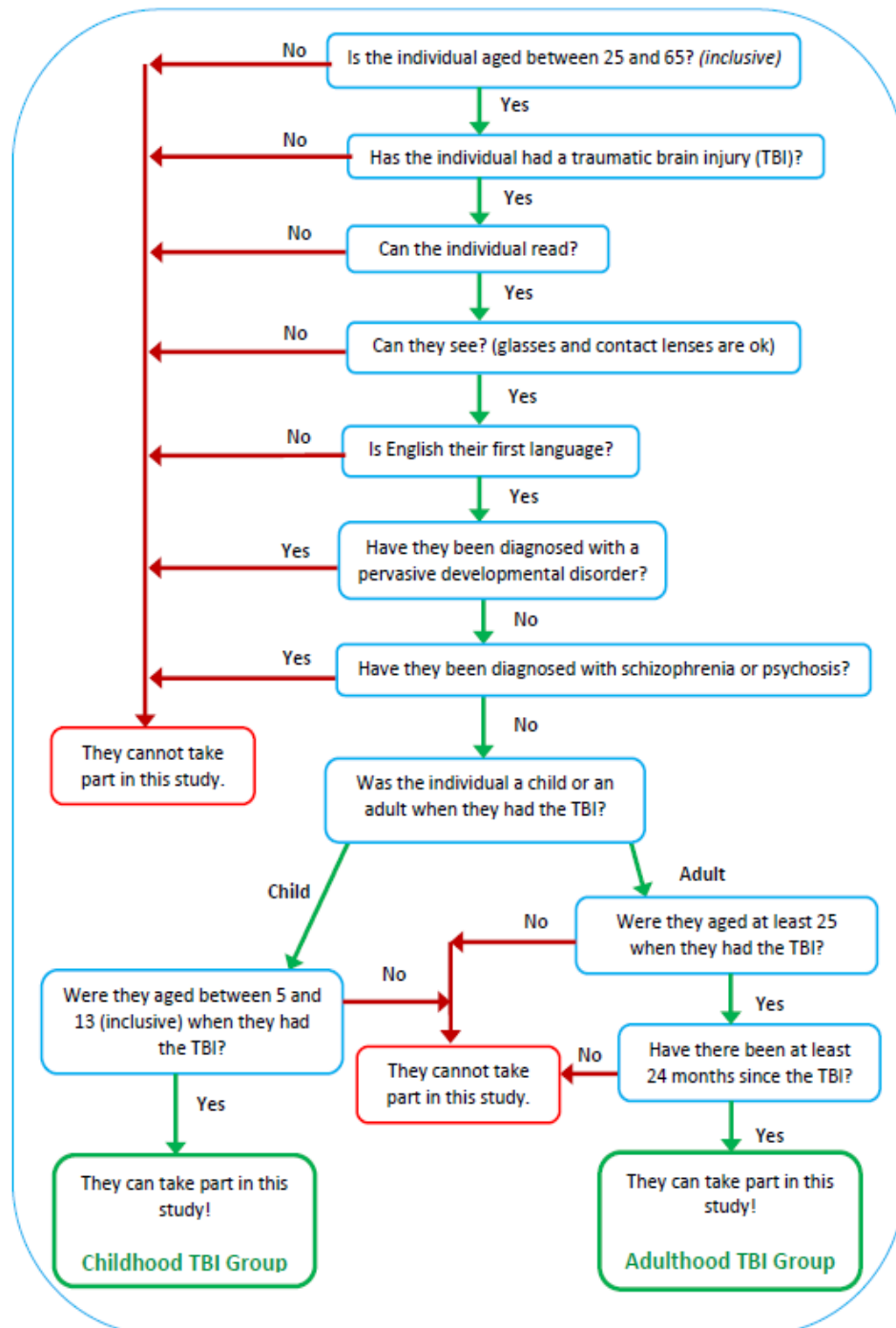
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## Appendix H: Inclusion/Exclusion Flowchart

Who can take part?  
Inclusion and Exclusion Criteria



Inclusion and exclusion criteria  
22 May 2011 – Version 1.2

Page 1/1

## Appendix I: Participant Information Sheet



**Would you like to take part in a new study on moral reasoning?**

**What is the study about?**

The study is looking at whether people use different styles of moral reasoning depending on how old they were when they had a traumatic brain injury (TBI)

**Who can take part?**

People who have had a TBI either when they were a child (aged 5-13) or an adult (aged 25-65)  
Everyone will be an adult when they take part (over 25)

**What does it involve?**

One session of questionnaires lasting about 90 minutes  
It will take place at a location of your choice

**Please read the rest of this information sheet for full details including how to take part**

## Would you like to take part in a new study on moral reasoning?



We are inviting you to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. Please read this information sheet before agreeing to take part. This should take about 5 minutes. Please ask if anything is not clear or if you want to know more.

### What is the purpose of this study?

This study is exploring what methods people use to think about moral dilemmas. This is known as 'moral reasoning style' or 'moral reasoning methods'. Everyone uses different moral reasoning styles. We want to know whether there are differences in moral reasoning style depending on the age at which someone had a brain injury.

This study is also investigating whether or not this is linked to emotion.

This study is not investigating whether someone has good 'moral fibre' or 'is moral'

This study is not investigating whether a brain injury affects 'moral fibre' or 'morality'

### What is 'moral reasoning'?

Our 'moral reasoning' is the way in which we weigh-up options and make judgements when we think about moral dilemmas. This is a famous example of a moral dilemma:

*Heinz's wife is very ill. Only one drug can save her. The only person who sells the drug charges £2000, but it costs only £200 to make. Heinz asks for money from everyone he knows, but still only has £1000. The man refuses to sell Heinz the drug for less money, even when Heinz promises to pay the rest when he can. Heinz then breaks into the shop and steals the drug.*

Our moral reasoning style is not whether we think Heinz was right or wrong, but instead it is the way in which we came to that decision.

There is no 'right' or 'wrong' moral reasoning, and there is no 'good' or 'bad' moral reasoning. Moral reasoning is not the same as 'moral fibre' or 'morality.'

### What does this study involve?

There is one short session of questionnaires. All of your answers will be anonymous.

#### What are the questionnaires?

- 1) Basic information – Eight short questions about your age, sex, education, employment and psychiatric history (about 5 minutes)
- 2) Moral reasoning questionnaire (SRM-SF) – This asks about the way you think about moral dilemmas (about 20 minutes)
- 3) Questionnaire about your mood 'during the session' (PANAS) – This asks about how you're feeling emotionally when you're in the session (about 5 minutes)



## Would you like to take part in a new study on moral reasoning?



- 4) Word list questionnaire (TOPF<sup>UK</sup>) – This looks at people's skills before an illness or injury (about 10 minutes)
- 5) Current thinking skills questionnaire (WAIS-IV) – This looks at people's thinking skills now (about 60 minutes)
- 6) Overall mood questionnaire (HADS) – This asks about your mood over the past couple of weeks (about 5 minutes)
- 7) Basic information about your brain injury – A few short questions about your brain injury. You don't have to give this information (about 5 minutes)

### *How long does it take?*

About 90 minutes

### *Where will it happen?*

Somewhere near to you that you are comfortable with

### *Who can take part?*

You can take part if:

- You are at least 25 years old and not more than 65 years old
- You can read
- Your native language is English
- You can see (including with glasses or contact lenses)
- You had a traumatic brain injury (TBI) either:
  - 1) when you were aged between 5 and 13
  - OR
  - 2) when you were aged 25 or older, with at least 24 months since it happened

### *Do I have to take part?*

No, you do not have to take part. Your care will not be affected if you choose not to participate in the study.

### *What are the disadvantages and risks of taking part?*

Taking part in this study requires some of your time, which may be inconvenient for you.

### *What are the possible benefits of taking part?*

We cannot promise the study will help you but we hope that the information we gain from this study will help improve our understanding of the effects of brain injury on moral reasoning.

### *What will happen if I decide I no longer wish to take part?*

After signing the consent form, you can still change your mind about taking part in the study up until you complete the testing session. If you tell us you've changed your mind we'll destroy any information you have given us. After the testing session, your answers will be anonymous, so we won't know which answers are yours and so we can't remove them.

### *What if there is a problem?*

If you are worried about any part of this study, you should ask to speak to the researchers who will do their best to answer your questions (contact details at the end of this sheet).

## Would you like to take part in a new study on moral reasoning?



If you are still unhappy and want to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the Patient Advice and Liaison Service (PALS) at the main reception desk of Hull Royal Infirmary, telephone 01482 335409, email [pals@hullpct.nhs.uk](mailto:pals@hullpct.nhs.uk) or visit or at: <http://www.hullpct.nhs.uk/pages/contact-us>.

### Will my taking part in this study be kept confidential?

All data will be handled according to ethical and legal practice. All information which is collected about you during the course of the research will be anonymous. Your completed questionnaires will be given a code number which will be used in the results. The coded data will be stored securely for five years after the study ends.

### What will happen to the results of the study?

The results will be written for a doctoral qualification and might be published in a scientific journal. You will not be personally identified in any of the results. Information about the results will be available from the researcher when the study ends in summer 2012. If you want to hear about the results, please let the researcher know.

### Who is organising and funding the research?

This research is part of a doctorate in Clinical Psychology. The research is paid for through the University of Hull.

### Who has reviewed the study?

All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by a Research Ethics Committee.

### Further information and contact details

If you want to know more or have any questions please contact Carly Telford on the contact details below.

#### I want to take part. What do I do next?

If you want to take part, please:

- 1) Tell the person who gave you this sheet, who will contact the researcher (Carly Telford) for you. Carly will then contact you to answer any questions you have and arrange a time to meet.

OR

- 2) Contact the researcher (Carly Telford) directly on these details:

Carly Telford  
Department of Clinical Psychology  
Hertford Building  
University of Hull  
HU6 7RX

email: [c.a.telford@2009.hull.ac.uk](mailto:c.a.telford@2009.hull.ac.uk)

phone: 01482 464106

## Appendix J: Participant Consent Form

Consent form 1 Participant number \_\_\_\_\_  UNIVERSITY OF Hull

### Moral reasoning style following acquired brain injury

This page asks for your permission for us to do the study with you

	Please put your initials in the box
<p>1. I have read and understand the information sheet 'Would you like to take part in a new study on moral reasoning?' (22 May 2011 - version 1.2).</p> <p>I have had a chance to:</p> <ul style="list-style-type: none"> <li>• Think about the information</li> <li>• Ask questions</li> <li>• Get all the answers to my questions that I want</li> </ul>	<input type="text"/>
<p>2. I understand that:</p> <ul style="list-style-type: none"> <li>• I am choosing to take part</li> <li>• I don't have to take part</li> <li>• I can choose to stop at any time</li> <li>• If I choose to stop nothing bad will happen</li> <li>• I don't have to give a reason to stop</li> </ul>	<input type="text"/>
<p>1. I understand the risks and benefits of doing the study.</p>	<input type="text"/>
<p>2. I agree to take part in the study</p>	<input type="text"/>

\_\_\_\_\_  
Name of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name of person taking consent

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

Consent form 2 Participant number \_\_\_\_\_



## Moral reasoning style following acquired brain injury

This page asks for your choices about a questionnaire which measures feelings

One of the questionnaires (the HADS) measures mood. If people get high scores, it can mean that they are worried (anxious) or sad (depressed). We are asking you to choose if you want to have the questionnaire scored straight away or later.

If you choose to have your HADS scored straight away:

- We can tell you what your scores are
- If your scores are high we can give you a sheet which tells you some ways to get help. We'll tell your case manager or key worker (if you have one). You can choose if you want us to tell your GP.

If you choose to have your HADS scored later:

- Your answers will be anonymous
- We will not be able to tell you your scores. We will not be able to tell your GP your scores. We will not be able to tell anyone your scores.

*please delete as appropriate	Please put your initials in the box
1. I understand that if I have my HADS scored <i>later</i> , then the researcher will not give my scores to me (or anyone).	<input type="checkbox"/>
2. If I have my HADS scored <i>straight away</i> and my scores are high, the researcher will tell me my scores. They will tell my case manager or key worker my scores.	<input type="checkbox"/>
3. I want the researcher to score my HADS <u>straight away/later</u> *.	<input type="checkbox"/>
4. If my HADS scores are high, I <u>do/do not</u> * want the researcher to send a letter to my GP telling them about it (they can only do this if I choose 'straight away').	<input type="checkbox"/>

\_\_\_\_\_  
Name of participant\_\_\_\_\_  
Date\_\_\_\_\_  
Signature\_\_\_\_\_  
Name of person taking consent\_\_\_\_\_  
Date\_\_\_\_\_  
Signature

### Moral reasoning style following acquired brain injury

This page asks for your choices about the researcher asking about your brain injury

As part of the study, the researcher would like to ask about your brain injury and some tests you have done previously. They can do this in different ways. Please cross out the options below to choose what way you want the researcher to ask about your brain injury. You can choose none of the options if you don't want them to ask at all, or if you don't want them to see your scores or records.

\*please cross out as appropriate

	Write 'YES' or 'NO' in the box
I give the researchers permission to:	
a. Talk to me	a. <input type="checkbox"/>
b. Talk to people involved in my care	b. <input type="checkbox"/>
c. Look at my medical records	c. <input type="checkbox"/>
I understand that my medical notes and data collected during the study may be looked at by individuals from regulatory authorities or from the NHS Trust where it is relevant to my taking part in this research. I give permission for these individuals to have access to this information.	Please put your initials in the box <input type="checkbox"/>

\_\_\_\_\_  
Name of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name of person taking consent

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

## Appendix K: Demographic Information Questionnaire

Participant Number



## Demographic Information Questionnaire

1. What is your date of birth?

2. Are you male or female? (please tick ✓ )

Male	<input type="checkbox"/>
Female	<input type="checkbox"/>

3. How old were you when you left school?

<input type="text"/>	Years old
----------------------	-----------

4. What qualifications do you have? (please tick ✓ )

I have no qualifications	<input type="checkbox"/>
SATs	<input type="checkbox"/>
GCSEs or GCEs or O Levels	<input type="checkbox"/>
A levels	<input type="checkbox"/>
University bachelor degree	<input type="checkbox"/>
University postgraduate degree	<input type="checkbox"/>
Other (please write)	<input type="text"/>

5. What kind of job do you have? (please tick ✓ )

I employ other people	<input type="checkbox"/>
I have a job (I am paid)	<input type="checkbox"/>
I have a voluntary job (I am not paid)	<input type="checkbox"/>
I work within my home (I am not paid)	<input type="checkbox"/>
I do not have a job	<input type="checkbox"/>

Participant Number



6. Are you currently taking any prescribed medication? (please tick ✓)

No	
Yes	What medications?

7. Have you ever seen someone for a mental health difficulty in the past? (e.g. depression, anxiety, phobia etc)

Please say a bit about this (if you don't want to say you don't have to):

8. Do you have any mental health difficulties at the moment?

Please say a bit about this (if you don't want to say you don't have to):

9. Do you have any criminal convictions?

Please say a bit about this (if you don't want to say you don't have to):

## Appendix L: Information about the TBI Questionnaire

Participant Number



### Information about the TBI itself

#### Questioning script

1. Who is answering the questions?

Participant	
Researcher (from records)	
Point of contact (state what relation)	
Other (state what relation)	

2. How old were you when you had the TBI? OR When did it happen?

	Years	Date of TBI _____
	Months	

3. What caused the brain injury? (e.g. road traffic accident)

4. Were you in a coma?

How long were you in a coma for? (Or GCS score)

How long after the TBI is it until you remember something? (Or PTA )



Participant Number

5. What problems do you have because of the brain injury? (e.g. concentration, memory)

6. Medical records and staff only

What areas of the brain were/are affected by the brain injury? (e.g. left parietal lobe)

7. Was there any additional information gathered about the brain injury?

## Appendix M: Participant Debriefing Sheet



### Debriefing

You have now finished. Thank you for taking part!



#### What happens next?

The answers you gave will now be analysed by the researcher and put into a written document, about whether moral reasoning is different if you had a brain injury when you were a child, or if you had a brain injury when you were an adult. We will also be looking at whether emotion is linked.

This written document should be finished in July 2012. We will try to publish it in a peer-reviewed journal. Your personal information will not be in the document, and your results will be anonymous.

#### Will I find out about the results of the study?

If you want us to.

If you want us to tell you about the result of the study, please let the researcher know now. We will then send you some information about the results when the study is finished. We'll ask if you want to comment on the results.

#### What if I no longer want my answers to be in the study?

If you no longer want your answers to be in this study, please tell the researcher now and she will take your answers out of the study.

After today, your answers will be anonymous. After today we won't be able to take your answers out of the study because we won't know which answers are yours.

#### What if I am upset after taking part in this study?

If you are upset after taking part, please let the researcher know now. You will be given the opportunity to talk about it. She can give you a sheet telling you some sources of support.

#### What if I have questions after today?

If you have any questions about any part of the study, please either contact the researcher directly on the details below, or ask a member of your care team to do so (if they were the ones who approached you about this study in the first place).

**Address:** Carly Telford  
Department of Clinical Psychology  
Hertford Building  
University of Hull  
HU6 7RX

**Email:** c.a.telford@2009.hull.ac.uk

**Phone:** 01482 464106



Thank you for taking part in this study!

## Appendix N: Sources of Support Sheet



### Sources of support for people who feel worried and/or upset

#### Why have I been given this sheet?

You have been given this sheet because you answered a questionnaire, the HADS (Hospital Anxiety and Depression Scale), and some of your answers suggested that you might be struggling with either feeling worried or sad. You may also have been given this questionnaire because you said you felt worried or upset at the end of this study.

#### So does that mean that I am depressed or anxious?

No.

Some people who have high scores on the HADS have depression or anxiety, but not everyone. The answers on this questionnaire just suggest that people *might* be struggling. It does *not* mean you definitely have depression or anxiety.

#### What should I do next?

If you think you need or want some support, then there are many sources of support you can access. This sheet only names some of them. You can:

##### Speak to your GP

If you think you might be suffering from depression or anxiety, speak to your GP. They can talk to you about your options. The researcher can contact your GP if you want them to.

##### Speak to your case manager or key worker

If you don't know who your GP is, then you can speak to anyone who is involved with your care, which might include the person who first told you about this study.

#### What other sources of support are there?

We have written a few sources of support here. You can talk to your GP or case manager or key worker to help you to think about your options.

##### The Samaritans

Samaritans provides confidential non-judgemental emotional support, 24-hours a day for people who are feeling upset, and people who might want to hurt themselves.

Telephone: 08457 90 90 90 (most branches also have a local number)

Email: [jo@samaritans.org](mailto:jo@samaritans.org)

Website: [www.samaritans.org](http://www.samaritans.org)

NHS Direct

NHS Direct is a 24-hour nurse-led telephone advice and information service and is part of the National Health Service.

Telephone: 0845 4647

Website: [www.nhsdirect.nhs.uk](http://www.nhsdirect.nhs.uk)

Depression Alliance

A website which offers help to people with depression. The people who made the website have depression too. It includes what depression is, treatments for depression, and local support groups.

Website: [www.depressionalliance.org](http://www.depressionalliance.org)

Headroom

BBC Headroom is a campaign to encourage people to look after their mental wellbeing. It has videos and surveys about life's ups and downs, wellbeing guides, and information about Headroom events.

Website: [www.bbc.co.uk/headroom](http://www.bbc.co.uk/headroom)

MIND

MIND is the leading mental health charity in England and Wales, and works for a better life for everyone with experience of mental distress. This is their website.

Website: [www.mind.org.uk](http://www.mind.org.uk)

Sort out stress

This is a website for men. It offers ideas and advice for dealing with stress.

Website: [www.sort-out-stress.co.uk](http://www.sort-out-stress.co.uk)

Please speak to the researcher if you are still worried or upset

## Appendix O: High HADS GP Letter



Carly Telford  
Trainee Clinical Psychologist  
Department of Clinical Psychology  
Hertford Building  
University of Hull  
Cottingham Road  
Hull  
East Riding of Yorkshire  
HU6 7RX

[Date]

[GP Name]  
[GP Address]

Dear Dr [GP name]

Re: [Participant Name]  
[Participant Address]

I am writing regarding the above named individual, who recently took part in a research study as part of my doctoral thesis. As part of this research, they were administered the Hospital Depression and Anxiety Scale (HADS), which measures general mood over a fortnight.

Their scores on the HADS indicated [moderate/high] levels of [anxiety/depression/anxiety and depression].

They have consented for me to reveal this information to you. I am therefore writing to request that you please use this information to discuss these results with your patient, including possible sources of support for [anxiety/depression/anxiety and depression] if you feel that is appropriate.

If you would like to discuss the matter further, please contact me on the above details. I will not be able to reveal further details of your patient's involvement in my research without further consent from them, but would be happy to discuss their HADS scores or this letter.

Yours sincerely,

Carly Telford  
Trainee Clinical Psychologist  
University of Hull