Investigating associations between empathy, morality and psychopathic personality traits in the general population

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Abstract

Although atypical moral and empathy processing are considered core features of psychopathic personality, little is known about how these constructs are associated with psychopathic traits in the general population. One-hundred-twenty-four adult males from the community were administered the Self-Report Psychopathy Scale 4 Short Form, as well as a wide battery of affect, empathy and morality tasks and questionnaires. Our findings indicate that both core affective-interpersonal, as well as lifestyle-antisocial features of psychopathy are associated with weaker empathic responses to fearful faces. However, only the unique variance of the affective-interpersonal features is associated with weaker empathic response to happy stories, lower propensity to feel empathic concern and less difficulty in making decisions on moral dilemmas. In contrast, the unique variance of the lifestyle-antisocial features is associated with greater propensity to feel empathic concern. These preliminary findings extend previous research and suggest that, while the joint variance between affective-interpersonal and lifestyle-antisocial features might drive some 'deficits' associated with psychopathy, there also appears also to be unique 'deficits' associated with the core affective-interpersonal features, particularly in relation to affective aspects of moral processing.

Keywords: Psychopathy; Emotional empathy; Morality; Empathic concern; Moral emotions

1. Introduction

Lack of empathy and amoral behaviour are considered core features of the psychopathic personality (Blair, Mitchell, & Blair, 2005). However, little is known about how specific dimensions of empathy and morality are associated with psychopathic traits in the general population. In the current study we employed several paradigms concurrently to investigate these associations.

1.1. Dimensions of psychopathic personality

Based on formal assessment with the Psychopathy Checklist – Revised (PCL-R; Hare, 2003), the syndrome of psychopathy can be diagnosed in forensic settings when an individual scores high on two dimensions. One, traditionally referred to as Factor 1, is characterized by affective and interpersonal features such as reduced guilt, empathy and attachment to significant others, along with deceptive, manipulative interactions. The other, Factor 2, relates to features involving impulsivity, poor behavioural control and antisocial behaviour (Hare, 2003; Hare & Neumann, 2008).

Recent taxometric studies suggest that psychopathy is a dimensional construct rather than a qualitatively distinct category of behaviour, and that psychopathic traits are best viewed as existing on a continuum, thus providing an empirical basis for studying individuals in terms of level of psychopathic traits rather than limiting studies to extreme groups (See Hare & Neumann, 2008 for a review). The strength of this dimensional perspective has led to a growing number of community studies on psychopathy (Lilienfeld & Fowler, 2006). Findings from these studies often mirror those observed in clinical/forensic samples (Benning, Patrick, & Iacono, 2005; Hall & Benning, 2006), further strengthening the view that there are

continuities between community and forensic participants in the mechanisms underlying psychopathy.

The presence of dysfunctional affective-interpersonal features is considered to be the core characteristic of psychopathy, distinguishing individuals who are psychopathic from those who are antisocial but not psychopathic (Blair, et al., 2005). Evidence from forensic and community samples also suggest that the two dimensions of psychopathy present distinct associations with various criterion measures of personality, emotionality and behaviour, particularly when their shared variance is controlled (e.g. Hicks & Patrick, 2006; Patrick, Hicks, Nichol, & Krueger, 2007; Uzieblo, Verschuere, van den Bussche, & Crombez, 2010), highlighting the distinct influence each dimension may have and the importance of inspecting the unique contribution of each dimension in order to provide a more comprehensive map of the psychopathy construct.

1.2. Emotional empathy, morality and psychopathy

Although there isn't complete agreement regarding the precise definition of empathy and its constitutive components (Batson, 2009) empathy is normally understood as an affective state caused by sharing the emotions of another person (Eisenberg, 2000; Hoffman, 2000; Singer, 2006). Emotional empathy, or simply empathy, can be defined by the subject's emotional state resulting from the observation or imagination of another person's state; the subject's emotional state is isomorphic but the subject is aware that it is vicariously elicited by the emotional state of the other person (Singer, 2006).

Empathy and morality have long been conceptually linked (Eisenberg, 2000; Hoffman, 2000), and empathy is thought to play a crucial role in moral behaviour. Empathy is not

considered to be pro-social *per se*. However, with further cognitive processing, empathic response may develop into empathic concern, guilt or a combination of the two. Such prototypical moral emotions are thought to provide the motivational force to 'do good' and avoid 'doing bad' (Moll & de Oliveira-Souza, 2007), and function as an emotional moral barometer, providing immediate and salient feedback on behaviour (Tangney, Stuewig, & Mashek, 2007). Actual behaviour is not necessary for this barometer to function, as people can anticipate their likely emotional reactions when considering behavioural alternatives. Emotional empathy can thus be regarded as a necessary step in a chain that begins with affect recognition and emotional contagion, and is followed by understanding another person's feelings; this understanding provides the basis for experiencing moral emotions, such as concern and guilt that in turn motivate moral behaviour.

Past research has found that adults and children with high levels of psychopathic traits have a selective impairment in the recognition of others' distress, particularly fear and sadness (e.g. Blair, Colledge, Murray, & Mitchell, 2001; Blair, et al., 2002; Blair et al., 2004; Montagne, et al., 2005). However, this impairment does not appear as consistent in community samples (Del Gaizo & Falkenbach, 2008). Adults and children with psychopathic traits have also shown reduced autonomic response to stimuli associated with distress in others (Blair, 1999; Blair, Jones, Clark, & Smith, 1997) and, in a community sample, adults with high traits of dysfunctional affective-interpersonal features have shown blunted affective empathic responses to the emotional displays of others (Ali, Amorim, & Chamorro-Premuzic, 2009).

Adults with psychopathy do not seem to show different patterns of responses regarding the endorsement of actions in moral dilemmas compared to controls (Cima, Tonnaer, & Hauser, 2010; Glenn, Raine, Schug, Young, & Hauser, 2009). However, they do show reduced

amygdala activity when responding to the same moral dilemmas, and those with particularly high scores of callousness show further reduced activity in several regions considered to be part of the moral circuitry (Glenn, Raine, & Schug, 2009). Some researchers have argued these individuals are able to distinguish between right and wrong but do not care (e.g. Cima, et al., 2010) as their moral knowledge appears to be intact but their moral emotions appear deficient failing to motivate moral behaviour.

In the current study we employed several paradigms concurrently to investigate how different features of the psychopathic personality are associated with distinct components of affect, empathy and morality described above. Based on previous research, we predicted that affective-interpersonal features would be associated with lower scores on various measures of affect, empathy and morality. We also predict that impulsive-antisocial behaviour features would be associated with greater scores on those measures.

2. Material and Methods

2.1. Participants

One-hundred-twenty-four adult males from western English speaking countries with ages between 18 and 48 (M= 26.23; SD= 7.07), and estimated IQ between 79 and 137 (M= 115.81; SD= 13.14), were recruited from the University College London Psychology Subject Pool and through online advertisement. Participants provided written informed consent and were compensated with £10 for their time.

2.2. Procedure

All tasks and questionnaires, apart from the *Wechsler Abbreviated Scale of Intelligence* (WASI; Wechsler, 1999), were presented on a computer using Psytools software (Delosis Limited). All tasks were presented randomly across participants and were followed by the questionnaires.

2.3. Materials

2.3.1 Assessment of General ability

The *WASI (Wechsler, 1999)* Full-Scale IQ Two-Subtest (FSIQ-2) was used to produce an estimate of general cognitive ability.

2.3.2. Assessment of psychopathic traits

Psychopathic traits were assessed with the *Self-Report Psychopathy Scale 4 Short Form* (SRP-4-SF; Paulhus, Neumann & Hare, in press), a 29-item scale designed to measure psychopathic attributes in non-institutionalised samples. The SRP-4-SF assesses psychopathic traits, organised in four facets – interpersonal, affective, lifestyle and antisocial — consistent with recent research on the PCL-R. However, like the PCL-R, the four facets can be modelled in terms of the traditional two-factor dimensions. The SRP has been shown to have good construct validity and is strongly correlated with the PCL-R (Lilienfeld & Fowler, 2006; Paulhus, Neumann, & Hare, in press),

2.3.3. Measures of Affect, Empathy and Morality

2.3.3.1. Emotion Multimorph Task

The Emotion Multimorph task, previously used by Blair and colleagues (2004) and Rogers and colleagues (2006), is a measure of sensitivity to recognise emotional facial expressions. Three identities were prepared for each emotion (sadness, fear, anger and happiness) by gradually morphing a neutral affect expression into the prototypical emotional expression in 20 stages of 2 seconds each. Presentation order of stimuli was randomized across participants. Mean expression recognition stage scores were computed following the procedure used in Blair and colleagues (2004).

2.3.3.2. Empathy image task using the Self-Assessment Manikin (SAM-Faces)

Based on Ali and colleagues (2009), this task estimates participants' emotional response to emotional faces using the Self Assessment Manikin (SAM) methodology. The SAM has strong psychometric properties and is widely used to measure affective response (Bradley & Lang, 1994). In the present task, participants were asked to rate their affective state when watching images depicting a person showing a sad, fearful, angry, happy or neutral expression. The valence scale ranges from a low-spirited manikin to a widely smiling one, going through a middle neutral stance; low ratings on the manikin mean negatively valenced affective responses and high ratings mean positively valenced affective responses. This task is thought to tap into the emotional empathy construct as it not only estimates participants' vicarious response to emotional stimuli, but also comprises elements of self-awareness (participants have to evaluate their emotional response) and self/other distinction (participants are asked how the stimulus makes them feel). To create the image set for this task, 30 pictures for each emotion were selected from gettyimages_database, istockphoto and other public sources. Each picture consisted of one person, whose face was the focal point of the image. Eight postgraduates rated each picture according to what emotion was displayed, its valence and arousal. From the initial set, 8 images were selected for each emotion (4 female

and 4 male). Criteria for selection were complete inter-rater agreement over emotion portrayed, and consistency of valence and arousal ratings. Selected images were randomised for each participant. Cronbach's α of valence scores on this task were 0.89 for sad, 0.82 for fearful, 0.72 for angry, 0.72 for neutral, and 0.88 for happy faces.

2.3.3.3. Empathy-Eliciting Short Stories task using the SAM (SAM-Stories)

The SAM-Stories task was designed to assess participants' emotional response to emotional short stories using the SAM methodology. Participants were presented with 12 short stories portraying sadness, anger or happiness. To generate the story set for this task, 24 original short stories were created and presented to 8 postgraduates indicated what emotion was portrayed in each story and rated its intensity. Criteria for selection were complete inter-rater agreement over emotion portrayed, and consistency on intensity ratings. Cronbach's α of valence scores on this task were 0.79 for anger, 0.83 for happy, and 0.78 for sad stories.

2.3.3.4.Empathic Concern Scale of the Interpersonal Reactivity Index (IRI; Davis, 1980)

The empathic concern scale assesses the tendency to experience feelings of sympathy and compassion for others (e.g. "I often have tender, concerned feelings for people less fortunate than me").

2.3.3.5. Moral emotions task

Adapted from Kédia and colleagues (2008), this task comprised the presentation of brief stories depicting prototypical moral situations, i.e. "an agent harms a victim". Depending on whether the agent and the victim are the self or other, these stories would elicit four kinds of moral emotions: Guilt, Compassion, Self-Anger and Other-Anger. As the main goal was to focus on moral emotions, the harmful action is performed unintentionally in all stories to

prevent possible interferences from other cognitive processes likely involved in moral judgement. In the original task 20 different scenarios were used, with 6 possible endings each. In order to make the task less extensive, 18 scenarios were chosen, with 3 possible endings each: two portraying a harmful action and one neutral. Participants were asked to read each story and rate to what extent they would experience each emotion on a 7-point scale (1=not at all; 4=fairly; 7=extremely). Mean ratings of each moral emotion were created after subtracting neutral ratings from target ratings within each scenario.

2.3.3.6. Moral dilemmas task

Based on previous published work (e.g. Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Koenigs, et al., 2007), this task is a scenario-based measure of moral decision. Participants were asked to make decisions on a series of 8 moral dilemmas portraying a choice of whether or not to sacrifice one person's life in order to save the lives of a group of others, differing on whether there is direct physical contact with the victim (Personal dilemmas) or not (Impersonal dilemmas). Participants were asked to answer if they 'Would do… in order to…?' and to rate the difficulty of the decision on a 10-point scale.

2.4. Data analyses

Mean inter-item correlations for the SRP Interpersonal (.23), Affective (.24), Lifestyle (.28), and Antisocial (.21) scales suggested item homogeneity indicating that they were unidimensional indicators of their respective factors. Alpha for the total SRP scale was good (.85), and similarly for the items used to form composite scores of the traditional F1 (.79) and F2 (.73) dimensions. The F1 and F2 composites were significantly correlated ($r = .62$, $p < .001$). To verify the adequacy of the two-factor model of the SRP-4-SF, confirmatory factor analysis was conducted using Mplus, Version 6.1 (Muthen & Muthen, 1998-2010). Using the

Interpersonal and Affective SRP scale scores as indicators of F1, and Lifestyle, Antisocial scales as F2 indicators, the 2-factor solution of the SRP-4-SF showed good model fit (Model fit: $X^2(1) = 2.82$, $p > .05$, CFI = .987, SRMR = .021).

Pearson and Spearman correlational analyses were conducted using SPSS, version 13.0 for Windows. Preliminary analyses showed that estimated IQ was significantly correlated with some of the measures. Therefore, two sets of analyses were conducted. First, estimated IQ was entered as a control variable in order to adjust for the influence of cognitive ability on the relationships. Second, to examine the unique variance of each dimension in relation to criterion variables, each dimension of SRP was also partialled out from one another.

Benjamini and Hochberg False Discovery Rate (Benjamini & Hochberg, 1995) was used to control for the probability of making a Type I error on multiple comparisons. Corrected p-values are presented.

Where distinct associations between the two SRP dimensions and a given criterion variable were identified, Steiger's Z-tests (two-tailed) were conducted to test if the difference between the correlations was significantly different.

3. Results

Descriptive statistics and a complete correlational table for all experimental paradigms can be found in supplementary materials.

Pearson and Spearman's correlation coefficients and False Discovery Rate adjusted p-values between SRP dimensions and all measures used are reported in Table 1. Z and p-values of difference between regression coefficients are also presented.

********** Insert Table 1 about here **********

After correcting p-values for multiple comparisons, no significant associations between the dimensions of SRP and variables of Multimorph and Moral emotions tasks were found. Both SRP dimensions showed significant associations with less negative empathic responses to fearful faces and the affective-interpersonal dimension showed an additional significant association with less positive emotional responses to happy stories. Significantly different and opposite associations between the SRP dimensions and propensity to feel empathic concern were found. Affective-interpersonal dimension was negatively associated with the propensity to feel empathic concern, whilst lifestyle-antisocial dimension showed the opposite direction when the overlap between the two dimensions was accounted for. There were no significant associations between SRP dimensions and endorsement of actions on the moral dilemmas task, but both dimensions showed negative associations with perceived difficulty in making those decisions. However, the associations with lifestyle-antisocial dimension ceased to be significant when affective-interpersonal was kept constant.

4. Discussion

This study examined the associations between multiple measures of affect, empathy and morality with different features of the psychopathic personality, in a community sample of males. Overall, our findings indicate that in the general population, both dimensions of psychopathy are associated with weaker empathic responses to fearful faces. Our data also

suggest that there appears to be some specificity between the two dimensions of psychopathy and domains of empathic and moral processing: the unique variance of the SRP affective-interpersonal dimension was associated with weaker empathic response to happy stories, lower propensity to feel empathic concern and less difficulty to make decisions in moral dilemmas; in contrast, the unique variance of the SRP lifestyle-antisocial dimension was associated with greater propensity to feel empathic concern.

Although difficulties in recognising sad and fearful facial affect have been reported in previous studies (e.g. Blair, et al., 2004; Montagne, et al., 2005), no significant correlations between the dimensions of the SRP and sensitivity to recognise facial affect survived correction for multiple comparisons in the present study. Previous research with a community sample has reported similar negative results (Del Gaizo & Falkenbach, 2008). It is possible that impairments in emotional recognition are present only in clinical cohorts of psychopathy, which would explain the lack of consistent findings in studies using community samples.

Similar to Ali and colleagues (2009), our findings indicated an association between psychopathic traits and less negative emotional responses to fearful faces in the SAM-Faces task. Both dimensions of psychopathy were related to less negative emotional responses to fearful faces. However, these associations ceased to be significant once the shared variance was removed, suggesting that the variance shared by the dimensions of psychopathy drives the reduced emotional response to fearful faces. On the other hand, only the affective-interpersonal dimension of the SRP was significantly correlated with less positive emotional responses to happy stories, even when the variance overlap with the lifestyle-antisocial dimension was accounted for. This finding might indicate that affective-interpersonal features

of psychopathy are associated with diminished empathic responsiveness to positive, as well as negative emotions.

Although no significant correlations with the moral emotions task variables survived correction for multiple comparisons, we did find opposite significant correlations between both SRP dimensions and propensity to feel empathic concern. Empathic concern is considered to be a prototypical moral emotion (Eisenberg, 2000), and thus to function as a moral barometer motivating behaviour. The unique variance associated with affective-interpersonal features was correlated with lower propensity to feel concern for others, whereas the unique variance associated with lifestyle-antisocial was correlated with greater propensity to feel concern for the distress of others. Similar effects revealing opposing associations have been reported previously, with evidence from forensic and community samples suggesting that the two dimensions of psychopathy have opposite relationships with emotion and emotional reactivity. For example, previous studies have shown that after controlling for the overlap between the two dimensions, the affective-interpersonal dimension is negatively associated with constructs such as emotional distress, fearfulness, trait negative affect, whilst the impulsive-antisocial behaviour dimension is positively associated with these constructs (Hicks & Patrick, 2006). Our results also indicate that neither SRP dimension is associated with increased endorsement of actions in the moral dilemmas task, replicating previous data from forensic (Cima, et al., 2010) and community samples (Glenn, Raine, Schug, et al., 2009). Nonetheless, affective-interpersonal features appear to diminish the level of difficulty that making these decisions represent. To our knowledge this is the first study exploring perceived difficulty in making decisions on moral dilemmas in relation to psychopathic traits. The perceived ease with which those individuals high on affective-interpersonal features made moral decisions could merely reflect a general ease in decision

making, rather than anything circumscribed to moral decision making. Alternatively, it could specifically reflect ease in making decisions about emotionally aversive dilemmas and, taken together with the other findings, reflect some level of emotional disengagement. The moral dilemmas task used in this study comprised highly emotional moral dilemmas involving the sacrifice of one life to save the life of a group of others. These moral dilemmas have been found to evoke activity in the amygdala and other brain structures implicated in emotional processing (Greene et al., 2001). At the same time, it has been found that in subjects scoring higher in psychopathy traits, amygdala functioning is disrupted during moral decision making (Glenn, Raine, & Schug, 2009). Unfortunately, these alternative hypotheses cannot be tested with the current data.

Some limitations of this research should be noted. Although our results suggest that the different features of the psychopathy have at least partially divergent associations with certain domains of emotional, empathy and moral processing (as evidenced by statistically significant differences in the correlation coefficients), research on larger samples is required to reliably test the difference between the correlations of the SRP dimensions and the criterion variables. It should also be noted that a number of potentially interesting associations did not survive correction for multiple comparisons in these exploratory analyses. These negative results should be interpreted with caution due to restricted statistical power afforded by our sample.

This was the first study to administer a large battery of affect, empathy, and morality tasks and relate these to different features of psychopathy. The preliminary findings from this study suggest that both dimensions of psychopathy make some distinct contributions to empathy and affective aspects of moral processing. Research on larger samples from community and

forensic settings is required to probe the precise extent to which different features of psychopathy have distinct associations with particular empathic and moral features.

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Table 1. Correlations between SRP scores and experimental measures

	SRP total score		**SRP Affective-Interpersonal (AI)**				**SRP Lifestyle-Antisocial (LA)**			
	Controlling for IQ		Controlling for IQ		Controlling for IQ & LA		Controlling for IQ		Controlling for IQ & AI	
	r	corrected *p*	*r*	corrected *p*	*r*	corrected *p*	*r*	corrected *p*	*r*	corrected *p*
Multimorph: Stage scores[1]										
Sad faces	-0.02	ns	0.00	ns	0.03	ns	-0.04	ns	-0.05	ns
Fearful faces	0.09	ns	-0.16	ns	-0.18	ns	-0.03	ns	0.09	ns
Angry faces	0.10	ns	0.00	ns	0.10	ns	-0.12	ns	-0.16	ns
Happy faces	0.01	ns	0.01	ns	0.01	ns	-0.01	ns	-0.01	ns
SAM-Faces: Valence ratings[1]										
Sad faces	0.18	ns	0.18	ns	0.13	ns	0.13	ns	0.02	ns
Fearful faces	**0.31**	**0.004**	**0.25**	**0.029**	0.07	ns	**0.32**	**0.004**	0.22	ns
Angry faces	0.20	ns	0.15	ns	0.02	ns	0.22	ns	0.16	ns
Neutral faces	0.03	ns	0.01	ns	-0.01	ns	0.04	ns	0.04	ns
Happy faces	-0.19	ns	-0.22	ns	-0.12	ns	-0.19	ns	0.03	ns
SAM-Stories: Valence ratings[1]										
Sad stories	0.09	ns	0.12	ns	0.13	ns	0.02	ns	-0.06	ns
Anger stories	0.10	ns	0.11	ns	0.08	ns	0.07	ns	0.00	ns
Happy stories	-0.20	ns	**-0.26**	**0.024**	**-0.26***	**0.035**	-0.09	ns	0.09*****	ns
IRI: Empathic concern[1]	**-0.27**	**0.015**	**-0.40**	**0.000**	**-0.46***	**0.000**	-0.06	ns	**0.26***	**0.042**
Moral Emotions task: Ratings[1]										
Compassion	0.09	ns	0.04	ns	-0.05	ns	0.13	ns	0.13	ns
Guilt	-0.15	ns	-0.17	ns	-0.15	ns	-0.08	ns	0.03	ns
Other-Anger	0.19	ns	0.22	ns	0.19	ns	0.12	ns	-0.02	ns
Self-Anger	0.09	ns	0.13	ns	0.14	ns	0.04	ns	-0.06	ns
Moral dilemmas: Action endorsement[2]										
Impersonal dilemmas	-0.04	ns	-0.06	ns	-0.07	ns	-0.01	ns	0.03	ns
Personal dilemmas	0.09	ns	0.06	ns	-0.01	ns	0.11	ns	0.08	ns
Moral Dilemmas: Difficulty ratings[1]										
Impersonal dilemmas	**-0.38**	**0.000**	**-0.39**	**0.000**	**-0.30**†	**0.017**	**-0.28**	**0.016**	-0.05†	ns
Personal dilemmas	**-0.27**	**0.012**	**-0.28**	**0.014**	-0.20	ns	-0.20	ns	-0.04	ns

[1] Pearson partial correlation coefficients are reported. (2-tailed)

[2] Spearman partial correlation coefficients are reported. (2-tailed)

* After controlling for IQ and shared variance, SRP AI and SRP LA presented significantly different regression coefficents with Valence ratings of happy stories (z= 2.18; p=0.03) and IRI Empathic Concern (z= 4.61; p=0.00)

† After controlling for IQ and shared variance, SRP AI and SRP LA difference between regression coefficients did not reach statistical significance (z= 2.18; p=0.12)

Supplementary materials

Table 1. Descriptive statistics

	Mean	SD	Minimum	Maximum
Age	26.23	7.07	18	48
IQ	115.81	13.14	79	137
SRP-4-SF[1, 2]				
Total	61.84	13.28	33	102
Affective-Interpersonal dimension	32.15	7.98	14	56
Impulsive-Antisocial dimension	28.56	6.57	16	45
Multimorph: Recognition stage score				
Sad faces	9.38	0.32	0	17.33
Fearful faces	10.90	0.26	3.67	17.67
Angry faces	11.10	0.34	1	19
Happy faces	14.65	0.27	2	19.33
SAM-Faces: Valence ratings				
Valence sad faces	2.88	0.92	1	5.13
Valence fearful faces	3.63	1.07	1	6
Valence angry faces	4.01	1.20	1	6.63
Valence neutral faces	5.16	0.65	2	6.63
Valence happy faces	6.53	1.12	2.13	9
SAM-Stories: Valence ratings				
Sad stories	2.31	1.13	1	8.5
Anger stories	3.62	1.16	1	6.5
Happy stories	7.12	1.21	2.25	9
IRI: Empathic concern	18.40	4.87	5	28
Moral Emotions task: Ratings				
Compassion	2.55	1.61	-2.25	5.25
Guilt	4.14	1.23	0.44	6
Other-Anger	3.54	1.24	-0.3	6
Self-Anger	3.90	1.24	0	6
Moral dilemmas: Action endorsement				
Impersonal dilemmas	3.38	1.04	0	4
Personal dilemmas	1.27	0.99	0	4
Moral Dilemmas: Difficulty ratings				
Impersonal dilemmas	5.67	2.33	1	10
Personal dilemmas	4.97	2.24	1	10

[1]Descriptive statistics of a sample of 304 male offenders: SRP total score: mean=77.47; SD=17.32; minimum=35 and maximum=127 (Paulhus, Neumman & Hare, in Press)

[2]SRP total score, SRP AI and SRP LA followed a normal distribution, with skewness = 0.147; 0.151; and 0.28, respectively; and kurtosis = 0.254; 0.235; and -0.179, respectively.

Table 2. Correlations between all experimental variables and estimated IQ

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Estimated IQ																					
Multimorph: Recognition stage score[1]																					
2. Sad faces	0.26**																				
3. Fearful faces	0.40***	0.41***																			
4. Angry faces	0.23**	0.50***	0.53***																		
5. Happy faces	0.35***	0.49***	0.51***	0.59***																	
SAM-Faces: Valence ratings[1]																					
6. Sad faces	0.06	-0.02	0.00	-0.02	0.01																
7. Fearful faces	0.12	0.12	0.06	0.06	0.09	0.64***															
8. Angry faces	0.05	0.11	0.01	0.09	-0.01	0.52***	0.75***														
9. Neutral faces	-0.05	-0.02	-0.16	-0.12	-0.09	0.14	0.31***	0.30***													
10. Happy faces	**-0.17***	-0.03	-0.12	-0.15	-0.02	-0.34***	-0.16	-0.12	0.50***												
SAM-Stories: Valence ratings[1]																					
11. Sad stories	0.11	0.04	0.07	0.08	0.10	**0.55*** **	**0.28****	0.15	**-0.30****	**-0.40*** **											
12. Anger stories	0.07	0.08	0.06	0.09	0.04	**0.48*** **	**0.39*** **	**0.31*** **	-0.14	**-0.34*** **	0.65***										
13. Happy stories	**-0.26****	-0.08	-0.15	-0.09	-0.13	**-0.40*** **	**-0.32*** **	**-0.20***	0.14	**0.48*** **	-0.48***	-0.47***									
14. IRI: Empathic concern[1]	-0.04	-0.01	-0.10	-0.06	-0.09	**-0.18***	-0.13	-0.07	0.08	**0.18***	**-0.24****	-0.11	**0.29*** **								
Moral Emotions task: Ratings[1]																					
15. Compassion	**0.29****	0.08	0.12	0.11	0.04	-0.08	0.04	0.02	0.00	-0.01	-0.01	0.01	0.16	**0.24****							
16. Guilt	0.00	0.05	0.17	0.16	-0.03	**-0.33*** **	-0.17	-0.05	0.08	**0.26****	**-0.35*** **	**-0.32*** **	**0.45*** **	**0.25****	0.41***						
17. Other-Anger	-0.09	0.02	0.06	-0.05	-0.05	**-0.20***	-0.12	-0.02	0.03	0.07	**-0.23****	**-0.28*** **	**0.26****	0.02	0.16	0.38***					
18. Self-Anger	**-0.18***	0.03	0.07	0.03	-0.11	**-0.29*** **	-0.13	-0.01	-0.03	0.07	**-0.26****	**-0.27****	**0.33*** **	0.02	0.23**	0.62***	0.59***				
Moral dilemmas: Action endorsement[2]																					
19. Impersonal dilemmas	0.27**	0.02	0.14	0.05	0.08	0.12	0.07	0.06	0.07	0.03	0.05	0.00	-0.06	0.02	0.09	-0.11	-0.07	-0.16			
20. Personal dilemmas	-0.17	0.12	-0.06	0.02	-0.04	0.04	0.02	-0.03	0.06	-0.02	-0.04	-0.02	-0.05	-0.01	**-0.18***	-0.17	0.05	-0.05	0.25**		
Moral Dilemmas: Difficulty ratings[1]																					
21. Impersonal dilemmas	-0.03	0.02	-0.04	-0.06	-0.02	**-0.24****	**-0.26****	-0.16	-0.15	0.05	-0.15	-0.13	**0.18***	**0.19***	-0.07	**0.21***	0.06	0.12	-0.29**	-0.21*	
22. Personal dilemmas	-0.02	0.14	0.08	-0.03	-0.05	-0.01	-0.14	-0.10	-0.03	-0.03	-0.10	**-0.18***	0.12	0.10	-0.10	-0.02	-0.03	-0.04	0.05	0.29**	0.46***

[1] Partial Pearson correlation coefficients are reported; ***p<0.001, **0.001<p<0.01, *0.01<p<0.05 (2-tailed)

[2] Partial Spearman correlation coefficients are reported; ***p<0.001, **0.001<p<0.01, *0.01<p<0.05 (2-tailed)

Table 3. Correlations between all experimental variables controlling for estimated IQ

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Multimorph: Recognition stage score[1]																				
1. Sad faces																				
2. Fearful faces	**0.35*** **																			
3. Angry faces	**0.46*** **	**0.49*** **																		
4. Happy faces	**0.44*** **	**0.43*** **	**0.56*** **																	
SAM-Faces: Valence ratings[1]																				
5. Sad faces	-0.03	-0.03	-0.04	-0.01																
6. Fearful faces	0.09	0.01	0.04	0.05	**0.64*** **															
7. Angry faces	0.10	-0.01	0.08	-0.03	**0.52*** **	**0.75*** **														
8. Neutral faces	-0.01	-0.15	-0.11	-0.08	0.15	**0.32*** **	**0.30*** **													
9. Happy faces	0.02	-0.06	-0.12	0.05	**-0.34*** **	-0.14	-0.12	**0.50*** **												
SAM-Stories: Valence ratings[1]																				
10. Sad stories	0.01	0.03	0.06	0.06	**0.55*** **	**0.26** **	0.15	**-0.29*** **	**-0.38*** **											
11. Anger stories	0.07	0.04	0.08	0.02	**0.47*** **	**0.38*** **	**0.31*** **	-0.14	**-0.33*** **	**0.64*** **										
12. Happy stories	-0.01	-0.05	-0.04	-0.05	**-0.40*** **	**-0.30*** **	**-0.19***	0.13	**0.46*** **	**-0.47*** **	**-0.47*** **									
13. IRI: Empathic concern[1]	0.00	-0.09	-0.05	-0.08	**-0.18***	-0.13	-0.07	0.08	0.17	**-0.24** **	-0.10	**0.29*** **								
Moral Emotions task: Ratings[1]																				
14. Compassion	0.01	0.00	0.04	-0.07	-0.10	0.01	0.00	0.02	0.04	-0.04	0.00	**0.26** **	**0.26** **							
15. Guilt	0.05	**0.19***	0.16	-0.03	**-0.33*** **	-0.17	-0.05	0.08	**0.26** **	**-0.36*** **	**-0.32*** **	**0.46*** **	**0.25** **	**0.43*** **						
16. Other-Anger	0.04	0.11	-0.03	-0.02	**-0.19***	-0.11	-0.02	0.03	0.06	**-0.22** **	**-0.28*** **	**0.24** **	0.02	**0.20***	**0.38*** **					
17. Self-Anger	0.08	0.16	0.07	-0.05	**-0.28** **	-0.12	-0.01	-0.04	0.04	**-0.25** **	**-0.27** **	**0.30** **	0.02	**0.30** **	**0.63*** **	**0.58*** **				
Moral dilemmas: Action endorsement[2]																				
18. Impersonal dilemmas	-0.07	0.03	-0.02	-0.04	0.10	0.04	0.05	0.10	0.07	0.03	-0.02	0.00	0.03	0.02	-0.12	-0.06	-0.11			
19. Personal dilemmas	0.15	0.04	0.05	0.01	0.05	0.05	-0.01	0.03	-0.05	-0.01	-0.01	-0.10	-0.02	-0.14	-0.17	0.04	-0.08	**0.46*** **		
Moral Dilemmas: Difficulty ratings[1]																				
20. Impersonal dilemmas	0.03	-0.03	-0.06	-0.01	**-0.24** **	**-0.26** **	-0.16	-0.15	0.05	-0.14	-0.13	**0.18***	**0.19***	-0.07	**0.21***	0.06	0.12	**-0.28** **	**-0.22***	
21. Personal dilemmas	0.15	0.09	-0.02	-0.05	-0.01	-0.14	-0.10	-0.03	-0.03	-0.10	**-0.18***	0.12	0.10	-0.10	-0.02	-0.03	-0.05	0.06	**0.27** **	**0.46*** **

[1] Partial Pearson correlation coefficients are reported; ***p<0.001, **0.001<p<0.01, *0.01<p<0.05 (2-tailed)

[2] Partial Spearman correlation coefficients are reported; ***p<0.001, **0.001<p<0.01, *0.01<p<0.05 (2-tailed)