



## Psychopathic meanness is associated with fewer over-mentalizing errors

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### ABSTRACT

In many of the tests used to investigate the relationship of psychopathic traits with theory of mind task performance, the nature of any mentalizing errors is unclear, and performance could reflect a tendency towards either under-mentalizing or over-mentalizing. In this study, a sample of 92 healthy adult participants completed a measure of psychopathic traits and the Movie for the Assessment of Social Cognition (MASC). The MASC not only assesses mentalizing about cognitive and affective mental states but also measures the proportion of under-versus over-mentalizing errors. Psychopathic meanness, but not boldness or disinhibition, was associated with better overall mentalizing, better cognitive mentalizing, and fewer over-mentalizing errors. Our findings are discussed in the context of using a consistent and well-defined operationalization of mentalizing and the importance of assessing the tendency toward under- or over-mentalizing errors to better understand the nature of theory of mind task performance in relation to distinct psychopathic traits.

The ability to understand and mentalize about others' thoughts, feelings, and beliefs, more commonly referred to as theory of mind (ToM), represents an important part of successful social interaction, and is crucial for prosocial behavior (Blakemore, 2012). It allows one to consider not only one's own perspective, but also the various perspectives of other people, allowing one to make predictions about others' behaviors (Choudhury et al., 2006). However, an understanding of others' mental states can also be used in premeditated attempts to manipulate and extort others for personal gain, a set of behaviors that is synonymous with the prototypical psychopath (Abu-Akel & Abushua'leh, 2004; Gillespie et al., 2018). An understanding of mentalizing in relation to psychopathic tendencies can therefore be revealing about the motivations to harm others and has implications for understanding the development of aggressive and antisocial behaviors (Doenyas, 2017).

Psychopathy refers to a constellation of personality traits including boldness (i.e., fearlessness and interpersonal dominance), meanness (i.e., callousness and lack of remorse or guilt), and disinhibition (i.e., impulsivity, emotion dysregulation) (Patrick et al., 2009), that are dimensionally distributed and vary along a continuum in the general population (Edens et al., 2006; Guay et al., 2007). In both clinical and non-clinical populations, a recent umbrella review ( $N = \sim 77,000$ ) showed that psychopathic traits across the lifespan are associated with an increased risk of dangerousness ( $r = 0.284$ , Cohen's  $d = 0.592$ ),

making it a topic of considerable interest in academic, criminal justice, and public policy settings (Gillespie et al., 2023). The association of psychopathy and dangerousness may, in part, reflect an impaired ability to process and understand social cues, with psychopathy associated with poorer recognition of others' facial expressions of emotion (Dawel et al., 2012), impaired visual attention to emotionally salient aspects of the face (Dargis et al., 2018; Gillespie et al., 2015, 2017), and hypo-reactivity in responses to others' distress (Gillespie et al., 2019; Lozier et al., 2014; Viding et al., 2012). These difficulties may restrict the extent to which one is able to recognize and experience another's distress as aversive and make it easier to inflict harm or suffering.

Despite these problems, it has been suggested that people with elevated psychopathic traits might show intact or even enhanced understanding of others' thoughts, feelings, and beliefs (Blair, 2008). These claims have received mixed support, and a recent meta-analysis showed that psychopathic tendencies are in fact associated with impaired rather than enhanced mentalizing abilities (Song et al., 2023). Although this review showed that psychopathic traits are associated with impaired mentalizing, the authors also highlighted several limitations of the existing evidence base that should be addressed in future work. First, many of the classic tests used to assess mentalizing in psychopathy fail to meet two basic criteria: (1) that respondents should attribute a mental state to another person and maintain a distinction between self and

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other perspectives; and 2) that lower-level processes (e.g., attention orientation) should not possibly account for successful task performance (Quesque & Rossetti, 2020).

Second, it was highlighted by Song et al. that many of the classic tests also fail to distinguish between mentalizing about others' cognitive and affective mental states. Mentalizing about cognitive mental states, including others' thoughts, intentions, and beliefs, has been assessed using a variety of tests, including story interpretation (Blair et al., 1996), false belief tasks (Dolan & Fullam, 2004), ascribing mental states to animations (Schwenck et al., 2012), and visual perspective taking (Drayton et al., 2018). Mentalizing about affective mental states, on the other hand, has tended to rely on the Reading the Mind in the Eyes Test (RMET; Baron-Cohen, Wheelwright, Hill, et al., 2001). Notably, Song et al. found no difference in the strength of the relationship between psychopathic tendencies and mentalizing about cognitive versus affective mental states.

Third, it was noted that very few studies explored the underlying nature of any mentalizing errors (i.e., the tendency toward over-versus under-mentalizing). "Hyper-ToM" (or over-mentalizing), refers to the tendency to excessively attribute intentions or self-referential meaning to others, while "Hypo-ToM" (or under-mentalizing), refers to the lack of a functional concept of mental states (Abu-Akel & Bailey, 2000; Crespi & Badcock, 2008; Frith, 2004). This tendency toward either over-mentalizing or under-mentalizing has been linked to opposed neural signatures in key regions of the social brain (Ciaramidaro et al., 2014), and can impact on the ways in which a person understands and responds to the social world around them.

Fourth, few studies used a three-factor or four-facet conceptualization of psychopathy to examine associations with mentalizing, precluding conclusions to be drawn about the three separable dimensions of psychopathic boldness, meanness, and disinhibition.

One commonly used approach to assess mentalizing about cognitive and affective mental states, as well as over- and under-mentalizing, is the Movie for the Assessment of Social Cognition (MASC; Dziobek et al., 2006). The MASC is a naturalistic and ecologically valid task that is sensitive to subtle differences in mentalizing abilities among healthy adults (Smeets et al., 2009), is easily administered, and relatively resource non-intensive. The MASC has been used to index over- and under-mentalizing in various psychopathologies, including autism and schizophrenia (Dziobek et al., 2006; Montag et al., 2011; Vaskinn & Abu-Akel, 2019), and positive schizotypy (Wastler & Lenzenweger, 2021).

In one study that used the MASC to examine mentalizing in psychopathy, adolescents with more features of psychopathic meanness (i.e., callousness, lack of remorse) tended to make a greater number of over-mentalizing errors (Sharp & Vanwoerden, 2014). However, this pattern was considered surprising, with over-mentalizing usually being most characteristic of disorders of high affect, for example, depression and borderline personality disorder (Sharp et al., 2011). The extent to which psychopathic boldness, meanness, and disinhibition in adult samples are associated with problems in mentalizing about cognitive and affective mental states, and tendencies to over-versus under-mentalize, are unclear. In this study, we aimed to examine the relations of boldness, meanness, and disinhibition with mentalizing in a community sample of adults. Earlier work has established that mentalizing performance is superior in people with greater general intelligence (Baker et al., 2014), in women compared to men (Greenberg et al., 2023), and in people with fewer autistic traits, with autism associated with distinct patterns of under- and over-mentalizing (Martinez et al., 2017; Vaskinn & Abu-Akel, 2019). We therefore aimed to measure and control for the effects of estimated full-scale IQ, gender, and autistic traits, in our analyses. Because there is little evidence to support a directional relationship of distinct psychopathic traits with different types of mentalizing errors, we predicted that psychopathic traits would be associated with worse performance on the MASC, but we did not formulate directional hypotheses regarding under- and over-mentalizing

errors. Consistent with meta-analytic results (Song et al., 2023), we expected the association of psychopathic tendencies with mentalizing to be strongest for the interpersonal/affective (boldness, meanness) than the impulsive/antisocial (disinhibition) features of psychopathy.

## 1. Methods

### 1.1. Participants

An *a-priori* power calculation using G\*Power indicated a minimum sample size of 83 people would be required to detect a small effect size ( $r = -0.22$ ) observed by Sharp and Vanwoerden (2014) for the association of affective psychopathic traits with performance on the MASC (90% power,  $\alpha$  level = 0.05). We recruited a sample of 92 healthy adults (64 females), aged between 18 and 37 ( $M \pm SD = 20.49 \pm 2.50$ ) from the community and student population. Student participants took part in return for course credit. Participants reported no history of psychiatric illness, epilepsy, neurological disorders, brain injury or alcohol or substance abuse problems. Written informed consent was received from each participant. All experiments were carried out in accordance with relevant guidelines and approved by the University of Birmingham Committee for Ethical Review.

### 1.2. Assessment instruments

#### 1.2.1. The movie for the Assessment of Social Cognition (MASC)

The MASC (Dziobek et al., 2006) is a 15-min video that shows four friends planning to meet for dinner, preparing and eating a meal, and playing a game. Over the course of the video, the characters show misunderstandings, express irony and ambiguous body language, act flirtatiously, and make insulting comments. The task contains 51 multiple-choice questions of which six were control questions. The critical 45 questions aimed to test the participants' abilities to infer the thoughts, intentions, feelings, and emotions of the characters. Each question was presented following a short clip from the movie. The total number of correct responses reflects an individual's general mentalizing performance. In addition, the MASC can distinguish between errors of over-mentalizing (overinterpretation, reading too much into the situation) and under-mentalizing (under interpretation, or a lack of understanding of a character's mental state), and includes questions that ask about knowledge, beliefs and intentions (28 questions), versus feelings and emotions (17 questions).

#### 1.2.2. The Triarchic Psychopathy measure (TriPM)

The TriPM (Patrick & Drislane, 2015) is a 58-item, self-report questionnaire designed to assess psychopathic traits in the general population. It consists of three subscales measuring boldness, meanness, and disinhibition. *Boldness* entails social assertiveness and emotional resiliency; *meanness* entails deficient empathy and predatory exploitativeness; and *disinhibition* entails impulsiveness and difficulties regulating emotions. The three subscales show good internal consistency (Cronbach's  $\alpha = 0.79, .83, \text{ and } .79$ , respectively) (Hall et al., 2014).

#### 1.2.3. The Autism Spectrum Quotient (AQ)

The AQ (Baron-Cohen, Wheelwright, Skinner, et al., 2001) consists of 50 items that measure the presence of traits associated with the autistic spectrum within the general population. Each item is given a score of 0 or 1. The AQ has good internal consistency (Cronbach's  $\alpha = 0.81$ ) (Hurst et al., 2007).

#### 1.2.4. The National Adult Reading Test (NART)

The NART (Nelson & Willison, 1991) consists of 50 words of irregular pronunciations. The total number of correct pronunciations is used to predict the full, verbal and performance Wechsler Adult Intelligence Scale (WAIS) IQ (Crawford et al., 1989).

### 1.3. Analytic approach

First, preliminary analyses were performed between all the study variables, including independent sample *t*-tests, to examine performance between male and female participants, and Pearson's correlations to examine all inter-relationships. Next, we examined the association of TriPM boldness, meanness, and disinhibition scores with total, cognitive, and affective mentalizing errors, under-mentalizing errors, and over-mentalizing errors, using multiple regression, while controlling for gender, full scale IQ, and total AQ scores. All analyses were reported using a false-discovery correction at  $q_{fdr} < 0.05$  to control the overall false positive rate.

## 2. Results

Table 1 summarizes the scale and subscale sum scores on the various questionnaires and indices of MASC performance. Mean values for each of the TriPM subscales were somewhat higher than those reported in other Western community samples (Somma et al., 2018; van Dongen et al., 2017), but Weidacker et al. (2017) reported mean subscale scores for Boldness ( $M = 49.3$ ), Meanness ( $M = 35.8$ ), and Disinhibition ( $M = 36.0$ ) in a community sample of adults that were similar to those reported in Table 1. The number of over- and under-mentalizing errors was marginally higher than those reported in a community control sample, but lower than those reported in a schizophrenia patient sample (Montag et al., 2011).

As shown in Table 2, independent sample *t*-tests, revealed that men made significantly more cognitive errors and marginally more errors overall compared to women. Fig. 1 summarizes the correlation results between all the study variables. We observed significant negative correlations between all MASC outcomes and TriPM meanness. Total errors, affective errors, and over-mentalizing errors were also negatively associated with disinhibition. Affective errors were positively correlated with total AQ scores.

The results of the regression analyses are summarized in Table 3. Participants who scored higher for meanness made fewer overall errors on the MASC, fewer cognitive errors, and fewer over-mentalizing errors (see Fig. 2). Participants who scored higher for AQ made more over-mentalizing errors.

## 3. Discussion

This study examined the association of TriPM psychopathic traits with mentalizing in a sub-clinical sample recruited from the community and university population. We used the MASC, a naturalistic performance-based measure of mentalizing, to assess the proportion of

cognitive and affective errors, and the proportion of over- and under-mentalizing errors.

TriPM meanness, but not boldness or disinhibition, was related to better performance on the MASC, with fewer overall errors, fewer cognitive errors, and a reduced tendency toward over-mentalizing. Our findings contradict those of a recent meta-analysis, which showed that the interpersonal/affective features of psychopathy are associated with impaired theory of mind task performance (Song et al., 2023). Few of the studies in Song et al.'s meta-analysis relied on a three-factor structure of psychopathy, instead relying more heavily on a two-factor operationalization, and it was recommended that future research should examine associations with other factor structures that include specific dimensions assessing the affective component of psychopathy. Although psychopathic tendencies have been linked with worse mentalizing about affective states, many of these studies have relied on the RMET (Dolan & Fullam, 2004; Gillespie et al., 2018, 2021; Richell et al., 2003; Schiffer et al., 2017; Sharp & Vanwoerden, 2014), which fails the criteria for ToM measures recently proposed by Quesque and Rossetti (2020). Indeed, the RMET has been suggested to better measure facial affect recognition than affective mentalizing task performance (Oakley et al., 2016). Based on results from the MASC, which passes both criteria outlined by Quesque and Rossetti, we have shown that psychopathic meanness is related to better cognitive mentalizing, but the association with affective mentalizing was non-significant.

Our results also shed new light on the underlying pattern of errors made by participants who scored highly for psychopathic meanness, with these traits found to be associated with a reduced tendency to overinterpret others' mental states. A reduced tendency to overinterpret or overattribute mental states is broadly consistent with a general hypovigilance to socio-emotional stimuli in psychopathy (Blair, 2013). Although earlier work has shown that the affective features of psychopathy are associated with a greater tendency to over-mentalize in adolescents (Sharp & Vanwoerden, 2014), it was noted that these findings were unexpected, especially given that this pattern has been found to characterize those who show high affect, including those with depressive and borderline personality features (Sharp et al., 2011). Notably, we found no evidence for a statistically significant association of either the boldness or disinhibition features of psychopathy with mentalizing.

The contrast between the findings reported here and the mentalizing deficits observed by Sharp and Vanwoerden (2014) in adolescent samples may reflect developmental changes affecting routes to understanding others' minds in those with psychopathic tendencies. For example, longitudinal research has shown that as individuals with psychopathic traits age into adulthood, they become less reliant on affective routes to mentalize about mental states, and instead rely more heavily on cognitive routes (Satlof-Bedrick et al., 2019). Given that psychopathy is associated with difficulties in affective processing, this move toward more cognitive processing may account for less error-prone mentalizing in adult compared to adolescent samples. Importantly, the ability to mentalize about others minds may allow people who score highly for psychopathic meanness to instrumentally use others for personal gain (Abu-Akel & Abushua'leh, 2004; Gillespie et al., 2018), particularly when considered in the context of difficulty resonating with another's distress (Blair, 2013).

Our findings are subject to some limitations. First, although we recruited a sufficiently large sample to detect the desired effect based on a power calculation, our sample included mostly female participants who had a relatively young mean age. Both participant gender and age can influence mentalizing task performance, with females tending to perform marginally better than males on the MASC (Fossati et al., 2018), and younger adults tending to perform better than older adults on basic ToM tasks (Henry et al., 2013). Our sampling may therefore introduce a degree of bias into our results. Second, we used a self-report measure of psychopathy, and as such our results may be limited by desirability effects and participants' ability for introspection. However, our use of an

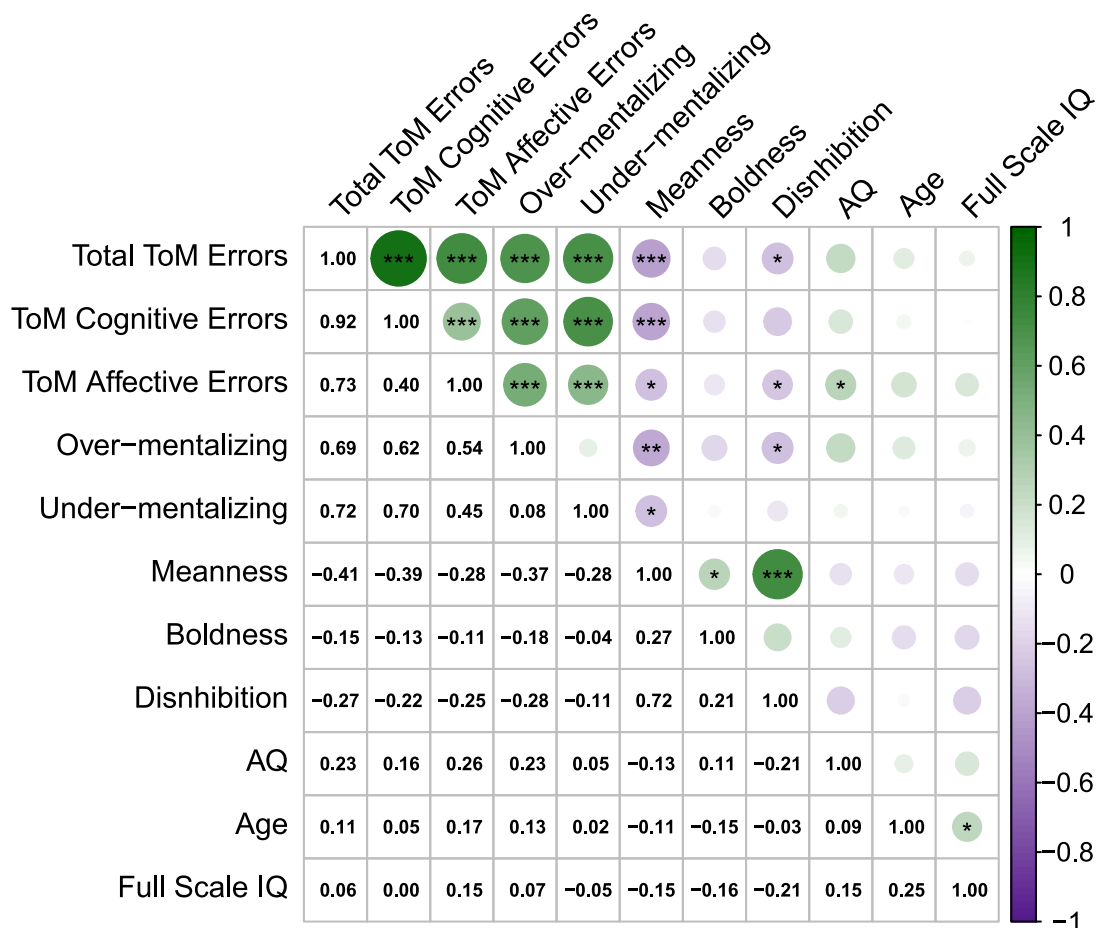
**Table 1**

Mean  $\pm$  SD sum scores for each for each self-report questionnaire scale/subscale, the National Adult Reading Test, and the number of errors on the Movie for the Assessment of Social Cognition (N = 92).

Measure	Mean $\pm$ SD	Range
The Triarchic Psychopathy Measure (TriPM)		
Boldness	26.10 $\pm$ 7.60	9–52
Meanness	43.98 $\pm$ 7.97	19–57
Disinhibition	40.84 $\pm$ 8.84	4–56
The Autism Spectrum Quotient (AQ)	14.61 $\pm$ 6.34	5–40
The National Adult Reading Test (NART)		
Full Scale IQ	108.12 $\pm$ 7.60	92–121
NART Verbal IQ	106.63 $\pm$ 7.00	92–118
NART Performance IQ	107.82 $\pm$ 6.73	94–119
The Movie for the Assessment of Social Cognition		
Total number of Errors	10.61 $\pm$ 4.41	2–28
Cognitive Errors	6.34 $\pm$ 3.26	0–20
Affective Errors	4.28 $\pm$ 1.94	0–8
Under-mentalizing Errors	5.10 $\pm$ 2.28	0–14
Over-mentalizing Errors	5.35 $\pm$ 3.10	1–20

**Table 2**  
Performance of males (n = 28) and females (n = 64) on mentalizing components assessed using The Movie for the Assessment of Social Cognition.

ToM Measures	Males (Mean ± SD)	Females (Mean ± SD)	t-value	P <sub>FDR corrected</sub>	Cohen's d [95 %CI]
Total errors	12.32 ± 3.04	10.02 ± 4.72	2.38	<b>0.050</b>	<b>0.50 [0.08, 1.00]</b>
Cognitive errors	7.86 ± 2.81	5.64 ± 3.24	3.12	<b>0.010</b>	<b>0.67 [0.25, 1.18]</b>
Affective errors	4.46 ± 1.60	4.20 ± 2.08	0.60	0.548	0.13 [-0.32, 0.59]
Over-mentalizing	5.93 ± 2.29	4.72 ± 3.12	1.84	0.089	0.39 [-0.04, 0.87]
Under-mentalizing	6.36 ± 2.53	5.08 ± 3.31	1.83	0.089	0.38 [-0.04, 0.87]



**Fig. 1.** Correlation matrix of all study variables. Lower triangle shows significant correlations surviving False Discovery Rate (FDR) correction. Upper triangle shows correlation values. ToM = theory of mind.

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

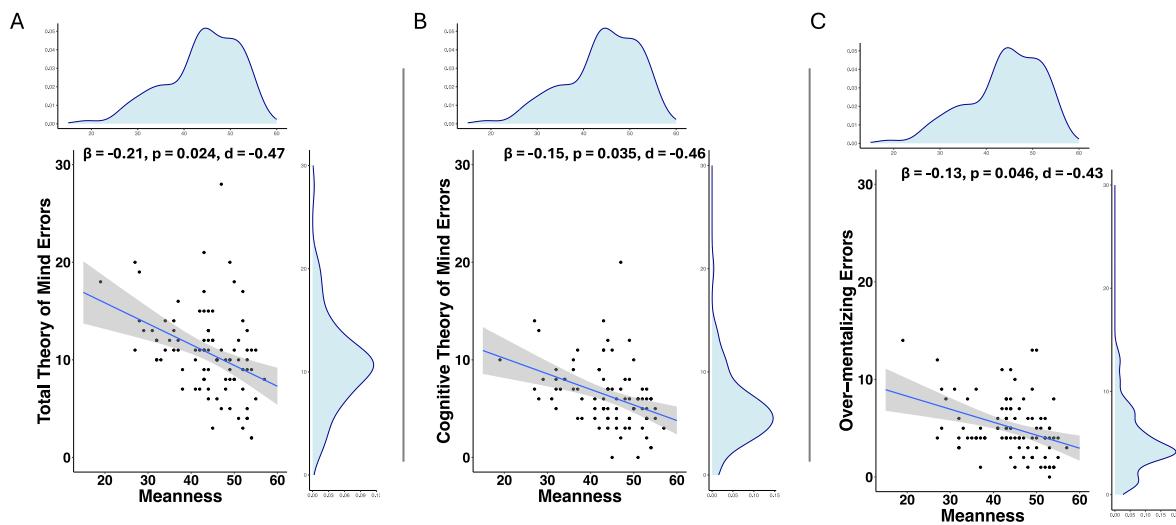
experimental task to assess mentalizing might help to avoid biases leading individuals to assume gender-role stereotypes (Baez et al., 2017) and may help to eliminate potential method effects (Crampton & Wagner III, 1994). Third, although our sample showed relatively high levels of psychopathic traits, and relationships of psychopathic traits observed in community samples have been shown to parallel those observed in more extreme clinical and forensic samples (Seara-Cardoso & Viding, 2015), future work should nonetheless explore these relationships in samples characterized by more extreme levels of PCL-R assessed

psychopathy. Finally, relatively little is known about the nature of mentalizing errors in relation to psychopathic traits, and longitudinal data will be needed to better understand the interplay of psychopathic traits with the processing of socio-emotional stimuli and the tendency to over- and under-attribute mental states. Future research should also seek to examine the relations of TriPM assessed psychopathic traits with related constructs based on patient narratives, including measures of reflective functioning based on the Adult Attachment Interview (George et al., 1996), and assessment of metacognitive functioning using the

**Table 3**  
Summary of models results for the various theory of mind measures.

Parameter Model	$F$ ( $p_{FDR}$ corrected) <sup>a</sup> $R^2_{Adjusted}$	Boldness $\beta$ (se)	Meanness $\beta$ (se)	Disinhibition $\beta$ (se)	Gender (Male) $\beta$ (se)	IQ $\beta$ (se)	AQ $\beta$ (se)
Total errors	3.36 (0.013) $R^2 = 0.135$	-0.054 (.061)	<b>-0.210<sup>a</sup></b> (.092)	0.042 (.072)	-0.327 (1.197)	-0.014 (0.059)	0.141 (0.071)
Cognitive errors	3.37 (0.013) $R^2 = 0.139$	-0.028 (0.045)	<b>-0.149<sup>a</sup></b> (0.069)	0.049 (0.053)	-1.099 (0.914)	-0.045 (0.043)	0.084 (0.053)
Affective errors	2.48 (0.038) $R^2 = 0.092$	-0.017 (0.027)	-0.072 (0.042)	-0.006 (0.033)	0.667 (0.557)	0.022 (0.027)	0.062 (0.033)
Over-mentalizing errors	3.17 (0.013) $R^2 = 0.122$	-0.047 (0.040)	<b>-0.125<sup>a</sup></b> (0.062)	0.009 (0.048)	0.117 (0.806)	-0.011 (0.040)	<b>0.099<sup>a</sup></b> (0.040)
Under-mentalizing errors	1.31 (0.264) $R^2 = 0.020$	-0.003 (0.046)	-0.136 (0.070)	0.060 (0.055)	-0.382 (0.909)	-0.024 (0.045)	0.016 (0.054)

<sup>a</sup>  $p < 0.05$ .



**Fig. 2.** Association of meanness with mentalizing errors, cognitive errors and over-mentalizing errors. **A** shows the negative association between meanness and total errors. **B** shows the negative association between meanness and cognitive errors. **C** shows the negative association between meanness and over-mentalizing errors. Panels also show density plots for meanness and the various MASC outcomes.

Metacognition Assessment Scale (Lysaker et al., 2005).

Our findings provide important directions for understanding mentalizing in relation to distinct features of the psychopathic personality in adults. Our results call for careful consideration of the performance based measures used to assess mentalizing, with the criteria proposed by Quesque and Rossetti (2020) providing a useful guide to the selection of appropriate tests. Greater consistency in the criteria used to select tests of mentalizing in clinical and forensic psychological science will improve understanding of the effects of psychopathology on social cognitive abilities. Our results provide new insights into the nature of the relationship between psychopathic meanness and mentalizing about others' mental states, suggesting that the affective features of psychopathy may be associated with *better* understanding of others' cognitive mental states, and that this success reflects a reduced tendency toward over-mentalizing.

#### CRediT authorship contribution statement

**Steven M. Gillespie:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ahmad M. Abu-Akel:** Writing – review & editing, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

#### Data statement

The data that support the findings of this study are available from the corresponding author, SMG, upon reasonable request. Participants were not consented to make their data publicly accessible.

#### Disclosure statement

No potential competing interest was reported by the authors.

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#### Declaration of competing interest

No potential competing interest was declared by the authors.

#### Data availability

Data will be made available on request.

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