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Impaired Cognitive Empathy in Criminal Psychopathy: Evidence From a Laboratory Measure of Empathic Accuracy

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Empathy deficits feature prominently in theoretical accounts of psychopathy, yet studies that have examined various aspects of emotional processing related to empathy have produced a mixed body of findings. We created a laboratory measure of cognitive empathy based on the empathic accuracy paradigm (i.e., the ability to accurately infer others' emotions in a simulated interpersonal interaction) and used it to examine relationships between psychopathy (assessed with the Psychopathy Checklist - Revised) and cognitive empathy in a sample of incarcerated male offenders. Psychopathy was inversely associated with empathic accuracy performance, as well as with the number of responses when rating the emotional states of others. Empathic accuracy performance was most strongly associated with the behavioral/antisocial and lifestyle features of psychopathy. When the emotional content of target vignettes was examined, psychopathy was associated with poorer empathic accuracy for negatively valenced emotions only (fear and sadness), although nonsignificant moderate effect sizes were also observed for joy. Whereas the interpersonal/affective factor of psychopathy was associated with poor empathic accuracy for joy, the behavioral/antisocial factor was associated with poor overall empathic accuracy for negatively valenced emotions. At the psychopathy facet level, the interpersonal and lifestyle features of psychopathy were associated with poor empathic accuracy for positively valenced emotions, whereas the affective and antisocial features of psychopathy were inversely associated with empathic accuracy for negatively valenced emotions. In contrast to its association with poor empathic accuracy performance, psychopathy was not associated with ratings of perceived task difficulty.

Keywords: psychopathy, antisocial personality, empathy, empathic accuracy, emotion

The striking lack of empathy often described as characteristic of psychopaths has received a great deal of attention in lay, clinical, and theoretical accounts of psychopathy (Cleckley, 1941/1988; Hare, 2006; Soderstrom, 2003). However, surprisingly few empirical investigations have directly examined relationships between psychopathy and performance on laboratory measures of empathy. To address this gap, we designed a laboratory measure of empathic processing based on the well validated empathic accuracy paradigm and used this measure to elucidate relationships between psychopathy and empathic processing.

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Empathy and Empathic Accuracy

Empathy has been defined as a complex interpersonal phenomenon that involves the formation of an affective/motor/cognitive connection between an individual displaying an emotional behavior (hereafter referred to as a *target*) and an individual observing that emotional display (hereafter referred to as a *perceiver*). At a very basic level, an empathic interaction involves a perceiver internalizing and experiencing, at least to a limited degree, the affective state of a target. This "affective contagion" is thought to occur largely automatically and involuntarily and has been functionally linked to the limbic system and surrounding cortical structures (Blair, 2005; Decety & Jackson, 2004; Hatfield, Cacioppo, & Rapson, 1994; Smith, 2006). It has also been reported that a perceiver tends to synchronize his or her body language (such as facial expressions, hand gestures, or posture) with that of a target. As with affective contagion, this motor mimicry is thought to occur predominantly on a subconscious level of awareness and appears to be functionally linked to the activity of mirror neurons located in the parietal and inferior frontal cortical areas (Blair, 2005; Carr, Iacoboni, Dubeau, Mazziotta, & Lenzi, 2003; Decety & Jackson, 2006). Sharing in the affective state and motor behavior of a target has been theorized to represent a lower-order, rudimentary system of empathic processing sometimes referred to as perception-action coupling (Preston & de Waal, 2002), which evolved to facilitate a variety of prosocial and cooperative behaviors observed in the animal world.

In contrast, cognitive empathy is considered a higher-order process that involves complex mentation, generally including conscious understanding of another's internal states (Ickes, 1997), as well as self-other awareness or the ability of a perceiver to mentally separate himself/herself from a target (Decety & Jackson, 2004). Unlike perception-action coupling, cognitive empathy is a process that appears to require awareness and volition and can be used by a perceiver to regulate his or her response in an empathic interaction. Cognitive empathy involves complex interpersonal judgment in addition to input from affective and episodic memory stores and is thought to be functionally subserved by a diffuse cortical network in the prefrontal and temporoparietal cortices (Blair, 2005; Decety & Jackson, 2006). Two forms of cognitive empathy, each with partially distinct neural correlates, have been distinguished in the literature; the first involves inferences regarding others' emotional states, and the second (termed Theory of Mind) involves inferences regarding others' complex intentions and beliefs (Blair, 2006). Contemporary models of human empathy include perception-action coupling at the ontogenic core and cognitive empathy as the more advanced evolutionary development (de Waal, 2005). Arguably, it is the cognitive component that enables the distinction between human empathy and perception-action coupling displayed by nonhuman species, and it was the focus of the present investigation.

Cognitive empathy has been operationalized in many studies using self-report measures. However, the assumption that individuals are able to understand and report on subtle cognitive and affective processes (such as empathy) is controversial (Nisbett & Wilson, 1977; Sprangers, Van den Brink, Van Heerden, & Hoogstraten, 1987). Arguably the best validated laboratory measure of cognitive empathy to date is the empathic accuracy paradigm developed by Ickes and colleagues, which is designed to measure the ability to accurately infer emotional states from videotaped recordings of naïve (i.e., nonactor, nonconfederate) participants (for details see Ickes, 1997). The empathic accuracy paradigm is especially appealing for the study of human empathic processing because of its use of seminaturalistic interpersonal interactions as stimuli, thus emphasizing ecological validity in a standardized laboratory task. This methodology has been validated in a variety of normative samples (Hall & Schmid Mast, 2007; Ickes, Stinson, Bissonnette, & Garcia, 1990; Ponnet, Buysse, Roeyers, & De Corte, 2005; Simpson, Orina, & Ickes, 2003), but no prior study, to our knowledge, has examined empathic accuracy in psychopathic offenders. In addition, the standard Ickes empathic accuracy paradigm has substantial limitations, which we addressed in the current study (see below).

Prior Research on Empathic Processing in Psychopathy

Empathy dysfunction has been strongly implicated in theoretical and clinical descriptions of psychopathy (Cleckley, 1941/1988; Hare, 1999). In fact, negative associations have been consistently reported between various self-report indices of empathy and psychopathic personality traits (e.g., Anastassiou-Hadjicharalambous & Warden, 2008; Sandoval, Hancock, Poythress, Edens, & Lilienfeld, 2000)[1]. However, findings from prior self-report studies that specifically examined cognitive empathy using the Perspective Taking subscale of the Davis Interpersonal Reactivity Index (see Method) are mixed, with evidence of both negative correlations (Mullins-Nelson et al., 2006; Pardini et al., 2003) and no relationship (Williams & Paulhus, 2004; Zágon & Jackson, 1994) between self-report measures of psychopathic traits and perspective taking. Two other studies reported no significant associations between clinical ratings of psychopathy (using the Hare Psychopathy Checklist) and perspective taking scores (Book & Quinsey, 2004; Dolan & Fullam, 2004). Furthermore, the conclusions that can be drawn from these studies are limited, as self-report and observer-report empathy scores are informative about the perception of individuals' personality and behavioral traits related to empathy, but they do not provide insight into the processes involved in empathic interaction.

Laboratory studies that have examined relationships between psychopathic traits and performance on tasks related to various components of empathic processing have also produced mixed findings. Several of these studies examined psychophysiological responding (skin conductance, cardiac reactivity) to emotionally laden stimuli. These paradigms can be said to bear on the lower-order, affective component of empathy because they involve largely automatic responses to emotionally evocative stimuli involving other people but have little implication for the cognitive component of empathy. The reader is referred to Brook, Brieman, and Kosson (2012) for a detailed review of these findings.

Much of the laboratory evidence regarding the higher-order cognitive component of empathy has come from behavioral paradigms that required participants to make conscious decisions regarding emotions or mental states displayed by target participants. Findings suggest that, when asked to classify affect from static pictures of faces, psychopaths do not commit an overall greater number of classification errors than nonpsychopathic participants (Blair & Coles, 2000; Book, Quinsey, & Langford, 2007; Glass & Newman, 2006; Kosson, Suchy, Mayer, & Libby, 2002; Pham & Philippot, 2010; Stevens, Charman, & Blair, 2001), with one exception (cf. Habel, Kuhn, Salloum, Devos, & Schneider, 2002). Instead, psychopaths' recognition deficits tend to be circumscribed to emotions of fear (Blair & Coles, 2000; Stevens et al., 2001), sadness (Blair & Coles, 2000; Stevens et al., 2001), disgust (Kosson et al., 2002; Pham & Philippot, 2010), anger (Pham & Philippot, 2010), and/or happiness (Pham & Philippot, 2010), although studies vary with regard to which specific emotions are associated with impaired recognition. Conversely, in paradigms that use composite or morphed pictures of facial affect (such that each successive slide provides more information regarding the target emotion), psychopathy is typically associated with overall recognition deficits (Dolan & Fullam, 2006; Hastings, Tangney, & Stuewig, 2008), as well as deficits in recognizing fear (Blair, Colledge, Murray, & Mitchell, 2001; Blair et al., 2004), sadness (Blair et al., 2001; Dolan & Fullam, 2006; Hastings et al., 2008),

[1] Negative associations have been reported between self-report measures of empathy and psychopathic traits in both incarcerated (Flight & Forth, 2007; Pardini, Lochman, & Frick, 2003; Sandoval et al., 2000) and community (Anastassiou-Hadjicharalambous & Warden, 2008; Mullins-Nelson, Salekin, & Leistico, 2006; Williams & Paulhus, 2004; Zágon & Jackson, 1994) adult samples (cf. Book & Quinsey, 2004; Dolan & Fullam, 2004). Similarly, studies have reported significant negative associations between psychopathic traits and observer ratings of empathy in children as young as 4 years of age (Dadds et al., 2009).

and happiness (Hastings et al., 2008; Dolan & Fullam, 2006). Similarly, studies examining vocal affect recognition have reported that individuals with psychopathic traits have overall affect recognition deficits (Bagley, Abramowitz, & Kosson, 2009; Blair, Budhani, Colledge, & Scott, 2005; Blair et al., 2002; Stevens et al., 2001), in addition to deficits in recognizing fear (Blair et al., 2005; Blair et al., 2002) and sadness (Stevens et al., 2001) from others' speech. In one study, psychopathy was associated with overall recognition deficits when emotion classifications were made solely on the basis of prosodic speech cues, or solely on the basis of semantic speech cues. Additionally, psychopaths were selectively deficient in recognizing sadness and happiness from semantic cues and in recognizing surprise from prosodic cues (Bagley et al., 2009).

Importantly, not all behavioral research suggests that psychopaths are deficient in their ability to recognize emotion. For example, studies using Theory of Mind (ToM) tasks have consistently shown that, compared with nonpsychopathic controls, psychopathic individuals are not deficient in correctly inferring others' mental states from simple stories (Blair, Sellars, Strickland, & Clark, 1996; Dolan & Fullam, 2004; Jones, Happe, Gilbert, Burnett, & Viding, 2010) or from static pictures of the eye region (Dolan & Fullam, 2004; Richell et al., 2003). One study found that inmates with elevated psychopathic traits were deficient in inferring affective states (emotions) but not cognitive states (beliefs) in a modified ToM task (Shamay-Tsoory, Harari, Aharon-Peretz, & Levkovitz, 2010). Moreover, two studies reported that psychopathic inmates did not differ significantly from community controls in their ability to categorize emotions from static pictures of facial expressions, either overall or for specific emotions (Book et al., 2007; Dolan & Fullam, 2004).

In fact, there is some evidence suggesting superior performance of psychopaths on tasks related to cognitive empathy (Book et al., 2007; Dolan & Fullam, 2004; Hansen, Johnsen, Hart, Waage, & Thayer, 2008). Such findings appear incongruent with the view of psychopathy as psychopathology; consequently, several theorists have argued that superior cognitive empathy combined with behavioral hostility, disinhibition, and manipulativeness confers an evolutionary advantage to psychopaths (Book & Quinsey, 2004). This view stems from the evolutionary psychology perspective, which holds that socially malignant traits (e.g., deceptiveness, aggression, emotional callousness), when expressed at low and constant frequency in a population, may confer reproductive and other survival advantages on individuals in whom these traits are prominently expressed (Mealey, 1995).

The findings reviewed above provide important insights into specific abnormalities impacting the emotional functioning of psychopaths, yet they permit only a partial understanding of potential empathy abnormalities in psychopathy, with behavioral paradigms producing findings of deficient, equal, and superior processing of emotional information in psychopathic versus nonpsychopathic participants. This lack of consensus in the extant experimental literature may be in part attributable to the substantial variance in the methodology used in these studies, both in terms of psychopathy assessment and indices of emotional processing. Several prior studies had derived psychopathy ratings from various self-report measures, thus limiting the generalizability of findings to psychopathy as assessed via clinical ratings. Furthermore, the few studies that had separately examined the specific dimensions of psychopathy (Bagley et al., 2009; Dolan & Fullam, 2006; Habel et al., 2002) reported divergent relationships with measures of empathic processing, highlighting the importance of examining the components of psychopathy in addition to total scores.

A more important gap in the literature stems from the fact that no prior psychopathy study has addressed empathic processing in a seminaturalistic paradigm consistent with contemporary definitions of cognitive empathy. Stimuli used in past investigations (static pictures, recordings of human vocalizations, motion picture clips) have limited ecological validity because they fail to capture the complexity of human empathic interaction, which involves the simultaneous interpretation by a perceiver of multiple verbal and nonverbal cues displayed by a target. The empathic accuracy paradigm, on the other hand, has the needed balance between empirical rigor and ecological validity that could provide important insights into empathic processing in psychopathy.

To this end, we designed a behavioral measure of empathic accuracy based on the Ickes et al. method and used this measure to examine relationships between psychopathy and cognitive empathy. Two competing hypotheses were tested. The *deficient empathy hypothesis* was based on theoretical accounts of psychopaths as emotionally underresponsive and empirical findings linking psychopathy to an impaired ability to discriminate emotions of others and to physiological underresponsiveness to distress cues of others. According to this hypothesis, psychopathy is characterized by one or more disruptions within the emotion processing network and should thus be associated with poor cognitive empathy performance. Alternatively, the *evolutionary fitness hypothesis* was based on the evolutionary psychology conceptualization of psychopathy as a survival strategy and on empirical findings linking psychopathy to adequate or superior performance on emotion processing tasks. According to the evolutionary fitness hypothesis, psychopathy is characterized by at least an unimpaired ability to understand others' emotions, and should be associated with adequate or even superior cognitive empathy performance. In addition, we hypothesized that cognitive empathy performance should correlate positively with trait cognitive empathy as measured by self report.

A concomitant aim of this study was to design an empathic accuracy task that improved on the original Ickes (1997) protocol, which has been criticized for its reliance on a single target who was relatively low in expressiveness and an open-ended response format which makes completion of the paradigm and coding of the responses somewhat cumbersome and arbitrary. Consequently, we attempted to design a paradigm with multiple individuals serving as targets to generate greater variation in target expressiveness. In addition, our task used a standardized forced choice response format to permit a standardized analysis of participant data.

Method

Participants

Participants were 103 adult male county jail inmates incarcerated for a felony or misdemeanor offense. Eligibility criteria for participation were as follows: estimated IQ >69, native English speaker, reading level $\geq$4th grade, no history of severe traumatic brain injury, no current diagnosis of a psychotic disorder, and no current use of psychotropic medication. Participants' ages ranged

from 18 to 51 years ($M = 31.31$, $SD = 8.00$). Sixty-two of the participants (60.2%) identified themselves as African American, 33 (32.0%) as Caucasian, 7 (6.8%) as Latino,[2] and 1 participant (1.0%) identified himself as other or mixed. The number of years of formal education ranged from 8 to 16 ($M = 11.34$, $SD = 1.70$).

Measures

Psychopathy. The Psychopathy Checklist – Revised (PCL-R; Hare, 1991) is the best validated and most widely used measure of psychopathy in incarcerated populations. It consists of 20 items rated on an ordinal scale (0–2) according to the degree to which the relevant disposition applies to the individual. Ratings were made on the basis of a detailed semistructured interview and a thorough review of available institutional files. In addition to the total score, we examined PCL-R scores at the factor and facet levels. The two-factor model (Harpur, Hare, & Hakstian, 1989) consists of Factor 1 (F1) indexing the affective and interpersonal traits of psychopathy and Factor 2 (F2) indexing the behavioral and antisocial features of the disorder. The four-facet model (Hare, 2003; Neumann, Vitacco, Hare, & Wupperman, 2005) further partitions F1 scores into the interpersonal (INT) and affective (AFF) facets and F2 scores into the lifestyle (LIF) and antisocial (ANT) facets.[3] The PCL-R total, factor, and facet scores have been extensively demonstrated to provide valid and reliable measures of psychopathic traits in various adult incarcerated samples (Cooke, Kosson, & Michie, 2001; Hemphill, Hare, & Wong, 1998; Sullivan, Abramowitz, Lopez, & Kosson, 2006). Psychopathy ratings were made by clinical psychology graduate students with extensive training in PCL-R assessment. Interrater agreement for PCL-R scores was good (average intraclass $r = .83$; one-way random-effects model, $n = 12$ pairs of raters).

Cognitive empathy. The empathic accuracy task was designed in accordance with the Ickes (1997) methodology, while improving on the original protocol in two major ways. First, the stimulus recording was designed to include target participants of both sexes and of varying age and ethnicity. Second, we introduced a standardized forced-choice response format as opposed to the open response format in the original protocol that required subjective scoring by independent judges.

Stimulus (target) recordings were created by videotaping adult volunteers while they relayed past emotional experiences. To simulate a naturalistic interpersonal interaction, target participants were seated directly across a video camera, which was unobtrusively positioned behind the experimenter, at participants' eye level. The experimenter then randomly assigned to each volunteer, one at a time, three primary emotions from the tripartite hierarchical inventory of emotion words outlined by Parrott (2001). Briefly, the primary level of Parrott's hierarchy consists of six basic emotions (love, joy, surprise, anger, sadness, fear) commonly described in the empirical psychology literature. The secondary level comprises 25 more complex descriptors of emotional states (e.g., affection, zest, irritation, disappointment, nervousness) nested within each primary emotion. The tertiary level comprises 135 descriptors of complex mental states (e.g., longing, contentment, resentment, embarrassment) nested within each secondary emotion.

For each of the assigned primary emotions, volunteers were asked to recall and provide a brief but detailed verbal account of a time in their lives when they felt the assigned emotion while refraining from referring to the emotion by name. Upon completion of their stories, volunteers viewed their recordings and were asked to identify and stop the playback at moments during which they felt an emotion, even if that emotion was different from the assigned emotion. For each such moment (or stop point), volunteers were asked to identify and rank-order (from most to least) the emotions they felt at that moment as they were relating their story. Potential responses consisted of the 25 secondary emotions from the hierarchy described above, and each secondary emotion was accompanied by a parenthesized list of its corresponding tertiary emotions to aid in rating the secondary emotions by providing additional emotional context. To optimize ecological validity and allow us to examine the breadth of participants' emotional responding, we did not restrict the number of emotions participants could endorse. Primary emotions were omitted from the response options to ensure that the task was not too easy. After the target recording sessions, recordings were edited to isolate a number of short video vignettes, each ending at the exact stop point identified by each volunteer as the moment when they felt an emotion.

The resulting video vignettes were piloted with a small ($n = 15$) sample of healthy participants to select the set of vignettes that provided the best combination of: psychometric fit (internal consistency, discriminating ability), variation in length and affective valence of the stories, and demographic characteristics of target participants. The final recording was 15.7 minutes in length and included 13 video vignettes from seven target participants (see the Appendix for detailed description). Three participants were Caucasian (two female, one male), two were East Asian (one female, one male), and two were African American (one female and one male). Age of target participants ranged from 24 to 43. Six of the seven target participants provided two vignettes, so as to enable an examination of change in empathic accuracy with repeated exposure to one target participant. With regard to the emotion ranked first by the target for each vignette, six of the vignettes portrayed positively valenced emotions (corresponding to primary emotions of love, joy, and surprise[4]), and seven portrayed negatively valenced emotions (corresponding to primary emotions of sadness and fear).

Perceiver participants viewed each target recording and were asked to rank-order (using the same response format as target participants) the emotions experienced by each target at the end (or stop point) of each vignette. Empathic accuracy was operationalized as the degree of correspondence (0–2 Likert scale) between a perceiver's rating of the most salient emotion (i.e., the emotion ranked #1) and each target's rating of the most salient emotion. In addition, we examined the total number of emotions endorsed by perceiver participants as a measure of breadth of emotional responding. Finally, perceiver participants were asked to provide a

[2] As our sample included only seven Latinos, we conducted all analyses first including and then excluding the Latino participants. Because there was no difference in the pattern of significance of findings, only the full sample analyses are reported in the Results section.

[3] Past factor analyses have also identified a three-factor solution that is similar to the four-facet model but omits the antisocial facet (Cooke, Michie, Hart, & Clark, 2004).

[4] Although surprise is not intrinsically a positively or negatively valenced emotion, both vignettes that ranked surprise as #1 in the target recording were positively valenced in content.

rating (on a 1–10 Likert scale, with 10 indicating most difficult) of the difficulty of rating each vignette as a measure of participants' own perception of their empathic accuracy performance.

Self-reported empathy. The Davis Interpersonal Reactivity Index (IRI; Davis, 1983) is a self-report measure that has been validated extensively in a variety of clinical and nonclinical samples, including psychopathic offenders (Jolliffe & Farrington, 2004; Mullins-Nelson et al., 2006; Rankin, Kramer, & Miller, 2005). The IRI is composed of 28 items that load on four conceptually independent scales: Perspective Taking (PT; the tendency to understand and adopt others' psychological states), Fantasy (FA; the tendency to imaginatively transport self into fictional scenarios), Empathic Concern (EC; sympathy toward others' misfortunes), and Personal Distress (PD; anxiety in emotional interpersonal situations). Of the four IRI scales, Perspective Taking is conceptually most closely related to the construct of cognitive empathy. Scores on the IRI subscales demonstrated acceptable internal consistency in the current sample (Cronbach's alpha: PT = .53, FA = .67, EC = .70, PD = .56).

General intelligence. Given the prior finding that differences in self-reported empathy between psychopathic and nonpsychopathic inmates are apparent at higher (but not lower) levels of intelligence (Heilbrun, 1982), we used the Shipley Institute of Living Scale (SILS; Zachary, 1986) as a measure of general intelligence. The SILS-estimated IQ scores (Weiss & Schell, 1991) have been previously validated in forensic samples (Szyhowski, 2008) and correlate highly with scores on other brief measures of intellectual functioning (Bowers & Pantle, 1998; Matthews, Lassiter, & Habedank, 2001; Villar, 2005).

Reading level. To examine whether any observed relationships between psychopathy and cognitive empathy were influenced by individual differences in reading ability, the Word Reading subtest from the Wide Range Achievement Test – Fourth Edition (WRAT-4; Wilkinson & Robertson, 2006) was used as a measure of word reading.

Emotional intelligence. To examine whether any observed relationships between psychopathy and cognitive empathy were influenced by individual differences in emotional intelligence, we used the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) as a measure of perceived emotional intelligence. The TMMS has been validated in a variety of clinical and nonclinical samples (Hodgson & Wertheim, 2007; Salovey, Stroud, Woolery, & Epel, 2002). In the current sample, TMMS scores were internally consistent (Cronbach's alpha = .84).

Results

Construct Validity of the Empathic Accuracy Task

As the empathic accuracy task was developed for the purposes of this study, several sets of preliminary analyses were conducted to examine its validity as a measure of cognitive empathy in the current sample. First, we examined the convergent and discriminant validity of empathic accuracy scores by comparing their associations with various self-report indices of empathy from the IRI. As a measure of cognitive empathy, empathic accuracy scores evidenced expected associations with scores on the PT scale, $r = .21$, $p = .04$, but not the FA, $r = .14$, $p = .15$, the EC, $r = -.05$, $p = .63$, or the PD, $r = -.001$, $p = .99$ scales. In addition, consistent with prior research (Ickes et al., 1990), participants exhibited greater empathic accuracy on their second, $M = 6.62$, $SD = 1.82$, than their first, $M = 5.57$, $SD = 1.75$, exposure to the same target, $t(102) = 4.67$, $p < .01$, consistent with prior findings of greater empathic accuracy with increasing target familiarity. Finally, in line with prior findings of greater empathic accuracy for female than male targets (Ickes et al., 1990), participants exhibited greater empathic accuracy for female, $M = 61.23$, $SD = 14.13$, than for male targets, $M = 41.82$, $SD = 15.39$, $t(102) = 10.20$, $p < .01$.[5]

Psychopathy and Cognitive Empathy

To examine relationships between psychopathy and cognitive empathy performance, we computed Pearson correlations between psychopathy total and empathic accuracy task scores. As presented in Table 1, psychopathy was inversely associated with empathic accuracy, $r = -.29$, $p < .01$. The correlation between psychopathy total scores and the number of responses was marginally significant, $r = -.19$, $p = .06$. Psychopathy was not associated with perceived task difficulty.

Psychopathy Factor and Facet Relationships

At the level of psychopathy factors, F2 scores were inversely associated with empathic accuracy, $r = -.26$, $p = .01$, and the number of responses (see Table 1). The relationship between F1 scores and empathic accuracy was marginally significant, $r = -.19$, $p = .06$. The F1 $\times$ F2 interaction did not account for a significant proportion of variance in empathic accuracy scores, $\beta = .63$, $p = .29$. At the facet level (see Table 1), scores on both the lifestyle and antisocial facets of psychopathy were inversely associated with empathic accuracy scores and the number of responses. None of the correlations between interpersonal and affective facet scores and cognitive empathy scores approached significance, and none of the psychopathy scores were significantly associated with perceived task difficulty rating scores.

To examine unique associations between psychopathy factor and facet scores and cognitive empathy scores, we computed partial correlations between each factor and facet score controlling for the effects of the other relevant factor or facets. As shown (above the diagonal) in Table 1, F2 scores were uniquely associated with empathic accuracy, $r = -.21$, $p = .03$, and the number of responses. Unique associations between the lifestyle facet and empathic accuracy scores, $r = -.19$, $p = .06$, and number of responses, $r = -.18$, $p = .07$, were marginally significant.

[5] To address target gender effects in the relationship between psychopathy and empathic accuracy, we examined empathic accuracy scores separately for female and male targets. In continuous analyses, total psychopathy scores were significantly associated with empathic accuracy for female, $r = -.30$, $p < .01$, but not male, $r = -.14$, $p = .16$, targets. At the psychopathy factor level, F1 scores showed significant associations with empathic accuracy for female, $r = -.31$, $p < .01$, but not male, $r = .04$, $p = .70$, targets, and F2 scores correlated significantly with empathic accuracy for both female, $r = -.20$, $p = .05$, and male, $r = -.19$, $p = .05$, targets. At the level of psychopathy facets, empathic accuracy for female targets was associated with all four facet scores, interpersonal $r = -.23$, $p = .02$, affective $r = -.28$, $p = .01$, lifestyle $r = -.20$, $p = .05$, and antisocial $r = -.20$, $p = .05$. Conversely, empathic accuracy for male targets was significantly associated only with the lifestyle features of psychopathy, $r = -.24$, $p = .02$.

Table 1
Intercorrelations Among Psychopathy, Cognitive Empathy, and Background Variables (All ns *= 100–103)*

	1	2	3	4	5	6	7	8	9	10
1. Psychopathy total	—									
2. Factor 1	.78**	—						−.10	.12	−.07
3. Factor 2	.84**	.35**	—					−.21*	−.30**	.02
4. Interpersonal facet	.69**	.84**	.36**	—				−.03	.17	−.10
5. Affective facet	.58**	.80**	.23*	.35**	—			−.07	−.03	.02
6. Lifestyle facet	.74**	.35**	.87**	.33**	.24*	—		−.19	−.18	.10
7. Antisocial facet	.76**	.33**	.84**	.37**	.17	.50**	—	−.07	−.14	−.06
8. Empathic accuracy	−.29**	−.19	−.26**	−.16	−.15	−.29**	−.21*	—		
9. Number of responses	−.19	.01	−.28**	.05	−.04	−.24*	−.20*	.13	—	
10. Perceived task difficulty	−.05	−.06	−.003	−.09	−.001	−.05	−.05	−.03	.02	—
11. Perspective taking	−.34**	−.20*	−.31**	−.12	−.22*	−.22*	−.40**	.21**	.17	.11
12. Emotional intelligence	−.11	.02	−.19	.13	−.10	−.18	−.16	−.04	−.01	−.06
13. IQ	.01	.07	−.03	.06	.06	−.07	.01	.04	.03	−.13
14. Reading level	.06	.15	.003	.14	.11	.08	−.08	.05	.05	−.01
15. Age	.01	.13	−.12	.17	.02	−.09	−.06	−.14	.07	−.06
16. Ethnicity	−.03	−.06	.08	−.05	−.04	.003	.09	.05	−.07	−.03
17. Education	−.27**	−.09	−.33**	.01	−.16	−.30**	−.22*	.15	.28**	.04

Note. Pearson two-tailed correlations. Zero order correlations are listed below the diagonal. Partial correlations are listed above the diagonal and represent relationships between empathic accuracy and psychopathy factor and facet scores controlling for the effects of the other relevant factors and facets.
* Correlation significant at $p < .05$ level. ** Correlation significant at $p < .01$ level.

Influence of Background Variables

As presented in Table 1, neither cognitive empathy nor psychopathy scores were significantly associated with emotional intelligence, estimated IQ, reading level, age, or ethnicity. Conversely, number of years of education was inversely associated with psychopathy total, F2, lifestyle, and antisocial facet scores, and positively associated with the number of responses. After partialing out the effects of education, relationships between empathic accuracy and psychopathy total, $r = -.26$, $p = .01$, F2, $r = -.22$, $p = .02$, and lifestyle facet scores, $r = -.26$, $p = .01$, remained significant; however, correlation with the antisocial facet dropped to trend level, $r = -.19$, $p = .06$. Number of responses remained significantly associated only with F2 scores, $r = -.20$, $p = .04$; correlations with the lifestyle facet, $r = -.12$, $p = .23$, and antisocial facet scores, $r = -.16$, $p = .12$ became nonsignificant.

Empathic Accuracy by Emotion Type and Valence

To further explore observed relationships between cognitive empathy and psychopathy, we computed empathic accuracy separately for the positively valenced (love, joy, surprise) and negatively valenced (sadness, fear) primary emotion categories. Overall, participants exhibited greater empathic accuracy for positive, $M = 56.39$, $SD = 16.72$, than for negative emotions, $M = 48.75$, $SD = 12.83$, $t(102) = 4.00$, $p < .01$. Correlations between psychopathy scores and empathic accuracy scores by emotion valence and type are presented in Table 2. At the zero-order level, total psychopathy scores were inversely asso-

Table 2
Relationships Between Psychopathy Scores and Empathic Accuracy for Each Emotion Type and Valence: Zero-Order and Partial Correlations (All ns *= 101–103)*

	Psychopathy scores												
		Factors				Facets							
		F1		F2		Interpersonal		Affective		Lifestyle		Antisocial	
Empathic accuracy scores	Total	Zero order	Partial	Zero order	Partial	Zero order	Partial	Zero order	Partial	Zero order	Partial	Zero order	Partial
Positive composite	−.14	−.06	−.01	−.14	−.13	−.12	−.09	.04	.12	−.22*	−.21*	−.08	.06
Love	−.07	.03	.07	−.10	−.12	−.02	−.01	.08	.10	−.08	−.05	−.10	−.08
Joy	−.19	−.23*	−.22*	−.07	.01	−.26**	−.23*	−.11	−.02	−.13	−.05	−.08	.04
Surprise	.004	.13	.18	−.10	−.15	.09	.10	.13	.15	−.20*	−.29**	.02	.11
Negative composite	−.31**	−.24*	−.16	−.26**	−.20*	−.12	.07	−.28**	.24*	−.21*	−.07	−.26**	−.18
Sadness	−.22*	−.16	−.10	−.19	−.14	−.05	.11	−.23*	−.22*	−.13	−.003	−.21*	−.19
Fear	−.23*	−.18	−.12	−.19	−.14	−.13	−.02	−.17	−.12	−.18	−.09	−.16	−.07

Note. Pearson two-tailed correlations. Partial correlations represent relationships between empathic accuracy and psychopathy factor and facet scores controlling for the effects of the other relevant factors and facets.
* Correlation significant at $p < .05$ level. ** Correlation significant at $p < .01$ level.

ciated with the negative emotion composite score, $r = -.31$, $p < .01$, and with scores for the specific negative emotions of sadness, $r = -.22$, $p = .03$, and fear, $r = -.23$, $p = .02$. Although psychopathy scores were unrelated to positive emotion composite scores, the association with joy scores approached statistical significance, $r = -.19$, $p = .06$.

Psychopathy factor and facet scores (see Table 2) showed divergent relationships with empathic accuracy for positive and negative emotions. At the psychopathy factor score level, F1 was inversely associated with joy scores, $r = -.23$, $p = .02$, and negative emotion composite scores, $r = -.24$, $p = .02$, with the latter becoming nonsignificant after controlling for the effects of F2. Conversely, F2 was inversely associated with negative emotion composite scores, $r = -.26$, $p = .01$, and evidenced trend-level relationships with sadness, $r = -.19$, $p = .06$, and fear scores, $r = -.19$, $p = .05$, and the correlation with the negative emotion composite remained significant after controlling for the effects of F1. At the facet level, interpersonal features of psychopathy were inversely associated only with joy scores, $r = -.26$, $p = .01$. Affective facet scores were inversely associated with the negative emotion composite, $r = -.28$, $p = .01$, and sadness scores, $r = -.23$, $p = .02$. Lifestyle facet scores were inversely associated with positive emotion composite, $r = -.22$, $p = .03$, and surprise scores, $r = -.20$, $p = .04$. Antisocial facet scores were inversely associated with the negative emotion composite, $r = -.26$, $p = .01$, and sadness scores, $r = -.21$, $p = .03$. After partialing out the effects of the other facets, lifestyle facet scores were no longer associated with the negative composite score, and associations between antisocial facet and negative emotion composite, $r = -.18$, $p = .07$, and sadness, $r = -.19$, $p = .06$, scores dropped to trend level.

Psychopathy Group Analyses

Group analyses using traditional psychopathy total score cutoffs examined empathic accuracy performance in psychopathic (PCL-R > 29; $n = 29$), nonpsychopathic (PCL-R < 21; $n = 25$), and middle-scoring (PCL-R = 21–29; $n = 49$) participants. In brief, group comparisons revealed significantly worse empathic accuracy performance in the psychopathic than in the nonpsychopathic group, both overall and for negatively valenced (but not positively valenced) emotions, and these group differences were associated with medium to large effect sizes.[6]

Discussion

The current study is the first, to our knowledge, to demonstrate impaired cognitive empathy in psychopathy using a seminaturalistic empathic accuracy paradigm. Our findings clearly corroborate the deficient empathy hypothesis, as evidenced by inverse associations between psychopathy and empathic accuracy scores, as well as robust group differences between psychopathic and nonpsychopathic inmates, which held independent of demographic factors, general intellectual and reading abilities, and perceived emotional intelligence. The current results corroborate and extend prior findings examining the performance of individuals with psychopathic traits on tasks related to cognitive empathy that found overall impaired recognition of emotion from morphed affective faces and speech cues. Both facial and vocal affect recognition are presumably important in naturalistic empathic interaction, and previously reported impairments in these skills point to possible etiologic mechanisms underlying performance deficits in our study. However, as outlined in the introduction section, overall deficits are not typically observed in facial affect recognition paradigms that use static faces or in ToM tasks. One possible explanation for this pattern of findings is that the real-time analysis of emotion from sequences of morphed faces and speech cues and from naturalistic interactions requires a more complex or dynamic level of emotion processing than the analysis of emotion from static stimuli. Such an explanation may be interpreted as consistent with the notion that psychopaths are capable of hearing the words but not the music in the full spectrum of affect displayed by a target in a naturalistic human interaction (Johns & Quay, 1962). In other words, psychopaths may not consistently evidence deficits in appreciating specific, concrete aspects of human affective displays but may fail when judging more complex and integrative components of emotion, such as dynamic facial expressions and voice prosody during naturalistic interpersonal interactions. This notion is further corroborated by recent evidence suggesting that psychopaths' emotional processing deficits are most evident in situations presenting greater stimulus complexity (Sadeh & Verona, 2012).

Psychopathy was also associated with endorsing fewer emotions in response to others' emotional displays, suggesting that in addition to being less accurate in judging others' most salient emotion in interpersonal interactions, psychopaths also have difficulty appreciating the full spectrum of emotions displayed by people. This is consistent with Cleckley's (1941/1988) notion that psychopaths exhibit a general poverty of affect in interpersonal interactions. This is a novel finding, as, to our knowledge, no prior study of cognitive empathy in psychopathy has examined the ability to recognize emotion in community (nonactor) participants given a

[6] Analysis of variance on the empathic accuracy scores revealed a significant effect of psychopathy group, $F(2,100) = 5.67$, $p < .01$, $\eta^2 = .10$. Follow-up analyses revealed lower accuracy scores in the psychopathic than the nonpsychopathic group, $t(52) = -3.12$, $p = .003$, $d = .85$. The nonpsychopathic group also had higher empathic accuracy scores than the middle-scoring group, $t(72) = 2.68$, $p = .009$, $d = .64$. The difference between the psychopathic and the middle-scoring group was smaller and non-significant, $t(76) = -.93$, $p = .36$, $d = .22$. At the level of specific emotion type and valence, the effect of psychopathy group was significant for the negative emotion accuracy composite, $F(2,100) = 6.93$, $p = .002$, $\eta^2 = .12$, as well as for the specific primary emotions of sadness, $F(2,100) = 3.68$, $p = .03$, $\eta^2 = .07$, and fear, $F(2,100) = 3.40$, $p = .04$, $\eta^2 = .06$. Post hoc comparisons revealed that psychopathic participants had significantly poorer accuracy than nonpsychopathic participants for the negative emotion composite score $t(52) = -3.38$, $p = .001$, $d = .92$, as well as for fear $t(52) = -2.27$, $p = .03$, $d = .62$ and sadness $t(52) = -2.61$, $p = .01$, $d = .72$. Nonpsychopaths performed better than middle-scoring participants on accuracy for the negative emotion composite score, $t(72) = 2.80$, $p = .01$, $d = .67$, and for fear, $t(72) = 2.28$, $p = .03$, $d = .56$, but not for sadness, $t(72) = 1.64$, $p = .11$, $d = .41$. There were no statistically significant differences between the psychopathic and the middle-scoring groups on any of the negative emotion scores, all ts < 1.49, all ps $> .14$. Likewise, no statistically significant group differences were found for composite positive emotion accuracy scores, $F(2,100) = 1.26$, $p = .29$, $\eta^2 = .03$, or at the level of the specific primary emotions of love, $F(2,100) = 1.16$, $p = .85$, $\eta^2 < .01$, joy, $F(2,100) = 2.34$, $p = .10$, $\eta^2 = .05$, or surprise, $F(2,100) = 1.48$, $p = .23$, $\eta^2 = .03$, despite the medium effect size for the group difference in empathic accuracy for joy between the psychopathic and nonpsychopathic groups ($d = .60$).

seminaturalistic interpersonal interaction or unrestricted response format.

The finding that poor empathic accuracy performance is most strongly associated with behavioral/antisocial (F2) and lifestyle features of psychopathy is intriguing. Theoretically, to the extent that the interpersonal/affective components of psychopathy represent the personality core of the disorder, psychopaths' performance on empathy-related tasks would be expected to correlate most strongly with F1 scores. In fact, evidence regarding relationships between specific psychopathy dimensions and indices of emotion processing has been mixed. Whereas research has linked F1 scores to psychophysiological (Vanman, Mejia, Dawson, Schell, & Raine, 2003; Verona, Patrick, Curtin, Bradley, & Lang, 2004) and lexical decision (Lorenz & Newman, 2002) abnormalities when processing emotional information, studies have also reported unique associations between emotional processing indices and scores on the behavioral/antisocial components of psychopathy (Dolan & Fullam, 2006; Fullam & Dolan, 2006; Patrick, Cuthbert, & Lang, 1994; Verona et al., 2004). Although it could be argued that poor empathic accuracy partially reflects externalizing psychopathology that is not specific to psychopathy, our findings of significant negative correlations between empathic accuracy and psychopathy total scores, as well as a marginally significant correlation with F1 scores (and some significant correlations between scores on interpersonal and affective facets and empathy for more specific emotion categories), indicate that the associations observed in this study are not entirely attributable to the lifestyle and antisocial features of psychopathy. Even so, theoretical implications of associations between poor empathic accuracy and the lifestyle features of psychopathy warrant further research. If cognitive empathy is as crucial in the development of prosocial interpersonal behavior as some theorists have posited (Preston & de Waal, 2002), it stands to reason that a developmental lack of cognitive empathy could contribute to the expression of lifestyle features of psychopathy such as parasitic and irresponsible behavior.

With regard to the valence of target emotions, our findings are consistent with prior research suggesting decreased sensitivity to negatively valenced affective stimuli in psychopathic individuals, including abnormal startle response to negatively valenced emotional scenes (Levenston, Patrick, Bradley, & Lang, 2000; Patrick, 1994), and deficient recognition of fear and sadness from static and morphed faces and speech cues. It should be noted, however, that these findings are not always specific to fear and sadness and are not entirely consistent across studies (see *Introduction* for review). One prominent explanation for psychopaths' relative insensitivity to fear and sadness is the violence inhibition model (Blair, 1995, 2001), according to which humans have evolved a cognitive-affective mechanism that becomes activated when faced with interpersonal displays of distress, which serves to inhibit violent behavior and promote development of "moral" decision making, empathy, and pro-social behavior. Blair has argued that psychopaths are characterized by deficient activation of the violence inhibition system and should therefore be relatively insensitive to displays of fear and sadness in others. The violence inhibition model is partially corroborated by our findings of significant relationships for negative emotions but not for positive emotions. However, prior studies have reported affect recognition deficits for emotions other than fear and sadness (Bagley et al., 2009; see also Pham and Philippot, 2010), and current results revealed marginally significant associations between psychopathy and accuracy for joy, as well as significant relationships between interpersonal and lifestyle features and empathic accuracy for positively valenced emotions. These findings suggest that the violence inhibition model, like other theories that posit exclusive deficits in processing negative affect, cannot explain the entire pattern of findings for individuals with psychopathic features. The evidence for significant associations between the interpersonal and affective components of psychopathy and valence-specific impairments in cognitive empathy also provide additional evidence that the core features of psychopathy are related to specific impairments in cognitive empathy. Such findings highlight the importance of examining factor and facet scores separately when investigating relationships between psychopathy and emotion processing.

Finally, findings of no relationship between empathic accuracy performance and subjective ratings of task difficulty are consistent with prior research suggesting a discrepancy between objective indices and subjective perception of emotion processing in psychopathic participants (Brook et al., 2012; Pham & Philippot, 2010).

Limitations

There are several limitations to this research. Because the emphasis in our design was on ecological validity, we did not control for the length of target vignettes and, as noted above, did not restrict the number of responses participants could make. Standardizing these factors could have strengthened the internal validity of the task; however, our goal was to design a task resembling a naturalistic interpersonal interaction. Likewise, our conclusions regarding specific emotion deficits are limited by the naturalistic nature of our task, as the target recording comprised unequal numbers of vignettes portraying specific primary emotions (e.g., two vignettes portraying surprise vs. four vignettes portraying sadness). Further, the absence of any vignettes in which the primary emotion was anger (or the related secondary emotion of disgust) prevents us from relating our findings to prior research reporting impaired processing of these emotions in psychopathic offenders.

Although an attempt was made to include an ethnically diverse and representative sample of target participants in the stimulus recording, the final stimulus set did not include any Latino participants. Given the preponderance of evidence from social psychology and affective neuroscience research that interpersonal identification is greatest for members of one's own racial or ethnic group, stimulus materials would optimally include a range of targets resembling the ethnic/racial composition of the potential perceiver sample. Nonetheless, because only seven participants in the current sample were Latino, this limitation did not significantly bias the results (see Footnote #2).

Finally, the generalizability of our findings is limited by our use of incarcerated male offenders as participants. Whereas the ethnic, educational, and socioeconomic characteristics of our sample appear representative of the jail and prison population in the United States, they are not representative of the population at large, and further research is needed to replicate these findings in community participants of both sexes.

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Appendix

Descriptive Characteristics of the Emotion Vignettes in the Target Recording

Vignette no	Target gender	Target ethnicity	Vignette length (seconds)	Target emotion (primary level)
1	Female	Caucasian	40	Sadness
2	Male	African American	78	Sadness
3	Female	Asian	38	Fear
4	Male	Caucasian	91	Fear
5	Female	Caucasian	54	Joy
6	Female	African American	19	Joy
7	Male	Asian	116	Surprise (positive)
8	Same target as vignette # 2		81	Love
9	Same target as vignette # 3		80	Fear
10	Same target as vignette # 4		85	Surprise (positive)
11	Same target as vignette # 5		70	Sadness
12	Same target as vignette # 6		80	Sadness
13	Same target as vignette # 7		112	Joy

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