

Recognition of Facial Affect in Psychopathic Offenders

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The authors examined the reliability of facial affect processing deficits found in psychopathic individuals (R. Blair et al., 2004) and whether they could be modified by attentional set. One hundred eleven offenders, classified using the Psychopathy Checklist—Revised (R. Hare, 2003) and Welsh Anxiety Scale (G. Welsh, 1956), performed a facial affect recognition task under 2 conditions. On the basis of research linking psychopathy, amygdala dysfunction, and deficits in facial affect recognition, the authors predicted that psychopathic offenders would display performance deficits when required to identify the emotional expression of particular faces. In addition, given evidence linking the affective processing deficits in psychopathy to focus of attention, the authors predicted that any deficits in facial affect processing would disappear when participants could anticipate which affective cues would be relevant on a given trial. Contrary to expectation, psychopathic offenders performed as well as controls in both conditions. The authors conclude that the conditions that reveal affective deficits in psychopathic individuals require further specification.

Keywords: psychopathy, affect, face processing

Hervey Cleckley's book *The Mask of Sanity* (Cleckley, 1976) stands as the classic depiction of psychopathic individuals, describing them as callous, manipulative, insincere, and remorseless, yet superficially charming, beings. Although individuals with psychopathy often pass as ordinary members of society, their actions betray their utter disregard for the rights and feelings of others. The study of psychopathy has long focused on this impoverished affective presentation as fundamental to the disorder. One major theory in the field posits that the affective poverty associated with psychopathy is due to a diminished capacity for fear (Lykken, 1995).

A substantial amount of research provides support for a low fear model of psychopathy. Relative to nonpsychopathic individuals, people with psychopathy display reduced and/or delayed startle potentiation while viewing negative stimuli (Patrick, Bradley, & Lang, 1993), poorer passive avoidance learning (Lykken, 1995; Newman & Kosson, 1986), and less autonomic arousal to distress (Blair, Jones, Clark, & Smith, 1997), punishment cues (Hare, 1965), and fear imagery (Patrick, Cuthbert, & Lang, 1994). Further, some studies have found reduced amygdala activity in individuals with psychopathic traits during affective processing (Bir-

baumer et al., 2005; Gordon, Baird, & End, 2004; Kiehl et al., 2001; Veit et al., 2002). Such findings have led some researchers to speculate about the potential role of the amygdala as a neural substrate for affective deficits associated with psychopathy (Blair, Budhani, Colledge, & Scott, 2005; Patrick et al., 1994).

Further support for an amygdala¹ model of psychopathy derives from studies of affect recognition with adults and children with psychopathic tendencies showing difficulty recognizing fearful and sad expressions of emotion (Blair et al., 2002, 2004, 2005; Stevens, Charman, & Blair, 2001). These findings represent impressive support for an amygdala model of psychopathy, as impaired recognition of fearful facial expressions is strongly associated with amygdala dysfunction (Adolphs et al., 1999). Data also link deficits in recognition of vocal fear to amygdala dysfunction, though evidence is not as strong or consistent as that for facial affect (Morris, Scott, & Dolan, 1999).

To date, two studies have demonstrated deficient recognition of fearful or sad affective expressions in an adult psychopathic population (Blair et al., 2002, 2004). However, a third investigation of facial affect recognition could find no evidence of a fear or sadness deficit in psychopathic participants (Kosson, Suchy, Mayer, & Libby, 2002). Though the latter study found less accurate processing of disgust faces among psychopathic individuals in the left-hand condition, this finding is not predicted by the amygdala model of psychopathy.

Given the theoretical importance of linking psychopathy to specific deficits in fearful and sad face processing for an amygdala-based model of psychopathy, the first goal of this study was to replicate

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¹ We recognize that the amygdala is a complex structure made up of several components, such as the basolateral amygdala and the central nucleus. As such, the region may be more accurately characterized as the amygdala complex. However, for the sake of brevity and to be consistent with those who have proposed the amygdala model of psychopathy, we refer to this region as the amygdala throughout the article.

previous results demonstrating a deficit. Thus, we tested the hypothesis that psychopathic offenders would be less accurate than controls in identifying fearful and sad facial expressions.

The second goal of this study was to examine whether the deficient facial affect processing of psychopathic individuals would be eliminated by manipulating attentional focus. Although they acknowledged that psychopathic individuals display a range of emotion processing deficits, Newman and colleagues (e.g., Newman & Lorenz, 2003) proposed that such deficits are moderated by attentional set or focus. According to these authors, psychopathic individuals process information as well as controls when it is congruent with their primary or deliberate focus of attention but are generally unresponsive to information that is incongruent with their primary focus of attention. Consistent with this proposal, psychopathic individuals are relatively insensitive to punishment cues when attending to such cues is incongruent with a primary attentional set to seek reward, but they process the same punishment cues as well as controls when doing so is congruent with a primary attentional set to avoid punishment (Newman & Kosson, 1986). With regard to the processing of facial affect, this model predicts that psychopathic individuals will perform as well as nonpsychopathic individuals when the affective information to be processed is congruent with their attentional set.

To address these hypotheses, we examined facial affect processing using two conditions: One condition resembled standard assessments of facial affect processing, whereas the second condition used the same stimuli but allowed participants to search for expressions that were congruent with their attentional set. In both tasks, a single word was followed by the presentation of four faces depicting four different affective expressions. In the first (identify) condition, the word was a number and indicated which of the four faces was the target of the affect identification task. Although this condition provided participants with a set to focus on a particular face, it did not involve a set to process a particular affective expression. In the second (locate) condition, participants were primed with a particular affective word (e.g., *sad*) and then had to locate which one of four faces was displaying the set-congruent (i.e., *sad*) affect.

Our predictions were based on past research as well as the attention model. The attention model did not yield a clear prediction for the identify condition because the affective expression to be processed was not necessarily incongruent with the deliberate focus of attention. Nevertheless, the identify condition procedure was similar to facial affect tasks used in past research and was, thus, expected to reveal processing deficits in psychopathic individuals. Conversely, the attention model predicted that psychopathic individuals would perform as well as controls in the locate condition because the affective cues to be processed were congruent with their attentional focus. Given our interest in Cleckley's (1976) classic notion of psychopathy, which emphasized the absence of neuroticism, and consistent with previous work in our lab, we evaluated our primary hypotheses using low-anxious participants.

Method

Participants

Participants were 111 Caucasian male inmates recruited from a medium security correctional institution in Wisconsin. Potential participants were prescreened to exclude those who were over 45 years of age, had a history

of psychosis or bipolar disorder, or were taking psychotropic medications. Additionally, participants were excluded if their Wechsler Adult Intelligence Scale—Revised (Wechsler, 1981) IQ was less than 70 as estimated by the Shipley Institute of Living Scale (Zachary, 1986). The groups (described below) did not differ significantly in age or estimated IQ. Informed consent was covered both orally and in a written format.

Psychopathy Assessment

The Psychopathy Checklist—Revised (PCL—R; Hare, 2003) was used to assess psychopathy, as it is known to have good reliability and validity in Caucasian samples. The PCL—R involved a 60–90-min interview and file review to obtain information used to rate 20 psychopathy-related items as 0, 1, or 2, reflecting the degree to which each trait was characteristic of the individual.

Interviewers were either graduate students or professional research assistants who received extensive training with the PCL—R. Interviewers and observers completed their ratings independently based on their separate recordings of participants' responses and file information. On the basis of 22 cases with multiple ratings, interrater reliability (intraclass correlation) was .997.

Participants were assigned to high- and low-psychopathy groups on the basis of standard cutoff scores of 30 and above ($n = 50$) and 20 and below ($n = 61$). In addition, a median split on the Welsh Anxiety Scale (Welsh, 1956) was used to divide participants into high- and low-anxious groups consisting of 53 and 58 participants, respectively. One high-anxious control group participant and 1 low-anxious psychopathy group participant were excluded because their accuracy was more than 2.5 standard deviations below the mean. We were not interested in studying the effects of anxiety, per se, or in controlling for it. Rather, we used a median split on our anxiety measure and crossed it with psychopathy because this is a well-validated method for distinguishing primary and secondary psychopathy (Newman, MacCoon, Vaughn, & Sadeh, 2005). Moreover, because the task involved multiple within-participant variables (e.g., affect, condition) we used a mixed-model design, which allowed us to examine these variables simultaneously in one analysis.

Stimuli

The MacBrain Face Stimulus Set² consists of 43 models displaying six different emotions with many of the emotions displayed twice by a particular model. Although these stimuli have not been coded by the Facial Action Coding System (FACS), preliminary validity data exist³ (Totten-

² Development of the MacBrain Face Stimulus Set was overseen by Nim Tottenham and supported by the John D. and Catherine T. MacArthur Foundation Research Network on Early Experience and Brain Development. Please contact Nim Tottenham at tott0006@tc.umn.edu for more information concerning the stimulus set.

³ Although the MacBrain face set has multiple advantages, the Pictures of Facial Affect are the most widely accepted facial affect set. For this reason, we administered a facial affect discrimination task to 51 undergraduates to compare the mean accuracy, standard deviation, and range of these two face sets. This task used the 80 target MacBrain faces from the current study and all 67 of the faces from the Pictures of Facial Affect depicting the same affective expressions. The mean accuracy (standard deviation) for the two sets was 91.7% (8.4%) and 86.9% (13.5%) for anger, 88.4% (6.3%) and 90.2% (8.8%) for fear, 96.1% (5.4%) and 97.1% (4.9%) for happy, and 77.5% (11.4%) and 78.8% (14.1%) for sad. Although quite similar overall, comparison of mean accuracies revealed only one significant difference involving anger. Given that anger recognition deficits have never been linked to psychopathy, such differences appear relatively unimportant for the current research. Further details of this pilot study are available upon request.

ham et al., 2002, 2006). The MacBrain set is more varied than the Pictures of Facial Affect (Ekman & Friesen, 1976) both in terms of the number of models and ethnic representation of the models. In addition, the faces are in color and therefore look more similar to those seen in everyday life. Forty models were used in the experimental trials and 2 in the practice trials.

Procedure

Participants were individually tested by male experimenters blind to group membership. The current task was one of three tasks administered as part of a 90-min testing session. Participants were paid \$3 for completing this task. We used two versions of our facial affect recognition task. Both conditions involved the simultaneous presentation of four faces following either a number word or an affect word. This allowed us to manipulate participants' attentional set while matching the target display of the two conditions.

The identify condition was designed to resemble measures of facial affect recognition that have been used in previous research. Participants were shown a row of four faces and asked to identify the emotion of a particular face designated by a number. In this condition, the set involved the processing of affective cues, but participants could not anticipate when a particular affect would occur and thus could not form a specific attentional set. In the locate condition, participants were asked to locate the face that matched a particular affective word (i.e., *anger, fear, happy, or sad*). Because the affect word was presented 1 s before the face was presented, we reasoned that participants could form a deliberate attentional focus to process specific affective cues. All participants completed both tasks and were randomly assigned to receive the locate condition before the identify condition or to perform the tasks in the reverse order.

For each task, participants completed 16 practice trials followed by 80 experimental trials evenly divided among the four emotions. In each trial, a word appeared for 1 s (an affect word in the locate condition and a number word in the identify condition) followed by a row of four faces, numbered 1–4. The four faces always involved one model and the four different affective expressions. However, owing to the alternative face templates available, the identical face–affect pair was never repeated. The participant then responded by pressing the number of the correct face (in the locate condition) or the affect of the designated face (in the identify condition) using a button box. After 2.75 s, the display disappeared and was followed by a 1-s interval before the next trial began. Participant responses and reaction times were automatically recorded by the computer. No feedback was given during the experiment.

Results

Preliminary Analyses

Group differences in intelligence and age were assessed using a 2 (group: psychopathic, nonpsychopathic) × 2 (anxiety: low, high)

analysis of variance (ANOVA) with Shipley Institute of Living Scale-estimated IQ and age as the dependent variables, respectively. No main effects or interactions involving group approached statistical significance. Participant characteristics are presented in Table 1.

To facilitate interpretation of the accuracy data, we also examined response speed using a 2 (group: psychopathic, nonpsychopathic) × 2 (anxiety: low, high) × 2 (condition: locate, identify) mixed-model ANOVA. There were no significant main effects or interactions involving group, although there was an effect for condition, $F(1, 103) = 35.678, p < .001$, indicating that responses were faster in the identify condition. Because groups did not differ in terms of their reaction times for either task, differential group effects for difficulty are unlikely. Furthermore, both groups were faster in the identify condition in which the focus was on just one face and slower in the locate condition in which participants had to search among four faces to locate specific affective cues. This suggests that both groups remained focused on one face in the identify condition and did not complete the task through a process of elimination, as doing so would likely have resulted in similar reaction times for both conditions.

Overall Analyses

To evaluate accuracy, we used a 2 (group: psychopathic, nonpsychopathic) × 2 (anxiety: low, high) × 2 (condition: locate, identify) × 2 (order: locate first, identify first) × 4 (affect: anger, fear, happy, sad) mixed-model ANOVA. This analysis yielded several significant effects. A Condition × Order interaction, $F(1, 103) = 44.464, p < .001$, indicated that participants were more accurate on whichever task they performed second. In Order 1, in which the locate task ($M = 80.7\%, SD = 8.4\%$) came first, participants performed better on the identify task ($M = 84.4\%, SD = 6.3\%$), whereas participants were more accurate in the locate task ($M = 83.4\%, SD = 10.1\%$) than in the identify task ($M = 77.0\%, SD = 9.6\%$) in Order 2. A significant main effect for affect, $F(3, 309) = 104.926, p < .001$, indicated that participants were most accurate for happy ($M = 91.0\%, SD = 6.4\%$), followed by anger ($M = 85.0\%, SD = 9.7\%$), fear ($M = 74.8\%, SD = 12.5\%$), and then sad ($M = 74.6\%, SD = 12.8\%$), expressions. An Affect × Order effect, $F(3, 309) = 4.439, p < .01$, indicated that accuracy for sad was better in Order 1 ($M = 78.0\%, SD = 9.9\%$), in which the locate condition was completed first, than in Order 2 ($M = 71.3\%, SD = 14.1\%$), in which the identify condition was completed first. A Condition × Affect effect, $F(3, 309) = 13.262,$

Table 1
Participant Characteristics

Measure	Control						Psychopathic					
	Low anxious <i>n</i> = 34		High anxious <i>n</i> = 27		Total <i>n</i> = 61		Low anxious <i>n</i> = 24		High anxious <i>n</i> = 26		Total <i>n</i> = 50	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
SILS	101.43	10.99	98.76	8.18	100.25	9.86	102.46	8.98	99.29	10.13	100.81	9.63
Age (years)	31.76	7.07	32.33	7.24	32.02	7.09	34.63	6.83	30.69	6.91	32.58	7.08
WAS	4.56	2.92	18.19	6.11	10.59	8.21	4.08	3.08	18.00	5.44	11.32	8.30
PCL-R	14.74	4.60	14.38	4.38	14.58	4.47	32.13	1.93	32.69	2.60	32.42	2.30

Note. SILS = Shipley Institute of Living Scale; WAS = Welsh Anxiety Scale; PCL-R = Psychopathy Checklist—Revised.

$p < .001$, indicated that participants' accuracy differed across the two conditions for anger, fear, and sad, but not for happy. For anger and sad, participants were more accurate in the locate condition (anger: $M = 87.9\%$, $SD = 10.1\%$; sad: $M = 76.8\%$, $SD = 14.5\%$) than in the identify condition (anger: $M = 82.1\%$, $SD = 13.5\%$; sad: $M = 72.5\%$, $SD = 16.1\%$). Accuracy for fear was greater in the identify ($M = 77.2\%$, $SD = 14.5\%$) than in the locate ($M = 72.4\%$, $SD = 16.2\%$) condition. There was also a significant Condition \times Affect \times Anxiety \times Order interaction, $F(3, 309) = 2.664$, $p < .05$, which was generally consistent with the Condition \times Order effect described above except that the effect varied with anxiety for anger and sad expressions. Finally, there was an Affect \times Group \times Order interaction, $F(3, 309) = 3.249$, $p < .05$, which we unpack in the following section on the basis of its relevance for psychopathy.

Psychopathy-Related Effects

To unpack the Affect \times Group \times Order interaction, we conducted a separate 2 (group: psychopathic, nonpsychopathic) \times 2 (order: locate first, identify first) ANOVA for each of the four affects. These analyses revealed two significant effects. First, a significant Group \times Order interaction for fear, $F(1, 107) = 5.263$, $p < .05$, indicated that the nonpsychopathic individuals performed nonsignificantly more accurately ($M = 77.3\%$, $SD = 8.4\%$) than psychopathic individuals ($M = 73.1\%$, $SD = 15.0\%$) in Order 1, $t(48) = 1.218$, $p = .229$, whereas the psychopathic group ($M = 78.2\%$, $SD = 13.6\%$) performed significantly better than the control group ($M = 71.5\%$, $SD = 11.6\%$) in Order 2, $t(59) = -2.061$ $p < .05$. Second, paralleling results from the overall analyses, a significant effect for order, $F(1, 107) = 7.916$, $p < .01$, in the analysis of sad affect indicated that accuracy was better in Order 1, in which the locate task was completed first ($M = 78.0\%$, $SD = 9.9\%$), than for Order 2, in which the identify task was completed first ($M = 71.2\%$, $SD = 14.1\%$).

Planned comparisons were used to examine the predication that low-anxious psychopathic individuals would perform as well as controls in the locate condition but worse than controls in the identify condition. Contrary to prediction, the groups performed similarly under both locate, $t(56) = -0.415$, $\eta_p^2 = .003$, ns , and identify conditions, $t(56) = 0.621$, $\eta_p^2 = .007$, ns (see Table 2).

Discussion

In this study, we attempted to replicate evidence that psychopathic individuals have difficulty processing facial affect when asked to identify the affect of a particular face and predicted that any such difficulty would disappear when they were given a specific emotion set. Contrary to expectation, psychopathic individuals performed as well or better than controls regardless of experimental condition or facial affect. Although these findings are inconsistent with expectations, they are not without precedent. Using both verbal (Hiatt, Lorenz, & Newman, 2002) and facial stimuli (Kosson et al., 2002), other researchers have failed to find psychopathy-related deficits in the ability to recognize angry, fearful, happy, or sad emotional expression.

Through the current study we had hoped to clarify such inconsistencies by relating the presence and absence of group differences in emotion processing to the information processing require-

Table 2
Means and Standard Deviations for Percentage Accuracy of Facial Affect Recognition for 20 Trials in Each Condition Collapsed Across Order

Facial affect	Identify condition						Locate condition					
	Control			Psychopathic			Control			Psychopathic		
	Low anxious $n = 34$	High anxious $n = 27$	Total $n = 61$	Low anxious $n = 24$	High anxious $n = 26$	Total $n = 50$	Low anxious $n = 34$	High anxious $n = 27$	Total $n = 61$	Low anxious $n = 24$	High anxious $n = 26$	Total $n = 50$
Anger	83.1	12.7	79.1	15.7	81.3	14.1	81.0	13.4	83.7	12.4	82.4	12.8
Fear	77.5	12.3	74.1	14.2	76.0	13.2	76.5	18.6	78.7	13.5	77.6	16.0
Happy	92.2	7.6	91.5	7.6	91.9	7.5	91.3	8.1	88.5	10.2	89.8	9.3
Sad	74.1	15.1	69.4	18.2	72.1	16.6	72.3	17.8	71.7	13.9	72.0	15.7
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>

Note. Data for order are available upon request. Effect size estimates (η_p^2) were less than .016 for 20 of the 24 group comparisons. Estimates of effect size for the high-anxious groups with sad in the locate condition and with angry, fearful, and happy expressions in the identify condition fell between .029 and .035.

ments of the task. Unfortunately, our ability to test the set-dependent hypothesis was undermined because evaluating this prediction was dependent on first finding evidence of a facial affect processing deficit. The attention model does not make predictions regarding the presence or absence of deficits in facial affect recognition, but in light of previously reported deficits, we reasoned that the requirement to consider multiple affects might hinder emotion processing in psychopathic individuals by preventing them from forming a specific set to detect particular affective cues. To the extent that psychopathic individuals display emotion deficits, the attention model holds that the deficit will disappear in the presence of a specific affective focus. However, without a baseline (deficit) condition, it is not possible to demonstrate this differential deficit.

Instead, the central finding of this study concerns our failure to find any significant, psychopathy-related deficits in the processing of facial affect, even for fearful faces. These results combined with those from the Kosson et al. (2002) study raise questions about the reliability of the reported deficits in facial affect recognition for angry, fearful, happy, and sad expressions. Any such concern is especially relevant when considering the specific fearful face deficit, as it has provided much support for the amygdala model of psychopathy (Blair et al., 2004, 2005). Although other evidence is consistent with the amygdala model, the findings related to deficits in fear face recognition are particularly compelling. Thus, an additional failure to replicate indicates that further scrutiny of this model might be warranted.

A first step would be to contrast studies that have found deficits in face recognition with those that have not to identify procedural differences that could account for the discrepant findings. In the only study that obtained such a deficit in PCL-R-identified psychopathic adults, Blair et al. (2004) used a multimorph task that involved observing a neutral face morph into an emotional face and found a specific deficit in the fear processing of psychopathic individuals. Because participants had to decide as quickly as possible what emotion a face represented, we assumed that they must have picked out features and attempted to guess how these features might eventually represent a particular emotion. Further, because the task required participants to generate hypotheses and then modify them as the face continued to morph, performance may have depended upon an ability to evaluate and modify hypotheses concerning particular affective expressions. Thus, Blair's multimorph task appears to have tapped different skills than the facial affect recognition tasks used by Kosson et al. (2002) and in the current study. It is possible that Blair's task was more sensitive to group differences, but affect recognition tasks like those used by Kosson et al. and in the current study have played a more significant role in linking facial affect processing to amygdala dysfunction (Adolphs et al., 1999). Thus, it seems imperative to evaluate the potential importance of task demands in revealing an emotion deficit in psychopathic individuals and then examine whether the task demands predicting group differences are more or less associated with amygdala dysfunction.

The results of the current study also differ from those of Habel, Kuhn, Salloum, Devos, and Schneider (2002). However, these authors did not examine fear recognition. Furthermore, they used PCL-R scores of 20 and above to identify their psychopathic group, with the majority of their psychopathic participants earning PCL-R scores below the standard cut-off score of 30. Moreover,

the psychopathic groups displayed different responses to happy as well as sad faces—a finding that, therefore, is also at odds with other published studies on face processing in psychopathy.

Another important difference between the current and previous studies reporting group differences involves the facial stimuli used to assess emotion processing. We chose to use a stimulus set with only preliminary validity data because it offered greater flexibility for designing a task with 20 as opposed to the more typical 5 or 6 exemplars of each emotion. In light of the fact that these faces have not been FACS coded or evaluated using fMRI, it may be argued that they do not activate the same neural substrates as other more widely used stimuli. Nevertheless, studies such as Gordon et al.'s (2004) have demonstrated that observing amygdala-related differences between psychopathic and nonpsychopathic individuals does not depend upon using the Pictures of Facial Affect (Ekman & Friesen, 1976). Clearly, investigators must be cautious when using behavioral performance to draw inferences about brain functioning.

The findings of this study demonstrate that when psychopathic individuals were asked to match a face with an emotion, they had no more difficulty in doing so than controls. Owing to the two separate conditions (locate and identify) and the between-participants order variable (locate first, identify first), our analyses of these conditions afforded four distinct opportunities to find a facial affect processing deficit in psychopathic offenders. However, the psychopathic group did not display a significant performance decrement in any condition. Nor was there evidence for a specific sadness or fearfulness recognition deficit in the psychopathic group. In fact, the only significant difference between the psychopathic and control groups, in this study, was that the psychopathic group was more accurate in recognizing fear than the control group in Order 2, in which participants completed the identify task first. Thus, across four tasks, each with 20 trials for every emotion and over 100 participants, we found no evidence for an affect recognition deficit in psychopathic individuals. We acknowledge that our study differs from other studies that revealed processing deficits in terms of hand usage, the recognition task, and stimuli used, but we also believe that such conceptual replications are very important for understanding the nature and potential contextual limitations of any psychopathy-associated fear deficit. Specifically, recent attempts to replicate facial affect recognition deficits in psychopathy suggest that such deficits are unlikely when psychopathic individuals are using their right hand in a traditional facial affect recognition task (Kosson et al., 2002), in a search-based recognition task (locate condition of current study), or in a recognition task with distraction faces (identify condition of current study).

Over the years, a substantial amount of research has accumulated that could be viewed as supportive of a low fear model of psychopathy. However, an increasing amount of evidence indicates that the fear processing deficits are inconsistent and/or situation specific (see also Newman & Lorenz, 2003). Thus, it seems imperative to address such inconsistencies and to clarify why psychopathic individuals display fear processing deficits in some contexts but not in others. Moreover, investigating the circumstances that engender the performance deficits of psychopathic individuals on emotion processing tasks would provide a more comprehensive context for speculation concerning potential neural substrates of psychopathy. Although some evidence is consistent

with an amygdala model, the situational specificity of the findings raises the possibility that such evidence is a function of task-related demands and, thus, may involve other neural substrates aside from, or in addition to, the amygdala complex. Further research is needed to clarify when psychopathic individuals do and do not display affective processing deficits. To the extent that we understand the circumstances that moderate the performance deficits of psychopathic individuals, it should be possible to predict real-world behavior problems with greater accuracy, as well as to characterize the psychobiological mechanisms underlying such problems with greater specificity.

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