AFFECTIVE EMPATHY DIFFERS IN MALE VIOLENT OFFENDERS WITH HIGH- AND LOW-TRAIT PSYCHOPATHY

Daniela M. Pfabigan, PhD, Eva-Maria Seidel, PhD, Anna M. Wucherer, MSc, Katinka Keckeis, PhD, Birgit Derntl, PhD, and Claus Lamm, PhD

This study investigated affective and cognitive empathic processes in incarcerated violent offenders with lower and higher psychopathic traits and healthy controls. Participants witnessed painful expressions of others displayed on video clips. Skin conductance responses (SCR) were recorded to assess autonomic emotional arousal, and various empathy ratings were used as measures of self-reported vicarious responses. Reduced SCRs occurred during the observation of pain in others in lower and higher psychopathic-trait participants alike, compared to controls. Despite these diminished autonomic responses indicating reduced vicarious responses, only inmates with higher psychopathic traits provided empathy ratings comparable to those of the controls. These findings indicate that violent offenders display reduced autonomic arousal in response to distress cues of others, irrespective of psychopathy. However, only higher psychopathic-trait offenders were able to provide self-report in a way that let them appear to be as empathic as controls—enabling them to know, yet not to feel, what others feel.

This article was accepted under the editorship of Robert F. Krueger and John Livesley.

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This project was funded by the Viennese Science and Technology Fund (WWTF, CS11-016 OPIOIDEM-PATHY, to C.L.). D.M.P. and C.L. were supported by the research cluster MMI-CNS while writing this article (cofunded by the University of Vienna and the Medical University of Vienna). Participants’ financial remuneration was funded by a scholarship of the University of Vienna awarded to A.M.W. The funding sources had no role in study design, data collection, analysis, or interpretation of the current data. We thank the editor and the anonymous reviewers for helpful and highly constructive comments on an earlier version of this article.

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Psychopathy is a personality construct characterized by deficits in adaptation and affective processes (e.g., fearlessness, callousness, failure to form close emotional bonds, dishonesty, deficits in passive avoidance learning, and deficient empathic responses) as well as antisocial and impulsive behavior (Hare, 1991; Hare & Neumann, 2008). In forensic samples, psychopathy is usually assessed with the Hare Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003), which takes case history into account as well as information gathered during a semistructured interview. PCL-R total score is often split into two subfactors. PCL-R Factor 1 relates to the affective and interpersonal psychopathy aspect (e.g., deceitfulness, superficial charm), PCL-R Factor 2 relates to the lifestyle and social deviance aspect (e.g., impulsivity, irresponsibility, and antisocial behavior; Hare, 2003). However, recent theoretical accounts consider psychopathy also as a construct with a dimensional structure. This implies that individual variation in the extent to which someone holds psychopathic traits can also be found in community samples (Edens, Marcus, Lilienfeld, & Poythress, 2006).

Although empathic deficits are described as a core feature of psychopathy, it is not fully understood which empathy domain (cognitive or affective empathy) is disturbed. Cognitive empathy is characterized by understanding emotional states of others without necessarily experiencing their feelings (Davis, 1983). Cognitive processes such as emotion regulation, appraisal, and perspective taking also play an important role in modulating affective empathic responses (e.g., Decety & Lamm, 2006; Engen & Singer, 2013; Perry, Bentin, Bartal, Lamm, & Decety, 2010). Affective empathy is described as the vicarious experience of the emotional states of others, and thus comprises an actual sharing or resonance with the feelings of others (Decety & Jackson, 2004). Notably, cognitive and affective empathy are not independent, but inherently interact to generate as well as to modulate empathic responses (Singer & Lamm, 2009).

Until now, research has focused mainly on the link between cognitive empathy and psychopathy. For example, Richell et al. (2003), Dolan and Fullam (2004), and Blair et al. (1996) reported intact theory of mind in high-trait psychopathic individuals. In contrast, Brook and Kosson (2013) observed impaired empathic accuracy in criminal high-trait psychopaths. Direct investigations concerning affective empathy are comparatively rare (but see Cheng, Hung, & Decety, 2012; Decety, Chen, Harenski, & Kiehl, 2013; Decety, Skelly, & Kiehl, 2013; Domes, Hollerbach, Vohs, Mokros, & Habermeyer, 2013; Meffert, Gazzola, den Boer, Bartels, & Keysers, 2013). Moreover, most previous work on affective empathy used rather nonnaturalistic and decontextualized stimuli, such as photographs of facial affect that provided no information on the reasons, context, or implications of the displayed emotion. This raises the question of whether the processes engaged in these studies were actually related to full-blown empathy, or simply to subcomponents of this complex social skill (see also Zaki & Ochsner, 2012).

Next to self-report measures, variation in autonomic arousal is an established way to assess the affective component of empathic responses in humans that accompany empathic responses, such as skin conductance responses (SCR). Previous research has shown that SCRs reliably and unobtru-
sively indicate vicarious affective responses during empathy for pain (Hein, Lamm, Brodbeck, & Singer, 2011; Krebs, 1975). When using autonomic arousal to assess empathy, we note that SCR variation most likely reflects a mix of both self-related (i.e., personal distress related to negative emotionality) and other-related (i.e., empathic concern related to another person) emotional responses (Batson, Fultz, & Schoenrade, 1987; Decety & Lamm, 2011; Eisenberg et al., 1989). Although these components are not easy to disentangle, previous research (Hein et al., 2011) has shown that higher amplitudes of vicarious SCR to the pain of others predicted more costly helping. Notably, the experimental paradigm used in the Hein et al. study allowed excluding helping to be motivated predominantly by personal distress. This suggests that SCR in empathy for pain paradigms can be explained by a strong other-oriented component, and that reduced SCR speaks to reduced empathic concern.

Recent theoretical considerations that are important for the investigation of the affective empathy component suggest that antisocial populations, including high-trait psychopathic individuals, are most likely impaired in recognizing fearful and sad facial expressions (Dawel, O’Kearney, McKone, & Palermo, 2012; Marsh & Blair, 2008; Wilson, Juodis, & Porter, 2011). Such expressions are considered to be so-called distress-related signals, which are thought to elicit affective empathy in those who perceive them (Hoffman, 1987; Marsh & Ambady, 2007; Nichols, 2001; Preston & de Waal, 2002). In healthy humans, these distress-related signals have been proposed to contain specific perceptual properties that facilitate empathic responding and concurrently inhibit aggression (Marsh, Adams, & Kleck, 2005). R. J. R. Blair (2005) finally merged these considerations in his integrated emotions theory, which posits that high-trait psychopathic individuals are able to experience some emotions, but show impairments when trying to understand interpersonal distress cues. Notably, in an earlier study, R. J. Blair, Jones, Clark, and Smith (1997) confronted incarcerated high-trait psychopaths and low-trait controls with a passive viewing task of distress-related, threat-related, and neutral pictures while recording SCR. No group differences emerged for threatening and neutral pictures, but high-trait psychopaths displayed decreased SCR to distress cues compared with low-trait individuals. This was in line with earlier evidence from high-trait psychopathic individuals and control participants observing a person ostensibly receiving painful electric shocks (Aniskiewicz, 1979; House & Milligan, 1976). More recently, SCR and its relation to the psychopathy construct was investigated in a community sample, which passively viewed pleasant, unpleasant, and neutral complex pictures (Benning, Patrick, & Iacono, 2005). Lower SCR amplitudes were associated with heightened psychopathy scores in the healthy, noninstitutionalized participants.

Importantly, inconsistencies between self-report and psychophysiological measures of emotional experience were reported recently for high-trait psychopaths versus low-trait controls (Gao, Raine, & Schug, 2012). In line with these observations, Herpertz et al. (2001) suggested that associative text processing is not affected in high-trait psychopathy, as well as that self-report does not accurately reflect the actual experience of the emotional or empathic
states of high-trait psychopathic individuals. Consequently, the current study aimed to specifically investigate vicarious responses to the pain of others in higher psychopathic trait inmates compared to lower psychopathic trait inmates using both self-report and physiological measures. As a particular asset of the current study, a healthy control group served as a reference point for empathic responding.

A naturalistic empathy paradigm was used in which participants were confronted with affectively engaging painful expressions of patients undergoing therapeutic treatments, shown on short video clips (Lamm, Batson, & Decety, 2007; Lamm, Porges, Cacioppo, & Decety, 2008). Thus, the main focus was on vicarious affective responses rather than on “cold” cognitive processes associated with emotion recognition tasks. Reduced trait and state empathy was predicted in higher psychopathic trait inmates compared to lower psychopathic trait ones and controls (Hare, 1999). Furthermore, higher psychopathic trait inmates were expected to display decreased vicarious emotional responses compared to lower psychopathic trait inmates and controls, as indexed by SCR amplitudes (Blair et al., 1997). Additionally, to target cognitive components associated with empathy, we also investigated the modulation of affective empathic responses by cognitive processing. To this end, a cognitive appraisal manipulation was used, which gave participants further knowledge concerning the effectiveness or ineffectiveness of the therapeutic treatment (and hence whether patients “had suffered in vain”; Lamm, et al., 2007). No group differences were expected due to psychopaths’ well-documented cognitive and regulatory skills.

MATERIAL AND METHODS

PARTICIPANTS

The male sample (all Caucasians) consisted of 14 incarcerated higher psychopathic trait offenders (HPT), 16 incarcerated lower psychopathic trait offenders (LPT), and 15 healthy controls (HC) matched for age, education, and intelligence (Table 1). Psychopathy was assessed via file information and ratings on the Psychopathy Checklist-Revised (PCL-R; Hare, 1991). PCL-R scoring was performed by trained and certified forensic psychologists at the prison. PCL-R scores ranged from 7 to 34 (median = 23). For reasons of group comparisons, we used a median split to divide the current sample into two groups of inmates: those with higher psychopathic traits (HPT: mean = 27.43, SD = 3.55) and those with lower psychopathic traits (LPT: mean = 16.31, SD = 5.55). Importantly, a median split approach is able to capture the dimensionality of the psychopathy construct better than a more categorical extreme group design. The total time of imprisonment was assessed in days for each incarcerated participant. The study was conducted in accordance with the Declaration of Helsinki (revised 2000) and approved by the Institutional Review Board of the Austrian Ministry of Justice. All participants gave written informed consent prior to the experiment, received 10 €/h for participation, and were enrolled on a voluntary basis.
<table>
<thead>
<tr>
<th>Group</th>
<th>Higher Psychopathic Traits Group (HPT)</th>
<th>Lower Psychopathic Traits Group (LPT)</th>
<th>Healthy Control Group (HC)</th>
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<tr>
<td></td>
<td>(n = 14)</td>
<td>(n = 16)</td>
<td>(n = 15)</td>
</tr>
<tr>
<td>M SD</td>
<td>M SD</td>
<td>M SD</td>
<td>M SD</td>
</tr>
<tr>
<td>Age (years)</td>
<td>38.5 13.4</td>
<td>33.0 11.5</td>
<td>35.6 8.7</td>
</tr>
<tr>
<td>Education (years)</td>
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<td>11.4 2.2</td>
<td>12.1 2.1</td>
</tr>
<tr>
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<td>25.1 3.9</td>
<td>22.1 6.4</td>
<td>23.3 2.5</td>
</tr>
<tr>
<td>Time of imprisonment (days)</td>
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<td>1986.5 1319.0</td>
<td>25</td>
</tr>
<tr>
<td>PCL-R Factor I</td>
<td>11.1 2.3</td>
<td>6.7 2.8</td>
<td>– –</td>
</tr>
<tr>
<td>Factor II</td>
<td>13.3 1.8</td>
<td>8.6 4.0</td>
<td>– –</td>
</tr>
<tr>
<td>Total score</td>
<td>27.4 3.6</td>
<td>16.3 5.4</td>
<td>– –</td>
</tr>
<tr>
<td>PPI-R Fearless dominance (FD)</td>
<td>– –</td>
<td>– –</td>
<td>117.5 16.5</td>
</tr>
<tr>
<td>Antisocial Impulsivity (AI)</td>
<td>– –</td>
<td>– –</td>
<td>145.5 21.8</td>
</tr>
<tr>
<td>Total score</td>
<td>– –</td>
<td>– –</td>
<td>29.5 9 24.1</td>
</tr>
</tbody>
</table>

Note. Mean and SD of PCL-R factor and total scores (Hare, 1991, 2003) are depicted for both prison groups, as are mean and SD of PPI-R factor and total scores (Alpers & Eisenbarth, 2008; Lilienfeld & Widows, 2003) for the healthy controls. ** Significant.
The incarcerated group was recruited from the forensic psychiatry department of a correctional facility. All inmates were considered violent offenders with index offenses such as murder/homicide, assault, and battery. According to *DSM-IV* criteria, most inmates were diagnosed with Cluster B personality disorders (*n* = 7 in HPT, *n* = 5 in LPT), mixed diagnoses of personality disorders (*n* = 5 in HPT, *n* = 4 in LPT), and paraphilia (*n* = 6 in HPT, *n* = 2 in LPT). History of alcohol (*n* = 6 in HPT, *n* = 6 in LPT) or drug dependence (*n* = 3 in HPT, *n* = 1 in LPT) was found in several offenders. About half of the offenders were taking psychiatric medication at the time of testing (HPT: neuroleptic [*n* = 4], antidepressant and neuroleptic medication [*n* = 2]; LPT: antidepressant [*n* = 3], neuroleptic [*n* = 4], antidepressant and neuroleptic medication [*n* = 4]).

The control group (HC) consisted of 15 adults recruited from a community sample, with no history of psychiatric or neurological disorders, and no substance abuse assessed with SCID I and II screening questionnaires (Structural Clinical Interview for *DSM-IV*; Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1996). Two participants in each group were not available for SCR analysis because the analysis algorithm yielded zero values for SCR magnitudes in response to pain clip presentations.

**TASK**

A previously published and well-validated empathy-for-pain task was applied (Lamm et al., 2007). Participants were presented with video clips of individuals who had ostensibly been treated with painful auditory stimulation as a new therapy method for their neurological disease (Tinnitus aurium). This therapy method consisted of repeated intense acoustic stimulation, which resulted in severe pain, expressed by the patients on their face. Participants were instructed to watch the video clips and to rate perceived unpleasantness for themselves, assessing affective sharing (self-rating: “How unpleasant was watching the video for you?”) and affect evaluation from the perspective of the patient (other-rating: “In your opinion, how unpleasant was hearing the sound for the patient?”) on a 7-point Likert scale ranging from 1 (*not unpleasant*) to 7 (*extremely unpleasant*). Eight video clips were presented in two blocks with four clips each (two females, two males). Importantly, participants were told that not all patients had benefited from the treatment, which was shown prior to each block. This manipulation was used to assess the role of cognitive appraisal and has previously been shown to result in different neural activation patterns associated with affect regulation (Lamm et al., 2007). Notably, as determined in a large sample of independent participants (*N* = 111), the videos shown in the two different treatment conditions did not differ with respect to expressed pain intensity. Moreover, assignment of videos to conditions was counterbalanced across participants, so that any effect would be directly attributable to cognitive appraisal and not to stimulus characteristics. Each video lasted 3500 ms, depicting the transition of a neutral facial expression for 500 ms to an expression triggered by severe pain due to auditory stimulation. During the subsequent 1500 ms, the last frame of each video was presented.
Subsequently, the two unpleasantness ratings for self and other had to be delivered by pressing the corresponding button on the keyboard. In addition, participants provided ratings that allowed for the calculation of previously established indices for empathic concern and personal distress (Batson, Early, & Salvarani, 1997; Lamm et al., 2007; Lamm, Meltzoff, & Decety, 2010). For these indices, participants rated the degree to which they experienced different emotional states while watching the video, using a set of 14 adjectives and a 7-point Likert scale, ranging from 1 (not at all) to 7 (extremely). Six of these items (e.g., compassionate, sympathetic) were aggregated to an index of empathic concern, and eight were assigned to an index of personal distress (e.g., alarmed, distressed; see Batson et al., 1997). Personal distress can be regarded as empathic overarousal eliciting self-oriented negative feelings, whereas empathic concern is regarded as a feeling of concern for another person (Decety & Lamm, 2006; Singer & Lamm, 2009). After a short intertrial period of a black screen for 500 ms, the next video was presented.

**QUESTIONNAIRES**

*Psychopathic Personality Inventory-Revised.* The Psychopathic Personality Inventory-Revised (PPI-R; Alpers & Eisenbarth, 2008; Lilienfeld & Widows, 2005) is a 154-item self-report measure assessing psychopathic personality traits dimensionally. Two higher-order factors derive from the item pool: Fearless Dominance and Impulsive Antisociality. The overall Cronbach’s alpha reliability value is reported as .85; the values for the subscales range from .72 to .88 (Alpers & Eisenbarth, 2008). Only the control group filled out this questionnaire to screen these participants for high psychopathy traits and, consequently, to guarantee low levels of psychopathy in the control group.

*Raven's Standard Progressive Matrices.* Raven’s standard progressive matrices (SPM; van der Ven & Ellis, 2000) was administered to assess nonverbal intelligence. We used the short version with 32 Rasch-homogeneous items without time limit. Cronbach’s alpha reliability values are reported to range from .77 to .96 in different reference samples (Raven, Raven, & Court, 1999). Controls were administered the SPM after task completion. Inmates’ SPM scores were extracted from prison files, as were PCL-R scores.

*Interpersonal Reactivity Index.* The Interpersonal Reactivity Index (IRI; Davis, 1983) is a widely used 28-item measure of empathy-related traits, yielding information on interpersonal reactivity on four scales: empathic concern, fantasy, personal distress, and perspective taking, with Cronbach’s alpha reliability values between .71 and .78 (Davis, 1980). All participants filled out the IRI prior to the video task.

**EXPERIMENTAL PROCEDURE AND DATA PREPROCESSING**

Test sessions were held in the morning either in a quiet room in the prison or in a laboratory room at the Faculty of Psychology for the control group. The experimental protocol was standardized for both settings. Room tem-
Temperature was held constant between 23° and 24°C to ensure stable SCR. The video clips and ratings were presented on a 15.4-inch laptop monitor (Dell Latitude) using Presentation software (Neurobehavioral Systems, Albany, CA). The empathy-for-pain task lasted 10 minutes. Skin conductance was recorded using an 8-channel bioamplifier (Mobi8-BP; TMSi B. V., Enschede, the Netherlands) with a 24-bit A/D conversion rate. A custom-specific skin conductance sensor guaranteed the acquisition of unfiltered raw data. This sensor consisted of two flat Ag/AgCl electrodes, which were placed at the medial phalanges of the index and the ring finger of the nondominant hand. Skin conductance data were sampled at 1024 Hz and subsequently preprocessed and analyzed using MATLAB 7.10.0 (The MathWorks, Inc., Natick, MA) and Ledalab V3.4.2 (Leipzig, Germany). Data were downsampled to 10.24 Hz, smoothed, and continuous decomposition analysis was performed (CDA; Benedek & Kaernbach, 2010a). CDA incorporates the disentanglement of phasic components from tonic activity of skin conductance data based on standard deconvolution, without needing an additional baseline interval. As a result, CDA returns the skin conductance level as two distinct measures—a continuous measure of tonic electrodermal activity as well as a phasic driver as a continuous measure of phasic electrodermal activity. Stimulus-driven changes in phasic skin conductance were analyzed within a response window of 5000 ms after video onset. The response window is in line with previous literature investigating SCR modulation to video clips (Courtney, Dawson, Schell, Iyer, & Parsons, 2010; Hubert, Wicker, Monfardini, & Deruelle, 2009; Schneider et al., 2012). The subsequent analysis relied on SCR magnitude representing the average phasic driver within the defined response window (Benedek & Kaernbach, 2010b). SCR data were corrected for outliers group-wise with the box-plot function of PASW.

STATISTICAL ANALYSIS

Analyses were performed using PASW Statistics 18.0 (IBM SPSS Statistics, Somer, NY). The significance level was set at \( p \leq .05 \). Greenhouse-Geisser correction was applied if the ANOVA sphericity assumption was violated. Partial eta-squared (\( \eta^2_p \)) is reported for significant results to indicate effect sizes (Kirk, 1996). Significant group effects were analyzed with a priori planned linear contrasts.

BEHAVIORAL DATA ANALYSIS

Group differences regarding age, intelligence, and education were assessed with one-way ANOVAs. Differences between inmates concerning PCL-R scores were assessed with independent samples \( t \) tests, and differences concerning time of imprisonment were assessed with a Mann-Whitney \( U \) test due to a skewed nonnormal distribution of these data. Averages of ratings were computed separately for each participant and condition (effective and noneffective treatment). Unpleasantness ratings were analyzed separately for the self-rating and the other-rating, as were the two indices of state empathy, using two-way mixed-model ANOVAs with the between-subject factor group.
(HPT vs. LPT vs. HC) and the within-subject factor treatment (effective vs. noneffective). The questionnaire data of the IRI were analyzed with a two-way mixed-model ANOVA with the between-subject factor group and the within-subject factor IRI scales (personal distress vs. empathic concern vs. fantasy scale vs. perspective taking). Additionally, Spearman correlations (r) were calculated between time of imprisonment, IRI scales, and PCL-R scores for the inmates alone, and group-wise correlations for the unpleasantness ratings, the two indices of state empathy, and IRI scales for all participants.

**SCR ANALYSIS**

Artifact-free trials were averaged separately for each participant and condition (effective and noneffective treatment). SCR values were subjected to a two-way mixed-model ANOVA with the between-subject factor group and the within-subject factor treatment. Spearman correlations were calculated between SCR data and the duration of imprisonment for all inmates; further correlations were calculated for SCR data and PCL-R (only for inmates), PPI-R (only for HC), IRI scores, and for the unpleasantness ratings. Potential effects of medication on SCR data and ratings were assessed in the incarcerated group via a two-way mixed-model ANOVA with the between-subject factor medication type (medicated vs. nonmedicated) and the within-subject factor treatment.

**RESULTS**

**BEHAVIORAL RESULTS**

No group differences were observed for age, years of education, and SPM raw scores (Table 1; all p values > .200). Furthermore, HPT and LPT participants had spent comparable time in prison (p = .124). Healthy controls had a PPI-R mean score of 295.9 (SD = 24.13), which is lower than the male reference sample (325.42, SD = 24.92) composed of students and lower than a male forensic sample (338.71, SD = 25.68; Alpers & Eisenbarth, 2008).

Other-related unpleasantness ratings revealed an effect of treatment, $F(1, 42) = 16.52$, $p < .001$, $\eta_p^2 = .28$. All participants rated the facial expressions as more painful during video clips depicting patients with noneffective treatment than those in which treatment had been effective. Additionally, a significant group effect occurred, $F(2, 42) = 4.65$, $p = .015$, $\eta_p^2 = .18$). Inmates with lower psychopathic traits gave significantly higher ratings than higher trait inmates ($p = .004$), while all other comparisons, including the comparison of HPT and HC, were not significant (all $p$ values > .104). The interaction group $\times$ treatment was not significant ($F < 1$). Self-reported unpleasantness ratings revealed similar results. An effect of treatment was observed, $F(1, 42) = 18.19$, $p < .001$, $\eta_p^2 = .30$, indicating again that watching patients who had undergone noneffective treatment resulted in higher feelings of unpleasantness than watching patients who had benefited. The group factor also reached significance, $F(2, 42) = 6.62$, $p = .003$, $\eta_p^2 = .24$. LPT inmates gave
significantly higher unpleasantness ratings than HPT inmates \((p = .003)\) and HC \((p = .004)\); the ratings of HPT and HC did not differ \((p = .814)\). No interaction effect was found either, \(F(2, 42) = 2.34, p = .108\).

The analysis of the personal distress index (Batson et al., 1997) revealed an effect of treatment, \(F(1, 42) = 8.54, p = .006, \eta^2_p = .17\), which signified higher personal distress during the presentation of noneffective treatment videos than during effective ones. Furthermore, an effect of group was observed, \(F(2, 42) = 5.29, p = .009, \eta^2_p = .20\). LPT inmates reported more personal distress than HPT inmates \((p = .010)\) and HC \((p = .006)\); no difference was found between HPT and HC \((p = .908)\). No interaction effect was found \((F < 1)\). Analysis of the empathic concern index (Batson et al., 1997) also revealed an effect of treatment, \(F(1, 42) = 14.29, p < .001, \eta^2_p = .25\). All participants reported more empathic concern during noneffective treatment videos than during effective ones. In line with the other measures, a group effect occurred, \(F(2, 42) = 5.92, p = .005, \eta^2_p = .22\). LPT inmates reported more empathic concern than HPT inmates \((p = .025)\) and HC \((p = .002)\), and ratings of HPT and HC were not different \((p = .358)\). No interaction effect was observed \((F < 1)\).

**QUESTIONNAIRE DATA**

The IRI analysis yielded effects of IRI scales, \(F(3, 126) = 29.24, p < .001, \eta^2_p = .41\), and group, \(F(2, 42) = 3.21, p = .050, \eta^2_p = .13\), as well as an interaction, \(F(6, 126) = 3.43, p = .004, \eta^2_p = .14\). Thus, one-way ANOVAs were conducted for each IRI scale with the group factor (Bonferroni adjusted \(p\) value \(\leq .0125\) per ANOVA). Only the personal distress scale revealed significant group differences, \(F(2, 42) = 8.88, p = .001, \eta^2_p = .30\). LPT inmates reported higher personal distress than HPT inmates \((p = .046)\) and HC \((p < .001)\). HPT inmates gave also higher ratings than HC \((p = .046)\). ANOVAs of the other IRI scales did not reach significance (all \(p\) values > .197; Table 2).

Spearman correlations between the duration of imprisonment and PCL-R scores revealed a significant positive correlation between time spent in prison and PCL-R Factor 2 scores \((r_s = .46, p = .011)\). Trait and state empathy components were not related to the duration of imprisonment (all \(p\) values > .168). Moreover, in inmates trait empathy components were not related to the PCL-R total score (all \(p\) values > .187) apart from the personal distress scale \((r_s = -.45, p = .014)\). Both PCL-R Factor 1 \((rs = -.43, p = .018)\) and Factor 2 \((r_s = -.37, p = .046)\) were negatively related to heightened self-report of personal distress. Self-reported unpleasantness was positively correlated with the empathic concern and personal distress state indices in all groups (all \(p\) values < .019). A positive correlation between other-reported unpleasantness and the empathic concern state index was only observed in inmates with higher psychopathic traits \((p = .006)\). Controls showed a positive correlation between self-reported unpleasantness and IRI personal distress \((p = .019)\). In contrast, inmates with lower psychopathic traits showed positive correlations between self-reported unpleasantness and IRI empathic concern \((p = .004)\), between the empathic concern state index and IRI empathic concern \((p = .039)\) and IRI perspective taking \((p = .002)\), and between
Table 2. Mean Ratings and SEM of Empathic Concern and Personal Distress Indices (Batson et al., 1997) and the IRI Scales (Davis, 1983), Separately for the Three Groups.

<table>
<thead>
<tr>
<th></th>
<th>Higher Psychopathic Traits Group (HPT)</th>
<th>Lower Psychopathic Traits Group (LPT)</th>
<th>Healthy Control Group (HC)</th>
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<tr>
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<tr>
<td>Effective treatment</td>
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<td>14.44 0.47</td>
<td>13.80 0.60</td>
</tr>
<tr>
<td>Fantasy</td>
<td>12.29 0.66</td>
<td>13.63 0.72</td>
<td>12.07 0.69</td>
</tr>
<tr>
<td>Personal distress</td>
<td>10.14 ** 0.85</td>
<td>12.25 ** 0.64</td>
<td>8.00 0.69</td>
</tr>
<tr>
<td>Perspective taking</td>
<td>13.71 0.92</td>
<td>14.56 0.69</td>
<td>15.60 0.51</td>
</tr>
</tbody>
</table>

Note. **p < .05, two-tailed, significant group differences.
personal distress state index and IRI perspective taking ($p = .009$). Moreover, only scores on PCL-R Factor 2 were related to the unpleasantness ratings (other: $r_s = -.49, p = .006$; self: $r_s = -.48, p = .007$).

SKIN CONDUCTANCE RESULTS

The two-way mixed-model ANOVA revealed a significant effect of group, $F(2, 36) = 5.02, p = .012, \eta_p^2 = .22$. SCR data were significantly lower in lower psychopathic trait inmates ($p = .004$) and in higher psychopathic trait inmates ($p = .034$) compared to HC. SCR data of LPT and HPT did not differ ($p = .446$). No effect of treatment, $F(1, 36) = 1.43, p = .708$ nor an interaction effect ($F < 1$) were obtained (see Figure 1).SCR data were not correlated with time of imprisonment (all $p$ values > .100). Additionally, no significant correlations were observed for SCR data and PCL-R ($p > .325$) or PCL-R factors (all $p$ values > .517), PPI-R ($p = .128$), IRI scales (all $p$ values > .089), unpleasantness ratings (all $p$ values > .517), and empathic state indices (all $p$ values > .288).

No effects of medication on SCR magnitude were found, either for treatment, $F(1, 24) = 0.01, p = .911$, and medication type, $F(1, 24) = 0.21, p = .887$, or for their interaction ($F < 1$). Medication type had no effect on the affective ratings (all $p$ values > .112).

DISCUSSION

The present study investigated empathy for pain in male violent offenders subdivided into two groups with lower and higher psychopathic traits, and in healthy, noninstitutionalized controls. Our main finding is a dissociation between self-report and physiological data for the offender groups. Although both prison groups failed to show an increase in physiological arousal when confronted with distress-inducing video clips, only inmates with lower psychopathic traits reported significantly higher ratings of state measures of empathy. In contrast, higher psychopathic trait offenders were able to provide ratings of state empathy that were indistinguishable from those of the control group. In contrast to these group differences in affective empathic responding, modulatory cognitive processes assessed by means of appraisal were comparable in all groups.

The observation of reduced physiological responding to pain in others in offenders with higher psychopathic traits compared to controls is in line with previous work on the relationship between distress cues and psychopathy (Aniskiewicz, 1979; House & Milligan, 1976). However, the present results do not replicate findings on affective responsiveness in inmates (Blair et al., 1997), which indicated a linear negative relationship between SCR and psychopathy scores. These differences might be due to task differences and the fact that Blair et al.’s study did not include a healthy comparison group.

Another possibility to explain the present results derives from the most obvious difference between inmates and controls. While the latter walk freely through life and experience a variety of new social encounters on an every-
day basis, inmates have limited opportunities for social contact and in particular for encountering new persons. Therefore, to test whether prolonged imprisonment was associated with diminished SCR magnitude, correlation analyses of time of imprisonment with SCR was performed (as well as with state and trait empathy). Because none of these analyses yielded significant results, it is unlikely that reduced social contact is the main reason for altered empathic responsivity in inmates. Another option to explain the SCR differences between inmates and controls is related to the general tendency of inmates and in particular of violent offenders to engage in acts of violence. In line with this notion, Blair (2005) suggested that violent offending is more generally related to reduced empathic feelings. Indeed, several studies provide evidence that diminished SCR after emotional stimulus presentation was not specific for offender types or psychopathy scores (Pastor, Molto, Vila, & Lang, 2003; Wahlund, Sorman, Gavazzeni, Fischer, & Kristiansson, 2010). This interpretation is also supported by the lack of correlation between psychopathy scores and SCRs in the present study. The observed physiological hyporesponsiveness might therefore be attributed to violence-prone individuals in general (Wahlund et al., 2010). Along these lines, the discussion of whether psychopathy is associated with specific facial emotion recognition deficits is still ongoing (Dawel et al., 2012; Decety, Skelly, Yoder, & Kiehl, 2014). For instance, it has been suggested that high-trait psychopaths might suffer from a more generalized emotion recognition deficit, for example, diminished levels of attention toward emotional stimuli (Dadds et al., 2006; Dawel et al., 2012), rather than specific deficits for emotions such as fear and sadness only. Because the distress stimuli used here failed to
evoke “normal” affective responsiveness (compared to healthy controls) in the high-trait participants, our results also speak for rather general deficits in high-trait psychopathy, and not for specific emotion recognition deficits. Of note, other theoretical accounts of psychopathy predict selective impairments in fear processing (Lykken, 1957, 1995) and relate the observed SCR hyporesponsiveness in high-trait psychopaths to the combination of fear-processing deficits and heightened disinhibition and impulsivity (Fowles, 2000). However, the current research paradigm investigated predictions based on the integrated emotions theory by R. J. R. Blair (2005) because only distress-eliciting stimuli of other persons in pain, but not in fear, were presented in our experiment.

The present results revealed differences for the two imprisoned groups in self-report of trait and state empathic competencies. The lower psychopathic traits group gave the highest affect ratings of all three groups in nearly all empathic self-report domains—yielding a potential dissociation between self-report and physiological measures in this group. It is important to note that an identical pattern has been observed in previous studies with psychopathic samples—showing that only the physiological data differed between high-trait psychopathic individuals and low-trait controls, but not their self-report (Cook, Davis, Hawk, Spence, & Gautier, 1992; Herpertz et al., 2001; Patrick, Bradley, & Lang, 1993). Further inconsistencies between self-report and psychophysiological measures of emotional experience were reported recently for psychopaths versus controls (Gao et al., 2012). Along these lines, Herpertz et al. (2001) suggested that self-report in psychopathic individuals may not reflect their actual emotional or empathic experiences. More specifically, high-trait psychopaths might be able to deliver so-called text-appropriate self-report (Cook et al., 1992), presenting themselves as “normally emotional.”

This in turn raises the question of why lower psychopathic trait inmates delivered exaggerated empathic accounts. One option is that their heightened self-report ratings might reflect a particularly pronounced social desirability bias observed in low-trait inmates (Curwen, 2003; Dolan & Fullam, 2004). Alternatively, without sufficient real-life examples, lower psychopathic trait inmates (in particular given their average imprisonment time of more than 5 years) might have lost the ability to judge social situations adequately, which is reflected in positive correlations between the different self-report measures. To the contrary, high-trait psychopaths are known to be highly manipulative, to be able to evaluate social situations appropriately, and to display themselves to others in socially more favorable ways (Book, Quinsey, & Langford, 2007). Thus, it is not surprising that higher psychopathic trait inmates were able to adequately adjust their empathic responses to the level of “normality” in the present study. They were also the only group displaying a positive correlation between other-related unpleasantness (i.e., a measure of affective evaluation rather than shared affect) and IRI empathic concern (a trait measure of how concerned about others’ welfare they present themselves). Note, though, that this behavior was not accompanied by a matching physiological arousal, indicating a mismatch between the actual affective experience and its report. This pattern is in line with the so-called
emotion paradox (Lorenz & Newman, 2002), which states that psychopaths display normal appraisal of emotional cues, but impaired behavioral use of them. In the present case, higher psychopathic trait inmates self-displayed adequate cognitive-evaluative responses to the pain of others. However, their concurrent lack of an increased physiological response to the pain clips suggests reduced affective responding, and that their actual emotional state was at odds with its report. This was even more the case for the lower psychopathic trait inmates.

Although a negative relation between different trait empathy questionnaires and psychopathy has been reported previously (Mahmut, Homewood, & Stevenson, 2008; Zágon & Jackson, 1994), the present data fail to support this notion. However, in line with the present results, Book and Quinsey (2004) and Dolan and Fullam (2004) reported no differences in empathy scores between psychopathic individuals and healthy controls. Moreover, in a review of the literature, Brook, Brieman, and Kosson (2013) concluded that the discrepancy between subjective judgments and abnormal physiological responses is a rather consistent finding in behavioral and physiological studies investigating psychopathy.

Furthermore, the potential dissociation between affective and cognitive empathic processes is supported by the observation that all three groups responded comparably to the cognitive appraisal manipulation (i.e., all gave higher unpleasantness ratings following the noneffective treatment condition). Cognitive appraisal is one of the core processes of emotion regulation (Gross, 2002), describing the ability to up- or down-regulate ongoing emotional responses (Ochsner & Gross, 2005). It has been suggested previously that regulatory processes are also at work when one observes distress in others, enabling the observer to engage in supportive behavior even under harmful and highly aversive circumstances (Decety & Lamm, 2006; Lamm et al., 2007). The finding of lower unpleasantness, empathic concern, and personal distress for patients undergoing effective medical treatment is highly consistent with previous findings and indicates that appraisal processes were successfully engaged. The fact that this pattern of responses was observed in all groups alike suggests that cognitive empathic abilities were neither affected by psychopathy scores, nor in violent offenders in general (Blair et al., 1996; Richell et al., 2003).

Both offender groups reported empathy without any corresponding increase in physiological arousal as observed in controls. SCR can be regarded as an automatic physiological correlate of arousal; an increase in SCR is interpreted as an increase in emotional arousal (Critchley, 2002), which also accompanies empathic responses. SCRs are therefore assumed to be objective and hardly susceptible to conscious manipulation. A variety of cortical areas are implicated in the modulation of individual arousal levels and resulting SCR variation. One of these regions is the ventromedial prefrontal cortex (vmPFC), which is implicated in the regulation of arousal during affective processing (Williams et al., 2001) and internal self-reference processes (Critchley, 2005). Thus, this region might also be qualified to participate in the processing of empathic responses. Indeed, studies investigating neuronal correlates of affective empathy support the notion that vmPFC might be
one of the brain regions underlying affective sharing (Shamay-Tsoory, 2011). Thus, based on the present data, one might hypothesize that inmates display frontal dysregulation associated with poor behavior control and impulsivity when confronted with distress cues, as recently suggested (Decety, Skelly, et al., 2013; Meffert et al., 2013). This disturbance during the regulation of their emotional responses after confrontation with specific social cues might be further associated with a predisposition to reactive aggressive outbursts (Blair, 2004), which in turn might explain why these individuals are more often incarcerated. In the absence of direct measures of brain function in the present study, this possibility remains speculative. Future research applying a combination of neuroimaging and psychophysiological methods should aim to disentangle the impact of psychopathy scores and offender type on affective empathy in prison populations.

Finally, the question remains about which mechanisms enable higher psychopathic trait inmates compared to lower psychopathic trait ones to provide empathy ratings comparable to those of controls. Both groups showed comparable levels of intelligence, time of imprisonment, and incidence and treatment for mental disorders. Based on previous research, though, it seems that individuals with higher psychopathic traits may use socially relevant cues such as faces or body language to infer others’ intentions, emotions, and motivations. For instance, Book et al. (2007) observed individuals with higher psychopathic traits to make more accurate judgments of emotional intensity and vulnerability than nonpsychopaths. This advantage in reading nonverbal cues might be related to the recognition of victimization and might be important for social predation (Book et al., 2007). The authors proposed the concept of callous empathy to account for the lack of feelings for others, while exhibiting exact understanding of their mental states by using social cues. Based on the authors’ suggestion, one might infer that the ability to read others via social cues would explain psychopaths’ success in manipulating, using, and deceiving others.

As measures of psychopathy, we used the PCL-R in the prison group and the PPI-R in healthy controls. This may be considered a potential drawback regarding comparability of psychopathy levels between the different groups. In addition, we have not assessed further measures of impulsivity, disinhibition, or social deviance, which could have characterized the groups more reliably. Hence, besides administering the same psychopathy questionnaire in all participants to allow direct comparisons of control participants to those of the experimental groups, future studies should also assess traits such as impulsivity and disinhibition to highlight possible group differences and their impact on social interaction and related phenomena.

While the small sample size might be seen as a limitation of the current study, effect sizes of the group effects can be classified as medium (IRI) and large for the self-report and SCR data (Kirk, 1996). We also conducted post-hoc power analyses which suggested that the power of this exploratory study, despite the small group size, was appropriate for nearly all tested effects (1-β > .80). Moreover, rather small sample sizes are common in studies investigating aspects of psychopathy and empathy (Blair et al., 1997; Domes et al., 2013; Richell et al., 2003) because the pool of accessible participants
is limited and has to be selected carefully. Thus, we suggest regarding the current findings as preliminary and awaiting replication by future studies. We strongly emphasize that future studies should strive for larger sample sizes to further increase statistical power. In this respect, the post-hoc effect size calculations we provide should be seen as an estimate of power in order to plan future studies rather than as an estimate of the actual power of our analyses.

CONCLUSIONS

The present study indicates that violent offenders display generally reduced automatic physiological arousal when confronted with distress-inducing cues, independently from psychopathy scores. However, only higher psychopathic trait offenders were able to display themselves as individuals with empathic responses similar to those of noninstitutionalized controls. Lower psychopathic trait participants, in contrast, overexaggerated their empathic display. This distinction was only detectable by a combination of physiological and self-report measures and a comparison to healthy controls. Our results suggest that a precise characterization of empathy deficits in inmates low or high on psychopathic traits requires the inclusion of subjective and objective measures of emotional processes associated with empathy.

REFERENCES


PSYCHOPATHY AND AFFECTIVE EMPATHY


