Empathy and recognition of facial expressions of emotion in sex offenders, non-sex offenders and normal controls

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Abstract

Research conducted on empathy and emotional recognition in sex offenders is contradictory. The present study was aimed to clarify this issue by controlling for some affective and social variables (depression, anxiety, and social desirability) that are presumed to influence emotional and empathic measures, using a staged multicomponent model of empathy. Incarcerated sex offenders (child molesters), incarcerated non-sex offenders, and non-offender controls (matched for age, gender, and education level) performed a recognition task of facial expressions of basic emotions that varied in intensity, and completed various self-rating scales designed to assess distinct components of empathy (perspective taking, affective empathy, empathy concern, and personal distress), as well as depression, anxiety, and social desirability. Sex offenders were less accurate than the other participants in recognizing facial expressions of anger, disgust, surprise and fear, with problems in confusing fear with surprise, and disgust with anger. Affective empathy was the only component that discriminated sex offenders from non-sex offenders and was correlated with accuracy recognition of emotional expressions. Although our findings must be replicated with a larger number of participants, they support the view that sex offenders might have impairments in the decoding of some emotional cues conveyed by the conspecifics’ face, which could have an impact on affective empathy.

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1. Introduction

The construct of empathy has received much attention in different domains of research (e.g., psychology, ethology, cognitive neuroscience, and psychiatry) (see Eisenberg and Strayer, 1987; Ickes, 1997; Preston and de Waal, 2002; Decety and Jackson, 2004; Blair, 2005). Although there is little consensus among theorists regarding its definition and its constitutive components, most agree that empathy is a multidimensional phenomenon that involves an understanding of a person’s subjective experience, a perspective taking, and a vicarious sharing of emotional states in response to another’s affective cues, often resulting in feelings of concern or compassion for this person (i.e., sympathy), although it also can lead to self-oriented feelings (i.e., personal distress) (Davis, 1983; Hoffman, 1984; Decety and Jackson, 2004). Although it is unclear whether all the components are required for the unfolding of the empathetic process, it is usually acknowledged that...
they play important functions in social bonds (Anderson and Keltner, 2002), prosocial behaviors (Eisenberg and Miller, 1987), altruism (Batson, 1991) and moral judgment (Hoffman, 1987). In contrast, empathy impairments have been related to aggressive, delinquent and antisocial behaviors (Miller and Eisenberg, 1988; Jolliffe and Farrington, 2004; Lovett and Sheffield, 2007), and deficits in specific components of empathy have been proposed as a feature of autism or psychopathy (Blair, 2005).

The inverse relationship typically found between empathy and aggression led a number of researchers and clinicians to suggest that sex offenders (e.g., child molesters, rapists) are likely deficient in their capacity to empathize with their conspecifics (e.g., Marshall and Barbaree, 1990). More specifically, it was assumed that because of a lack of compassion for the victim’s distress, a child molester or a rapist does not inhibit an attack when he becomes sexually aroused toward a potential victim. However, empirical research on empathy in sexually aggressive persons conducted during the last three decades provided inconsistent findings (for reviews, see Marshall et al., 1995; Geer et al., 2000; Covell and Scalora, 2002). Some studies reported lower levels of generalized empathy or for some of its components (e.g., empathic concern, perspective taking) in sexual offenders compared with non-sexual offenders (Rice et al., 1994; Lisak and Ivan, 1995; Lindsey et al., 2001; Marshall and Moulden, 2001) or their non-offending counterparts (Hudson et al., 1993: study 2; Chaplin et al., 1995; Burke, 2001), whereas other studies have found no differences between sexual offenders and other groups of participants (Hoppe and Singer, 1976; Langevin et al., 1988; Hudson et al., 1993: study 1; Hanson and Scott, 1995), or showed empathy deficits in sex offenders only in specific situations or toward their own victims (Pithers, 1999; Fernandez and Marshall, 2003).

Marshall et al. (1995) proposed an appealing staged multicomponent model of empathy that was designed to examine potential deficiencies in sexual offenders at each stage of the process. According to this model, the ongoing process of empathy involves four discriminable steps: (1) emotional recognition, (2) perspective taking, (3) emotion replication, and (4) response decision. Stage 1, the emotion-recognition stage, is needed to decode or read emotional signals of others and is considered necessary for the unfolding of subsequent stages. Such signals, more specifically those conveyed by the face, constitute a primary way for communicating basic emotional states or current intentions and play a powerful role in the regulation of social interactions (e.g., Fridlund, 1994; Ekman and Rosenberg, 2005). Stage 2, perspective taking, which is the ability to understand another person’s viewpoint, is thought to be an essential component in the mechanisms that account for the theory of mind. Stage 3, emotion replication, involves some level of sharing or similarity in the feelings experienced by self and other. Finally, the last stage, response decision, refers to the observer’s decision to exhibit or not, on the basis of his/her feelings, a socially oriented behavior (e.g., helping or comforting behaviors).

The present study aims to focus on the first step of empathy process (recognition of emotional cues) in different groups of participants (sex offenders, non-sex offenders, and normal controls) and investigates the relationship between the ability to recognize emotional facial expressions and self-reported empathy. The few available findings suggest that sex offenders might be less accurate than controls or non-sex offenders in recognizing the emotional states of others (Hudson et al., 1993; Lisak and Ivan, 1995), although some negative findings have also been reported in the form of dissertation abstracts (Franklin, 2000; Cuevas, 2004). To date, the most detailed findings reported by Hudson et al. (1993) provided evidence that sexually aggressive men (child molesters and rapists) were less accurate than were violent non-sex offenders at recognizing emotional expressions, with confusions between fear and surprise on the one hand, and disgust and anger on the other hand. Such confusions between fear and surprise, in return, have been hypothesized to lead sex offenders to have difficulties in reading the distress in the “eyes” of another. However, because sex offenders often display affective disturbances (i.e., anxiety and depression) (Becker et al., 1991; Ahlmeyer et al., 2003; Dunsieth et al., 2004), which were not controlled for in previous studies, it is unclear whether these negative effects have contributed to the variance of data and, thus, may explain inconsistency among findings. More specifically, because substantial evidence indicated that depression or anxiety in non-offenders may bias the recognition of emotional facial expressions (Gur et al., 1992; Surguladze et al., 2004; Montagne et al., 2006), it is important for studies examining emotion recognition in sex offenders to partial out the effects of depression and anxiety. In the present study, such variables were entered as covariates in a design examining the ability of sex offenders (child molesters) to decode facial expressions of basic emotions compared with non-sex offenders and normal controls. Furthermore, because self-report measures may be affected by self-presentation, and because socially desirable responding has been reported in studies of sex offenders (Curwen, 2003), various scales presumed to assess distinct constitutive components of empathy (perspective taking, affective empathy, empathy concern, personal distress) entered self-reported social desirability.
as a covariate. By partialling out potential confounding effects such as depression, anxiety, and social desirability, we expected that our study should provide a more stringent assessment of the empathy process in both sex and non-sex offenders. The ability to decode distinct intensity levels of emotional expressions was also investigated in order to assess whether sex offenders were less accurate in recognizing emotions when affective cues expressed by others were reduced. Finally, by examining relationships between recognition accuracy of emotions and distinct components of empathy in offenders and non-offenders, our study was also designed to explore the relevance of the multidimensional staged process of empathy suggested by Marshall et al. (1995).

2. Methods

2.1. Participants

Thirty males divided into three groups matched for age and high school education level (E.L.) \((P>0.05)\) were recruited from a prison located south of Paris: a) a group of 10 inmates (age=43±4.49 years; E.L.=4.5±1.96 years) incarcerated for child sexual abuse (SO: sex offenders); b) a group of 10 inmates (age=38.1±3.81 years; E.L.=4.9±1.37 years) incarcerated for theft or fraud (NSO: non-sex offenders); and c) a group of 10 prison staff members (age=40.3±4.21 years; E.L.=5.8±1.55 years) directly involved in the supervision of inmates (non-offender controls). The criminal justice records were used to select the groups of offenders. All the offenders had already had an experience of incarceration before being transferred to the prison after their conviction. None of them were followed by the psychiatric service of the prison or were being treated during the study. Written informed consent was obtained from all participants.

2.2. Stimuli and material

2.2.1. Emotion recognition test

Black-and-white slides of models (6 males and 6 females), each one displaying a distinct facial expression of a basic emotion (happiness, sadness, anger, surprise, fear, and disgust), and an emotionally neutral face were chosen as prototype images from Ekman and Friesen’s (1976) Pictures of Facial Affect. The slides were scanned to 700×466 pixels to allow computerised presentation on a 17” screen of a laptop. For each prototypical emotion, facial expressions differing in intensity by 10% steps were then constructed using the MorphMan 4.0 software on the neutral face (0% of emotional intensity) and the full-blown expression (100% of emotional intensity). From this series, we selected three intensity levels for each emotional expression (40% = mild, 70% = moderate, and 100% = strong) giving a total of 36 emotional stimuli and 12 neutral faces.

2.2.2. Empathy questionnaires

2.2.2.1. The empathy scale of the Impulsivity—Venturesomeness—Empathy-7 questionnaire (ES-IVE-7, Eysenck et al., 1985). The IVE-7 is a 54-item questionnaire in a yes/no format that includes three scales: Impulsiveness (19 items), Venturesomeness (16 items), and Empathy (19 items). We used only the empathy scale, which is presumed to assess the affective component of empathy. This scale was derived from the Questionnaire Measure of Emotional Empathy (QMEE) of Mehrabian and Epstein (1972), who defined emotional empathy as “vicariously emotional response to the perceived emotional experiences of others”. Eysenck et al. (1985) reported an acceptable internal reliability \((\alpha=0.69)\) and published age norms for males \((n=559)\) and females \((n=761)\). Comparable findings of reliability and mean scores of empathy have been reported in a sample of French males and females (Caci et al., 2003).

2.2.2.2. The Interpersonal Reactivity Index (IRI, Davis, 1983). The IRI consists of four 7-item subscales – Perspective Taking (PT), Fantasy (FS), Empathic Concern (EC), and Personal Distress (PD). The first two subscales (PT and FS) measure the cognitive facet of empathy, whereas the other subscales (EC and PD) are presumed to tap the affective facet of empathy. The PT subscale assesses the ability to adopt the viewpoint of another person. The FS subscale measures the tendency to identify oneself with fictional characters in books, movies, or plays. The EC subscale reflects feelings of sympathy or compassion for another person. The PD subscale assesses self-oriented feelings of distress or anxiety in emergency situations or in reaction to negative emotions of another. Each item of the IRI is scored on a 5-point Likert scale ranging from 0 (does not describe me well) to 4 (describes me very well). Satisfactory internal (from 0.71 to 0.77) and test–retest (from 0.62 to 0.71) reliabilities have been reported for the four subscales (Davis, 1983), and sufficient external validity of the

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1 Although EC was designed to assess affective empathy, this subscale is usually considered as a measure of sympathy and contains few items assessing affective sharing.
IRI was provided by comparing it with other measures of empathy (Davis and Franzoi, 1991).

2.2.2.3. The Empathy Quotient (EQ, Lawrence et al., 2004). The EQ is a self-report questionnaire containing 40 empathy items and 20 filler items included to distract the participant from a relentless focus on empathy. Unlike other scales, it was explicitly developed to measure global empathy in both healthy individuals and psychiatric populations with empathic dysfunction (e.g., autistic spectrum disorders). Responses are given on a 4-point scale ranging from ‘strongly agree’ to ‘strongly disagree’. Baron-Cohen and Wheelwright (2004) reported high test–retest reliability for the EQ over a period of 12 months, and satisfactory concurrent validity evidenced by moderate correlations with the EC and PT subscales of the IRI. Satisfactory psychometric qualities of the French version of the EQ have been reported in a healthy sample of 201 males and 209 females (Berthoz et al., 2008).

2.2.3. The Depression Inventory—short form
Depression was measured with the French version of the shortened 13-item Beck Depression Inventory (BDI) (Beck et al., 1974; Collet and Cottraux, 1986), a widely used self-rating scale with established reliability and validity (Beck et al., 1988).

2.2.4. The State-Trait Anxiety Inventory (STAI-Y; Spielberger, 1983)
The state form of the STAI (French version: Bruchon-Schweitzer and Paulhan, 1993) was used in this study. The state form (S-STAI) is a well-validated self-report scale containing 20 items from which participants must indicate their degree of approval on a 4-point Likert-type scale ranging from 1 “No” to 4 “Yes”.

2.2.5. The Social Desirability Scale (SDS)
The SDS (Crowne and Marlowe, 1960) contains 33 true–false items tapping the tendency to respond to items in a socially desirable manner. A high score on this scale indicates that persons tend to over-report socially desirable information about themselves.

2.3. Procedure
Participants were tested individually in a quiet room. At the beginning of the session, the experimenter told them that a series of photographs showing men and women displaying emotional expressions would be presented over a few seconds on the screen of a laptop. Using a forced choice response format, participants had to judge, after each stimulus presentation, the emotion portrayed on the photograph by choosing one of the seven labels displayed on the screen (anger, disgust, fear, happiness, neutral, sadness, and surprise). They were also asked to rate the intensity of each emotional expression from 0 (no intensity — neutral) to 9 (extremely strong). Participants were shown examples of facial expressions of emotions differing in intensity (40%, 70%, and 100%) to ensure that they perceived differences between intermediate expressions of a specific emotion. Furthermore, in order to familiarize the participants with the procedure, they were asked to complete two practice trials during which the experimenter helped them if they did not understand the task. The 48 photographs were presented in a random order across participants for 6 s at a distance of about 40 cm. Stimulus presentation and timing were controlled using the SuperLab software. After the emotion-recognition test, the participants completed self-report questionnaires to assess empathy, depression, anxiety and social desirability.

2.4. Statistical analyses
Because the offenders reported higher depression and anxiety scores than the participants of the control group (see Section 3), recognition-accuracy, scores (hit rate) and intensity ratings of emotional expressions were submitted to a $6 \times 3 \times 3 \times 3$ (Emotion × Group × Intensity) multivariate analysis of covariance (MANCOVA, Pillai’s Trace), using BDI and S-STAI scores as covariates. Emotion (anger, disgust, fear, happiness, sadness, surprise) and Intensity (40%, 70%, and 100%) were introduced as within-subject factors, and Group (sex offenders, non-sex offenders, controls) as the between-subjects factor. Signal detection statistics were used to assess discriminability/sensitivity and response bias. Sensitivity, defined as the overlap between the signal and the noise distributions, was calculated by $d'$ (Stanislaw and Todorov, 1999). The estimation of $d'$ was obtained by subtracting the $z$ score corresponding to the false alarm rate (FAR) from the $z$ score corresponding to the hit rate (HR). FAR is the proportion of choices of a facial expression not matched to the appropriate emotion. Larger positive values of $d'$ indicate greater sensitivity; values close to 0 indicate a low sensitivity to the presence of the target emotional expression. Values less than 0 indicate a lack of sensitivity that might result from response confusion. Response bias, which measures the general tendency to provide yes or no responses to the target stimulus, was assessed by $C=-1/2 \times (Z_{HR}+Z_{FAR})$. When $C$ is negative, the participant is liberal (i.e., tends to select an emotional expression more
often), whereas when C is positive, the participant is conservative (i.e., tends to underestimate the presence of the emotional target). Then, $d'$ and C were submitted to a MANCOVA using Emotion as a within-subject factor, Group as a between-subjects factor, and BDI and S-STAI scores as covariates.

Because self-reports of empathy were strongly correlated with depression, anxiety and social desirability (see Section 3), these variables were entered as covariates using analyses of covariance (ANCOVAs) on ES-IVE, EQ, and IRI subscales scores (PT, EC, FS, PD). To control the familywise error rate due to multiple post hoc comparisons, Bonferroni correction of alpha level was used (Bonferroni i).

The strength of association between significant effects and the dependent variables (i.e., effect size) was estimated by partial eta squared ($\eta_p^2$).

3. Results

3.1. Depression, anxiety and social desirability and their relations with other measures

An analysis of variance (ANOVA) revealed that the sex offenders (SO) reported higher depression scores ($M=25.3$, $S.D.=4.14$) than the other participants (NSO: $M=13$, $S.D.=2.21$; controls: $M=9$, $S.D.=1.28$), $F(2, 27)=188.67$, $P<0.001$, with the non-sex offenders having more depressive mood than the controls ($P<0.001$, Bonferroni test). The SO group also obtained higher S-anxiety scores ($M=67.9$, $S.D.=3.93$) than did the other groups (NSO: $M=61$, $S.D.=2.79$; controls: $M=28.4$, $S.D.=3.50$), and the NSO were more anxious than the controls $F(2, 27)=376.38$ and Bonferroni test, $P<0.0001$. When social desirability was entered as a covariate, the pattern of findings between the groups of participants did not change for depression and anxiety.

BDI scores correlated significantly ($P<0.002$) across groups with the following empathic measures: $rs(28)=-0.92$ for EQ, $-0.92$ for ES-IVE, $-0.93$ for PT, $-0.55$ for FS, $-0.93$ for EC, and $0.83$ for PD. Similarly, strong significant correlations were found between empathic measures and S-STAI scores ($P<0.0001$): $rs(28)=-0.93$ for EQ, $-0.82$ for ES-IVE, $-0.91$ for PT, $-0.70$ for FS, $-0.91$ for EC, and $0.71$ for PD. Social desirability also correlated significantly ($P<0.01$) with the following measures: $rs(28)=0.81$ for EQ, $0.66$ for ES-IVE, $0.79$ for PT, $0.49$ for FS, $0.78$ for EC, and $-0.67$ for PD. Furthermore, an ANOVA carried out on scores of social desirability revealed a main effect of Group, $F(2, 27)=27.84$, $P<0.0001$. Controls had higher scores of social desirability ($M=23.3$, $S.D.=3.62$) than the other groups of subjects ($P<0.001$, Bonferroni tests), while no sign-

ificant difference was detected between sex offenders ($M=11.7$, $S.D.=4$) and non-sex offenders ($M=15.2$, $S.D.=3.08$), $P>0.05$.

3.2. Accuracy rates of emotional recognition

Table 1 shows mean rates of accuracy as a function of emotion category, group and intensity level of facial expressions. The MANCOVA indicated a significant main effect of BDI covariate on the accuracy rates of emotional recognition, $F(1, 25)=4.04$, $P=0.05$, $\eta_p^2=0.14$. A main effect for Group was also found, $F(2, 25)=47.76$, $P<0.0001$, $\eta_p^2=0.79$, indicating that the sex

<table>
<thead>
<tr>
<th>Emotion intensity level (%)</th>
<th>Group</th>
<th>SO</th>
<th>NSO</th>
<th>Controls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
<td>Mean S.D.</td>
</tr>
<tr>
<td>Neutral</td>
<td>0.82 0.13</td>
<td>0.86 0.12</td>
<td>0.94 0.08</td>
<td>0.87 0.12</td>
<td></td>
</tr>
<tr>
<td>Anger (40%)</td>
<td>0.70 0.26</td>
<td>1 0</td>
<td>1 0</td>
<td>0.90 0.20</td>
<td></td>
</tr>
<tr>
<td>Anger (70%)</td>
<td>0.75 0.35</td>
<td>1 0</td>
<td>1 0</td>
<td>0.92 0.23</td>
<td></td>
</tr>
<tr>
<td>Anger (100%)</td>
<td>0.90 0.21</td>
<td>1 0</td>
<td>1 0</td>
<td>0.96 0.13</td>
<td></td>
</tr>
<tr>
<td>Disgust (40%)</td>
<td>0.05 0.16</td>
<td>0.55 0.16</td>
<td>0.65 0.24</td>
<td>0.43 0.32</td>
<td></td>
</tr>
<tr>
<td>Disgust (70%)</td>
<td>0 0</td>
<td>1 0</td>
<td>1 0</td>
<td>0.67 0.48</td>
<td></td>
</tr>
<tr>
<td>Disgust (100%)</td>
<td>0.05 0.16</td>
<td>1 0</td>
<td>1 0</td>
<td>0.68 0.46</td>
<td></td>
</tr>
<tr>
<td>Fear (40%)</td>
<td>0.10 0.21</td>
<td>0.75 0.26</td>
<td>0.95 0.16</td>
<td>0.60 0.42</td>
<td></td>
</tr>
<tr>
<td>Fear (70%)</td>
<td>0 0</td>
<td>1 0</td>
<td>1 0</td>
<td>0.67 0.48</td>
<td></td>
</tr>
<tr>
<td>Fear (100%)</td>
<td>0.10 0.32</td>
<td>1 0</td>
<td>0.95 0.16</td>
<td>0.68 0.46</td>
<td></td>
</tr>
<tr>
<td>Happiness (40%)</td>
<td>0.90 0.21</td>
<td>1 0</td>
<td>1 0</td>
<td>0.97 0.13</td>
<td></td>
</tr>
<tr>
<td>Happiness (70%)</td>
<td>1 0</td>
<td>1 0</td>
<td>1 0</td>
<td>1 0</td>
<td></td>
</tr>
<tr>
<td>Happiness (100%)</td>
<td>1 0</td>
<td>1 0</td>
<td>1 0</td>
<td>1 0</td>
<td></td>
</tr>
<tr>
<td>Sadness (40%)</td>
<td>0.65 0.42</td>
<td>0.80 0.26</td>
<td>0.90 0.32</td>
<td>0.78 0.34</td>
<td></td>
</tr>
<tr>
<td>Sadness (70%)</td>
<td>0.60 0.46</td>
<td>1 0</td>
<td>1 0</td>
<td>0.87 0.32</td>
<td></td>
</tr>
<tr>
<td>Sadness (100%)</td>
<td>0.95 0.16</td>
<td>1 0</td>
<td>1 0</td>
<td>0.98 0.09</td>
<td></td>
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<tr>
<td>Surprise (40%)</td>
<td>0.40 0.32</td>
<td>0.80 0.26</td>
<td>1 0</td>
<td>0.73 0.34</td>
<td></td>
</tr>
<tr>
<td>Surprise (70%)</td>
<td>0.55 0.44</td>
<td>0.95 0.16</td>
<td>0.95 0.16</td>
<td>0.82 0.33</td>
<td></td>
</tr>
<tr>
<td>Surprise (100%)</td>
<td>0.50 0.41</td>
<td>0.95 0.16</td>
<td>0.95 0.16</td>
<td>0.80 0.34</td>
<td></td>
</tr>
</tbody>
</table>
offenders (M=0.51, S.D.=0.096) were less accurate than the non-sex offenders (M=0.93, S.D.=0.03) and the controls (M=0.96, S.D.=0.03) for recognizing emotional expressions (Bonferroni test, P<0.0001). Significant Emotion × Group, F(10,44)=4.16, P<0.0001, η²p=0.49, and Emotion × Intensity × Group interactions were detected, F(20, 34)=2.56, P=0.008, η²p=0.60. One-way ANCOVAs conducted on each emotional expression showed that these effects mainly reflect the fact that the sex offenders recognized less accurately disgust, F(2, 25)=65.83, P<0.0001, η²p=0.84, fear, F(2, 25)=29.13, P<0.0001, η²p=0.70, and anger expressions, F(2, 25)=10.22, P=0.001, η²p=0.45, than did the other groups of participants. They also decoded less accurately surprise, F(2, 25)=3.75, P=0.04, η²p=0.23, than the non-sex offenders (Bonferroni test, P<0.05). Furthermore, the sex offenders were less accurate in decoding mild levels of disgust F(2, 25)=5.75, P=0.009, η²p=0.315, and fear expressions, F(2, 25)=4.12, P=0.03, η²p=0.25, than were the non-sex offenders (Bonferroni tests, all P<0.05). It should be noted that the effect sizes are large, more particularly when the significant effects concerned the three groups of participants (i.e., see effect sizes for fear and disgust), suggesting that the effects can be accepted with confidence.

Significant effects for Group, F(2, 25)=27.49, P<0.001, η²p=0.69, and Emotion × Group interaction were found for the emotional sensitivity index (d′), F(10, 44)=3.01, P=0.006, η²p=0.41, with sex offenders being less sensitive (M=0.041, S.D.=0.78) than the other groups (controls: M=4.18, S.D.=0.49; NSO: M=3.59, S.D.=0.47). One-way ANCOVAs, using Group as the between-subjects factor, were also conducted on d′ to specific target faces (e.g., surprise responses to fear faces). The analyses revealed that sex offenders falsely identified disgust expressions as anger expressions, F(2, 25)=22.63, P<0.001, η²p=0.64 (controls: M=3.55, S.D.=0.87; NSO: M=3.00, S.D.=0.87; SO: M=−2.98, S.D.=1.32). Furthermore, sex offenders provided more false surprise responses when viewing fear faces, F(2, 25)=15.39, P<0.001, η²p=0.55 (controls: M=4.33, S.D.=1.03; NSO: M=3.42, S.D.=1.36; SO: M=−3.87, S.D.=1.74). No differences were detected between non-sex offenders and normal controls (P>0.05, Bonferroni test). The bias index (C) submitted to the MANCOVA indicated an effect for depression, F(1, 25)=6.22, P=0.02, η²p=0.20, and for Emotion × Group interaction, F(10,44)=2.06, P=0.049, η²p=0.32. The ANCOVAs conducted on C yielded a significant main effect of Group only for the sadness expression, F(2,25)=4.08, P=0.03, η²p=0.25. Post hoc comparisons revealed only that sex offenders tended to select less frequently the sad label than the non-sex offenders, P=0.09 (controls: M=−0.14, S.D.=0.29; NSO: M=−0.21, S.D.=0.60; SO: M=0.10, S.D.=0.67).

3.3. Intensity ratings of facial expressions

The MANCOVA failed to show significant effects for the distinct variables. Only the Emotion × Intensity × BDI interaction reached significance, F(10, 16)=2.55, P<0.05, η²p=0.61, suggesting the importance of depression for explaining differences in intensity ratings of emotional expressions as a function of their intensity level. Significant effects were found for the distinct variables (Intensity, Group, Emotion × Intensity, and Intensity × Group) only when the covariates were excluded from the analysis.

3.4. Empathy ratings

Self-rated empathy scores from the three questionnaires are reported in Table 2. The ANCOVA and the Bonferroni test indicated that the controls had significantly higher EQ scores than the offenders, F(2,24)=7.18, P<0.003, η²p=0.37. Differences between SO and NSO approached significance, P=0.053 (Bonferroni test). For the ES-IVE score, a group effect was also found, F(2,24)=8.41, P=0.002, η²p=0.41; the SO group reported lower affective empathy scores than the other groups, P<0.05, whereas no difference was found between the NSO and the controls. An ANCOVA was also applied on each IRI subscale. For PT, a significant difference was found among the three groups, F(2, 24)=4.04, P=0.03, η²p=0.25. The controls had a higher score on the PT subscale than the other groups (P<0.05, Bonferroni test), but no significant

| Table 2 | Mean scores on Empathy Quotient (EQ) scale, and on subscales of Empathy–IVE and Interpersonal Reactivity Index (IRI) in sex offenders (SO), non-sex offenders (NSO) and controls |
|---------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| SO      | NSO                                             | Controls                                         |
| Mean    | S.D.                                            | Mean    | S.D.                                            | Mean    | S.D.                                            |
| Empathy Quotient (EQ) | 5.60 | 1.07 | 19.8 | 5.39 | 50.5 | 6.36 |
| Empathy subscale-IVE | 4.60 | 1.57 | 12.3 | 2.06 | 17.0 | 1.70 |
| Perspective Taking (PT-IRI) | 6.60 | 1.26 | 12.2 | 2.39 | 20.9 | 1.66 |
| Fantasy (FS-IRI) | 10.50 | 1.58 | 8.50 | 3.44 | 16.7 | 3.77 |
| Empathic Concern (EC-IRI) | 4.60 | 1.90 | 12.0 | 2.79 | 23.9 | 2.60 |
| Personal Distress (PD-IRI) | 18.10 | 1.20 | 12.7 | 1.49 | 10.3 | 2.58 |
difference was found between SO and NSO. For the FS subscale, the Group factor did not reach significance, $F(2, 24)=1.82, P=0.13$. Differences between groups were also found for EC, $F(2, 24)=3.73, P=0.04$, $\eta^2_p=0.24$. Post hoc analysis revealed that the controls had higher ratings of EC than the SO only, $P<0.05$. Finally, a significant difference between the groups was observed for PD, $F(2, 24)=3.55, P=0.04$, $\eta^2_p=0.23$. Bonferroni tests revealed that the SO had higher PD scores than the NSO, $P=0.05$. The inspection of size effects for the IRI subscales indicates that they are rather small ($<0.3$), suggesting that the relationships between empathy components and delinquency are not consistent. In contrast, only the ES-IVE scale revealed a moderate size effect ($>0.4$).

### 3.5. Relationships between accuracy rates of emotion recognition and empathy scores

Partial correlations ($pr$), using BDI and S-STAI scores as covariates, were performed between emotional recognition accuracy and empathy scores across participants. Positive correlations were found between ES-IVE scores and accuracy rates for the following emotions: disgust ($pr=-0.56, P=0.002$), fear ($pr=-0.45, P=0.02$), surprise ($pr=-0.33, P=0.08$), and sadness ($pr=-0.33, P=0.08$). In other terms, the ability to recognize some emotions was greater in participants who obtained high scores of affective empathy. No significant correlations, however, were detected between EQ, PT, FS or EC scores and accuracy rates of emotion recognition. Nevertheless, negative correlations were found between PD and recognition accuracy rates for the following emotions: disgust ($pr=-0.34, P=0.08$), fear ($pr=-0.36, P=0.057$), surprise ($pr=-0.43, P=0.02$), anger ($pr=-0.48, P=0.01$), and sadness ($pr=-0.36, P=0.06$).

Partial correlations between empathic and recognition accuracy rates were also examined for the distinct levels of facial expressions of emotions. Recognition accuracy rates were positively correlated with ES-IVE scores for moderate ($pr=0.57, P=0.001$) and strong ($pr=0.50, P=0.006$) levels of fear, and for mild ($pr=0.36, P=0.058$) and strong ($pr=0.36, P=0.058$) levels of surprise. Finally, a positive correlation was found between the ability to decode moderate expressions of sadness and ES-IVE scores ($pr=0.42, P=0.02$). In contrast, PD scores were negatively correlated with recognition accuracy rates for moderate ($pr=-0.46, P=0.01$) and strong ($pr=-0.39, P=0.03$) levels of disgust. PD scores were also negatively correlated with recognition accuracy rates for moderate expressions of anger ($P=-0.52, P=0.006$), fear ($pr=-0.46, P=0.01$), surprise ($pr=-0.46, P=0.01$) and sadness ($pr=-0.45, P=0.02$).

### 4. Discussion

This research addressed two main issues derived from the multidimensional staged model of empathy proposed by Marshall et al. (1995). The first objective was to investigate whether sex offenders, compared with other participants, were impaired in their ability to recognize emotional cues (first stage of the model) conveyed by a conspecific’s face. The present study demonstrated that sex offenders, and more particularly child molesters, were less accurate in decoding emotional facial signals than non-sex offenders or normal controls. More specifically, the sex offenders were less sensitive than the other participants in recognizing facial expressions of anger, disgust, surprise and fear. These findings reflected the fact that they often confused fear with surprise on the one hand, and disgust with anger on the other hand. When viewing fear expressions, sex offenders frequently interpreted them as surprise signals, whereas disgust expressions were frequently decoded as anger signals. Such findings cannot be explained by offenders’ self-reported negative affective states, such as depression and anxiety, which were partialed out in the present study. Taken together, the pattern of results on emotional confusion is consistent with that obtained by Hudson et al. (1993) on a sample of sex offenders including both child molesters and rapists. Impairments in the recognition of fearful cues from the face have also been reported in adolescents with antisocial or aggressive behaviors (Blair and Coles, 2000; Carr and Lutjemeier, 2005).

What kind of explanation could account for the high rates of confusion in sex offenders’ emotional recognition? Regarding fear and surprise, one possibility is to consider the degree of similarity in the perceptual properties of these expressions that have in common a number of muscular actions in the upper part of the face (i.e., brow raising, and upper lid raising). Similarly, for anger and disgust, although the morphology of facial configurations is somewhat different, they also share a muscular action in the upper part of the face (i.e., brow lowering). Thus, one cannot rule out the hypothesis that the sex offenders’ misinterpretation in the decoding of basic emotions was possibly biased by selective processing of some facial cues. Additional studies are needed to test this hypothesis by manipulating the nature of facial cues presented to sex offenders.

Another level of analysis for explaining sex offenders’ difficulties in interpreting emotional recognition of conspecifics might be related to their history or past
experiences. Although our findings cannot resolve this issue, a tentative interpretation may be proposed by examining studies that have highlighted the potential influence of early adverse social environments on the recognition of emotional signals. Because many sex offenders have been exposed to negative interpersonal experiences and trauma during childhood (i.e., physical or sexual abuses) (e.g., Burton, 2000; Jonson-Reid and Way, 2001), research on emotional recognition in abused children is likely relevant. For instance, abused children were found to be less accurate than non-abused children in recognizing anger expressions (Camras et al., 1988), tended to over-interpret expressive signals as threatening, and over-identified anger relative to fear and sadness (Pollak and Kistler, 2002). It might be that abused children, by becoming defensively hypervigilant to hostile cues, could display a hostile attributional bias toward others (Dodge et al., 1995), more particularly when the affective cues are ambiguous or are conveyed by distinct expressions. It is, thus, possible that sex offenders in our study also displayed a hostile attributional bias when viewing distinct facial expressions (e.g., anger vs. disgust) conveying a similar affective cue. Regarding fear and surprise, although we have no clear explanation accounting for their confusion in sex offenders, Blair and Coles (2000) have hypothesized that individuals who display antisocial behaviors are less responsive to fearful signals of others because they have not learned during socialisation to associate harmful actions with the victim’s aversive cues that are thought to act as punishing stimuli. In the case of sexual offenders, one cannot rule out the possibility that, because of their history of maltreatment or negative interpersonal experience, they have difficulties in attributing social meaning to fear/distress cues and in associating them with related contextual information. Whether this theoretical interpretation is relevant for our findings remains to be investigated. The issue of the role of past experience in fear recognition could be indirectly explored by measuring emotional recognition via the generation of associated knowledge (Adolphs, 2002). More specifically, because fear expressions may activate conceptual knowledge related to both causal antecedents (e.g., punishment, danger, or aggression) and subsequent behavior (e.g., running away, inhibiting an action), it would be interesting in future studies to examine whether such contextual social knowledge is impaired in sexual offenders.

A second main objective of the current study was to examine self-reports of constitutive components of empathy and their relationships with emotional recognition in sex offenders, non-sex offenders and controls. Unlike previous studies, by using multiple rating scales of empathy and partialling out both negative affective states (depression and anxiety) and social desirability, we expected to sort out conflicting results in the literature and assess the relevance of the multidimensional staged model of empathy proposed by Marshall et al. (1995). Our findings revealed that the non-offender controls reported higher levels of empathy than did the offenders for the three scales used in this study. However, inspection of size effects indicated that the findings were more consistent for the ES-IVE scale (i.e., an index of affective empathy), which was the only empathy component that discriminated sex offenders from non-sex offenders. Compared with IRI-affective subscales (empathy concern, and personal distress), the ES-IVE scale is more affective sharing-oriented. Although the ES-IVE scale is not designed to specifically assess affective sharing/similarity between the self and the other, it is usually considered that it targets affective empathy more than the IRI subscales of empathy concern and distress, which are designed to tap sympathy and self-oriented distress, respectively. Because the available data on empathy in sex offenders are inconsistent, we suggest that, if differences exist between these persons and other control groups, affective empathy, and possibly affective sharing, are likely more altered than cognitive empathy (i.e., perspective taking) and sympathy (i.e., empathy concern). For personal distress, our findings revealed that the sex offenders reported a higher level than did the non-sex offenders, which can be interpreted as a proclivity of sex offenders to display more negative self-oriented feeling. However, it should be noted that the IRI subscale of personal distress imperfectly assesses the distress dimension of empathy because most of the items tap anxious and distress reactions not related to negative emotional expressions of others. Thus, further research is necessary to delineate more clearly whether distress would be observed in sex offenders in response to emotional displays of their conspecifics.

The view that affective empathy is more impaired than cognitive empathy or sympathy in sex offenders is also supported by the correlational findings that indicated that only ES-IVE scores were positively related to recognition accuracy of emotional expressions such as disgust, fear, surprise, and sadness, whereas personal distress negatively correlated with these emotions. Thus, these findings give some support to the multidimensional staged model of empathy proposed by Marshall et al. (1995). Although the correlational nature of our data does not permit a causal relationship to be established between emotion recognition and empathy processes, the pattern of findings obtained in our study is consistent with the hypothesis that the recognition of affective cues from conspecifics might be crucial in inducing affective empathy, and that difficulties
in recognizing some emotional expressions in sex offenders might be involved in impairments in affective empathy. Obviously, our findings did not rule out the view that other constituent components, such as perspective taking, may induce affective empathy or sympathy, via other pathways, even if individuals have no direct access to perceptually visible emotional cues. For instance, imaging the reactions and feelings of persons that were exposed to painful stimuli may induce personal distress (‘imagine self’) or empathic concern (‘imagine other’), and these two forms of perspective taking (self vs. other) are related to distinct patterns of cerebral activation (Lamm et al., 2007).

The link between emotion recognition (perception) and affective empathy (feeling and action) is also supported by both psychophysiological and cognitive neuroscience research, which has suggested that the link stems from an automatic perception–action mechanism leading to emotional contagion (Decety and Lamm, 2006). For instance, when unconsciously viewing angry and happy facial expressions, participants reacted with facial muscular actions corresponding to these emotions (Dimberg et al., 2000). Accumulating evidence from neuroimaging studies also suggests that the same cerebral network is activated when humans perceive emotional expressions and when they feel these emotions or represent the actions associated with them (Wicker et al., 2003; de Gelder et al., 2004; see also Decety and Lamm, 2006 for a recent review). For example, observing people expressing disgust faces and experiencing disgust oneself activated the same brain areas (e.g., anterior insula, and anterior cingulate cortex) (Wicker et al., 2003). Thus observing and feeling emotions may lead to a shared neural network between self and other. It is likely that such neuroimaging studies, if they were conducted in sex offenders in the future, could help to clarify whether such shared representations between perception and feeling are altered in sex offenders participating in emotional recognition and emotional induction tasks.

Finally, several limitations of our study must be acknowledged. First, despite the fact that our results showed strong size effects, they should be replicated on a larger sample of sex offenders. Second, although offenders and controls had similar education levels, they were not matched for IQ. Thus, the possibility that variations of IQ among groups could be related to differences in expression recognition data cannot be ruled out. Third, although the sex offenders of this study were probably not psychopaths (given their increased levels of depression and anxiety), no data on psychopathy was reported in the present sample. In the future, it would be interesting to study a large sample of sex offenders to investigate whether the association between sex offending and psychopathy is related to differences in measures of empathy and emotional recognition. Finally, given the shortcomings of self-report measures of empathy, which imperfectly assess distinct facets of empathy (e.g., affective sharing), our findings should be replicated using not only emotional recognition tasks and self-reported empathy scales, but also experimental paradigms designed to measure both subjective and psychophysiological (i.e., autonomic and facial electromyographic activity) indices of affective sharing.

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**References**


