Biological Psychology 92 (2013) 541–548

Contents lists available at SciVerse ScienceDirect

Biological Psychology

journal homepage: www.elsevier.com/locate/biopsycho

Emotion regulation in psychopathy

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ARTICLE INFO

Article history:
Received 14 August 2011
Accepted 28 June 2012
Available online 16 October 2012

Keywords:
Emotion
Cognition
Emotion regulation
Psychopathy
Factor 1 psychopathy
Psychophysiology of emotion
DSPD

ABSTRACT

Emotion processing is known to be impaired in psychopathy, but less is known about the cognitive mechanisms that drive this. Our study examined experiencing and suppression of emotion processing in psychopathy. Participants, violent offenders with varying levels of psychopathy, viewed positive and negative images under conditions of passive viewing, experiencing and suppressing. Higher scoring psychopathics were more cardiovascularly responsive when processing negative information than positive, possibly reflecting an anomalously rewarding aspect of processing normally unpleasant material. When required to experience emotional response, by 'getting into the feeling' of the emotion conveyed by a negative image, higher factor 1 psychopathic individuals showed reduced responsiveness, suggesting that they were less able to do this. These data, together with the absence of corresponding differences in subjective self-report might be used to inform clinical strategies for normalising emotion processing in psychopathic offenders to improve treatment outcome, and reduce risk amongst this client group.

1. Introduction

In the first part of the 19th century Pinel described psychopathy as a *manie sans délire*, a disorder of affect and impulse that otherwise seemed to spare intellectual functioning (Pinel, 1801, 1806). Later Cleckley's (1941) psychopath was identifiable by his 'general poverty in major affective reactions'. More recently, Hare's (1991, 2003) 2 factor model of psychopathy distinguished callous, unemotional traits (factor 1) from antisocial acts and unstable/deviant lifestyle (factor 2). Factor 2 psychopathy is characterised by affective disturbances believed to originate in aversive psychosocial learning (Blair and Mitchell, 2009). Disturbances include poor behavioural controls and impulsivity. Factor 2 is also associated with anxiety (Blackburn, 2007). In contrast, factor 1 psychopathy is characterised by callous unemotional traits thought to be rooted in temperament (Blair and Mitchell, 2009) and highly heritable (Viding et al., 2005). These traits include shallow affect and a lack of empathy, guilt or remorse. Factor 1 is exemplified by conning, manipulative behaviour combined with superficial charm aimed at maximising personal gain or excitement. The Psychopathy Check List-Revised (PCL-R; Hare, 1991, 2003) is the measurement standard for psychopathy in research and clinical settings. The PCL-R yields a total score, as well as subscores reflecting factor 1 and factor 2. While factor scores are correlated, they are also dissociable (Verona et al., 2004). Cognitive affective deficits have been shown, as predicted, to be most strongly related to factor 1 psychopathy. It is therefore important to consider them separately when examining emotion processing ability in psychopathy (Blair et al., 2004; Verona et al., 2004). Estimates suggest that 20–30% of prison populations can be categorized as 'psychopathic' (Harpur and Hare, 1994), while an additional unknown number of individuals meet similar affective criteria, without coming to the attention of criminal justice systems (Hare et al., 1999).

Emotion processing in psychopathy is an important area of study because the associated deficits are functionally linked to violent offending and can be a target for treatment. Importantly, factor 1 characteristics are thought to be more treatment resistant than those of factor 2 (Poythress et al., 2007). One of the most consistent findings from a wide range of studies of incarcerated psychopathic individuals is that they fail to process, experience or appreciate the emotional significance of stimuli in the way that individuals with lower psychopathy do (Blair et al., 2005; Book et al., 2007; Burns et al., 2011a; Christianson et al., 1996; Day and Wong, 1996; Kiehl et al., 1999; Louth et al., 1998; Patrick et al., 1993, 1994; Williamson et al., 1991; Hastings et al., 2008; Munro et al., 2007). Emotion processing in psychopathy has been studied in a variety of different ways, including the recognition of emotional categories (see Kirsch and Becker, 2007; Willmott et al., 2009 for reviews), the subjective experience of emotion (Kirsch and Becker, 2007) and psychophysiological responses to emotional material (Arnett, 1997; Kirsch and Becker, 2007; Lorber, 2004). In the present

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0301-0511/$ – see front matter
http://dx.doi.org/10.1016/j.biopsycho.2012.06.011

investigation we concentrated on the latter two, measuring both the strength of subjective experience of, and cardiovascular responsivity to, emotional images.

The psychophysiological response to differences in emotional valence (and arousal) has been well documented in the healthy population. Negative or unpleasant stimuli prompt heart rate deceleration, increased electromyographic (EMG) activity (such as frowning), increased skin conductance (SC) and potentiation of affective startle (see Kirsch and Becker, 2007 for a review). Conversely positive emotional material is generally associated with the reverse pattern (with the exception of SC). In contrast reduced or deficient autonomic responsivity to emotional material is usually reported in psychopathic individuals (Arnett, 1997; Kirsch and Becker, 2007; Lorber, 2004). In particular there are widely documented deficits in fear conditioning suggesting that psychopathic individuals are unable to learn a fear response in the way that others do (Hare et al., 1978) and reduced or absent autonomic differentiation between fearful and neutral stimuli across a variety of measures (e.g. Patrick et al., 1994; Levenston et al., 2000). In a detailed review of autonomic responsivity in psychopathy, Arnett (1997) notes that studies involving SC show a fairly consistent pattern of reduced electrodermal activity when psychopathic individuals process punishment or fearful stimuli, although response to positive material has been less well studied. In contrast the findings for cardiovascular (heart rate) response are less clear, with some showing acceleration in response to aversive stimuli (e.g. Hare and Craigen, 1974; Hare et al., 1978), while others suggest few psychopathy related differences (e.g. Patrick et al., 1993; Lorber, 2004).

In contrast, self-report ratings of the emotional content of stimuli have frequently failed to show corresponding differences, with psychopathic individuals showing similar valence and arousal ratings as do comparator groups. For example, Patrick et al. (1993) and Carmen Pastor et al. (2003) found no significant group differences for subjective ratings of picture content. Both high and low psychopathic individuals reported that they found emotional pictures more arousing and more interesting than neutral ones. A similar dissociation between psychophysiological response and self-report ratings was reported by Verona et al. (2004) when examining evocative sounds taken from a standardized set (positive for example baby's laugh; negative, for example baby's cry; neutral, for example toothbrush). Factor 1 was associated with attenuated SC for both valences of emotional sound, and factor 2 was related to heart rate differences, but neither factor was related to affective ratings, which were in line with normative data for these stimuli. Together these findings point to dissociations between physiological response and self-report related to affective stimuli in psychopathy.

Although experimental investigation of emotion regulation is a topic of considerable current interest (see Koole, 2009) its investigation in psychopathy has rarely been reported. Two studies are of some relevance however. Steinberg and Schwartz (1976) examined the extent to which psychopathic individuals could modify SC by using instructions alone and then using biofeedback training. Controls but not psychopathic individuals could implement instructions (requiring affective imagery) alone, whereas after biofeedback training both groups could influence their SC responsivity. In contrast no heart rate differences were found until after biofeedback training, when psychopathic individuals were unable to maintain the heart rate effects of the instructional manipulation. The authors concluded that while psychopathic individuals were able to regulate some physiological responses, other autonomic differences were less susceptible to control. A second study of direct relevance is that of Lobbestael et al. (2009) who examined the effect of anger induction in antisocial personality disorder (ASPD) and psychopathy. They found no group differences in self-reported levels of anger following mood induction, although heart rate and blood pressure were reduced for those with ASPD. In addition, post hoc analyses showed that those 6 participants who scored highly on factor 1 psychopathy were less physiologically responsive (blood pressure *decreased*) to the anger induction.

More recent emotion regulation paradigms (cf. Ochsner et al., 2004; Gross, 2002; Dalgleish and Yiend, 2006; Yiend et al., 2008; Mathews et al., 2004) have not yet been used to investigate emotion processing in psychopathy. In particular enhancement and suppression of emotional experience when viewing affective images has not, to our knowledge, been examined in psychopathy. In an fMRI study Ochsner et al. (2004) instructed participants to view affective pictures (negative and neutral) under three conditions (look, experience and suppress) and to rate the level of their emotional experience (0 = weak to 7 = strong). Results indicated that self-report ratings were significantly higher for experience and significantly lower for suppress compared to base-line look when viewing negative images. In addition, experiencing increased activation of the left amygdala whilst suppression decreased amygdala activation bilaterally. Deficits in amygdala activation are implicated in emotion processing deficits in psychopathy (Blair et al., 2005). We used an adaptation of the Ochsner design to examine emotion regulation in psychopathy. We used an instructed encoding task to manipulate the cognitive processing of emotional pictures in a sample of violent offenders categorised according to their level of psychopathy. If clinicians are to improve therapy outcome amongst psychopathic offenders, then evidence based knowledge about how these individuals process and regulate their emotional responses is vital. Our translational study (compare Yiend et al., 2011) aimed to address this clinical need by investigating the basic mechanisms involved in regulating emotion processing.

2. Method

2.1. Participants

95 male prisoners at the Dangerous and Severe Personality Disorder (DSPD) Unit, 'D Wing' at HMP Whitemoor were approached over a fourteen-month recruitment period between June 2009 and July 2010. Heart rate was chosen as the sole physiological measure due to the pragmatic considerations of security restrictions around equipment and prisoner acceptability and consent rates. The political and clinical context of these specialist units is described in detail in Burns et al. (2011a), together with characteristics of the UK DSPD population and how these compare to similar previous samples in the literature. Of these 70 (74%) consented to take part in the study. Seven participants subsequently refused to take part due to paranoid concerns about the heart rate monitoring equipment. For the same reasons, one participant agreed to complete only the self-report ratings. One participant was transferred from the prison before testing commenced. Consequently complete datasets were available for 61 participants, with 62 sets of data available in the case of self-report ratings.

2.2. Materials

2.2.1. Individual difference measures

Level of psychopathy was measured using the PCL-R (Hare, 1991, 2003), administered by trained and experienced clinical and forensic psychologists who conduct inter-rater reliability checks as part of their routine duties. It consists of a semi-structured interview used in conjunction with a collateral file search to give a score on a scale of 0–40 (sum of 0–2 for each of 20 traits) with higher scores indicating greater levels of psychopathy. In clinical settings a score of 30 is used as a diagnostic cut off. The Eysenck Personality Questionnaire (EPQ, Eysenck, 1975) was also administered. This is a widely used 100 item self-report questionnaire examining extroversion/introversion and neuroticism/stability and including a lie scale.

2.2.2. Picture stimuli

12 positive and 12 negative stimuli were selected from the International Affective Picture System (IAPS; Lang et al., 1999) on the basis of their normative valence and arousal ratings. Negative pictures included guns, scenes of attack and fire, while positive images (which were matched for arousal, see below) included sporting and