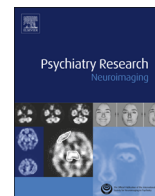




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## Feeling but not caring: Empathic alteration in narcissistic men with high psychopathic traits



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## ABSTRACT

Psychopathy is a personality disorder characterized by specific interpersonal–affective deficits and social deviance often marked by reduced empathy and decreased affective response to the suffering of others. However, recent findings in community samples suggest that the somatosensory resonance to other's pain measured with electroencephalography (EEG) is increased by psychopathic traits. This study aimed at comparing both the response to physical pain and the observation of pain being inflicted to another person in individuals with clinically significant psychopathic traits, namely patients with severe narcissistic personality disorder (NPD,  $n=11$ ), and community controls (CC,  $n=13$ ). The gating of somatosensory responses to a tactile steady-state stimulation (25 Hz) during the observation of pain-evoking and non-painful visual stimuli of hands was measured using EEG. Pain thresholds were assessed with a quantitative sensory testing (QST) battery. NPD compared with CC subjects showed similar thermal pain thresholds, but significantly higher pain pressure thresholds (PPT). Significantly greater somatosensory gating (SG) during the anticipation and the observation of pain in others was observed in NPD compared with CC subjects, but this difference was not associated with differences in self-pain perception. SG to pain observation was positively correlated with the Impulsivity–Egocentricity (IE) dimension of psychopathy. These findings demonstrated a stronger somatosensory resonance in the high psychopathic trait NPD group that suggests an increased somatic representation of observed pain despite lower dispositional empathy.

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### 1. Introduction

Psychopathy is a severe and complex personality disorder marked by affective and interpersonal alterations including a lack of guilt and empathy, a failure to form deep relationships, disregard for other people's well-being, antisocial behaviors, and weak impulse control (Hare, 1991; Lilienfeld, 1994). It has been proposed that psychopathy comprises interpersonal–affective traits (Factor 1) and antisocial deviance traits (Factor 2) (Hare, 1991, 2003; Cooke and Michie, 2001). Theoretically and empirically, interpersonal–affective deficits have received significant attention as they capture the core features of psychopathy (Cleckley, 1941; Karpman, 1941). Empathy disturbances constitute an important part of these interpersonal–affective deficits (Hare, 1991, 2003).

Empathy is largely recognized as a multilevel construct, involving the interaction of lower and higher order processes (e.g., Vachon-Pressseau et al., 2011) that predispose individuals to emotionally identify with other feelings and to share their affective experiences (Decety and Jackson, 2004; Kernberg, 2012). One proposed component of empathy is affective resonance, or the automatic activation in an observer of the affective and sensorimotor states perceived in another person. It reflects a capacity to share the feelings of individuals with whom we interact (Decety and Jackson, 2004; Lamm et al., 2011 for a review). Several studies have reported abnormal emotional reactions to arousing stimuli in psychopathic individuals (Kiehl et al., 2001; Müller et al., 2003), particularly during the observation of fearful facial expressions (Marsh et al., 2008), providing valuable insights about their emotional deficits and more specifically their empathy deficits.

More recently, observation of pain in others has been used as a paradigm to investigate the patterns of neural activity elicited by arousing stimuli in various populations (e.g., Singer et al., 2004; Avenanti et al., 2005; Bufalari et al., 2007; Lamm et al., 2007;

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Fecteau et al., 2008; Voisin et al., 2011; Marcoux et al., 2013). Despite the extended literature depicting the emotional deficits observed in psychopathic individuals, little is known about the neural bases of their reactions toward the pain of others. A first transcranial magnetic stimulation study (Fecteau et al., 2008) supported the empathy deficit hypothesis by showing that in a community sample the reduction of motor-evoked potentials induced by pain observation was stronger in individuals scoring higher on the Coldheartedness (C) scale of the Psychopathic Personality Inventory (PPI; Lilienfeld and Widows, 2005). A second study, also based on a community sample, has demonstrated stronger somatosensory resonance to others' pain in high-psychopathy individuals (Marcoux et al., 2013). These studies suggest a potential link between psychopathic traits and the resonance to other people's pain. While these findings are novel and interesting, somatosensory resonance to others' pain has not yet been studied in individuals showing pathological levels of psychopathic traits. From a clinical perspective, patients with severe narcissistic personality disorder constitute an interesting population as they present significant deficits on the interpersonal-affective component that is central to psychopathy (Blair, 2005; Ritter et al., 2011). Critically, previous studies have shown that patients with narcissistic personality disorder (NPD) show empathy deficits (e.g., Watson et al., 1984; Watson and Morris, 1991; Dimaggio et al., 2006; Ritter et al., 2011) and altered psychophysiological responses to emotionally evocative stimuli (Kelsey et al., 2001). However, no study has examined the relationship among psychopathic traits, empathy traits and empathy-related brain response to observed painful situations in a sample of individuals with high psychopathic traits such as severe narcissistic personality disorder (NPD) patients.

The current study thus aimed to extend the investigation of psychopathy in non-incarcerated samples by focusing on empathy deficits, which represent the core interpersonal-affective traits of psychopathy found in pathological narcissism. Because of the similarity between the cortical signatures of self-pain and of perception of pain in others, *in vivo* pain thresholds were also tested as the relationship between self-pain and pain in others might differ in psychopathic individuals. Severe NPD patients with high psychopathic traits and community controls (CC) were recruited to perform a pain-observation task designed to assess the somatosensory resonance component of empathy for the pain of others using a steady-state somatosensory response paradigm (Voisin et al., 2011). Based on recent findings (Marcoux et al., 2013), we predicted that severe NPD patients would show a greater reduction of somatosensory response to steady-state stimulation (somatosensory gating (SG)) during pain observation, compared with CC participants. This somatosensory gating would also be expected to be positively correlated with individual psychopathic traits. The link between the electroencephalography (EEG) measures of resonance and self-reported empathy was investigated to confirm empathy alteration in patients with a diagnosis of severe narcissistic personality disorder.

## 2. Methods

### 2.1. Sample

Twenty-seven adult Caucasian men (aged 21–50) took part in this study. The clinical group comprised 13 severe NPD patients recruited from an outpatient clinic of the Institut Universitaire en Santé Mentale de Québec specialized in the treatment of severe personality disorders. Diagnostic procedures for the clinical group included the following psychiatric and psychological assessments: a clinical interview adapted from the Structural Interview for Personality

Organization (Stern et al., 2010), the Psychopathy Checklist-Revised semi-structured interview (PCL-R) (Hare, 2003), and medical and criminal records. Detailed clinical data for the final sample ( $n=11$ ; two patients were excluded during data pre-processing for movement-related data noise across the records) are presented in Table 1. These NPD patients obtained scores ranging from 8 to 15 on Factor 1 of the PCL-R, indicating significant psychopathic traits. Fourteen age-matched men were recruited as a control group (CC) via public advertisements. Exclusion criteria for both groups included any neurological or pain-related condition. A history of psychiatric disorder was also considered an exclusion criterion for the CC group. Written informed consent was obtained from each participant. The Ethics Committees of the centers involved (Institut de Réadaptation en Déficience Physique de Québec and Institut Universitaire en Santé Mentale de Québec) approved the study, and participants received a 40\$ CAD compensation.

### 2.2. Questionnaires

The Psychopathic Personality Inventory (PPI-R) (Lilienfeld and Widows, 2005) is a 154-item self-report measure designed to assess the core personality traits of psychopathy. The total score and three main factors derived from the eight subscales were included in the analyses: Impulsivity-Egocentricity (IE), Fearlessness-Dominance (FD), and Coldheartedness (C). The PPI-R shows appropriate internal consistency among community/college samples (Cronbach's  $\alpha=0.78-0.92$ ; Ray et al., 2013) and satisfactory convergent validity with other self-report measures of psychopathy (Lilienfeld and Widows, 2005).

The Interpersonal Reactivity Index (IRI; Davis, 1980) is a 28-item measure developed as a self-report assessment of trait empathy. Each item is rated on a five-point Likert scale from 1 (*does not describe me well*) to 5 (*describes me very well*). In this study, the three subscales that Davis tied to either affective or cognitive aspects of empathy were used: Empathic Concern (EC), Personal Distress (PD) and Perspective Taking (PT). For the affective aspects, the EC subscale measures feelings of sympathy and compassion for others in distress, while the PD subscale measures self-oriented feelings of anxiety and distress in response to tense interpersonal situations. For the cognitive aspects, the PT subscale measures the tendency to adopt the psychological point of view of others.

### 2.3. Sensory and pain sensitivity testing

A short quantitative sensory testing (QST) battery was used to investigate the processing of somatic and nociceptive stimulation perceived by participants. Five subtests were used: cool and warm detection thresholds (respectively CDT and WDT), cold and heat pain thresholds (CPT and HPT), and pressure pain threshold (PPT). Cool and warm detection thresholds, as well as cold and heat pain detection thresholds, were obtained with a 9-cm<sup>2</sup> MEDOC Thermode contact probe (TSA Neuro-Sensory Analyzer; Medoc Ltd. Advanced Medical System, Israel) to induce a progressive warming or cooling sensation (32 °C, ramp at 1 °/s) on the inner forearm of participants. Detection thresholds measured the minimal temperature change that participants could detect, while pain thresholds measured the temperature needed to induce in participants a sensation of pain associated with either warm or cold stimulation. The pain pressure test measured with an algometer the force that needed to be applied on one's thumbnail to elicit a pain sensation.

**Table 1**  
Clinical assessment.

	Principal Dx	Comorbid Axis-II	PCL-R total	PCL-R F1	PCL-R F2
1	NPD	Paranoïd	18	11	6
2	NPD	–	16	9	4
3	NPD	ASPD	24	11	12
4	NPD	ASPD and BPD traits	24	8	16
5	NPD	ASPD traits	28	15	13
6	NPD	BPD traits	(22)	(10)	(12)
7	NPD	ASPD and BPD traits	31	11	18
8	NPD	ASPD and BPD traits	21	8	11
9	NPD	ASPD and BPD traits	(23)	(12)	(11)
10	NPD	ASPD	(24)	(10)	(14)
11	NPD	–	23	9	14

PCL-R: Psychopathy Checklist Revised, F1: Factor 1 and F2: Factor 2.

NPD: narcissistic personality disorder, ASPD: antisocial personality disorder, BPD: borderline personality disorder.

Numbers inside brackets are approximated scores using patient file information.

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