



# Distraction from cognitive processing by emotional pictures: Preliminary evidence for an association with interactions between psychopathy-related traits in a non-clinical sample



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## ABSTRACT

In individuals with psychopathy, the presence of emotional stimuli implicates a relatively weak distraction from performing cognitive tasks. This study assessed whether there is also a relationship between specific combinations of psychopathy-related traits present in the general population and sensitivity of cognitive processing to distraction by emotional stimuli. The participants ( $N = 80$ ) were screened for these traits using the Psychopathic Personality Inventory and performed a classification task in the presence of pictures with a low or high arousal value. Emotional distraction (ED) was operationalized in terms of the response time on trials with high- versus low-arousal pictures. The interaction between affective-interpersonal and impulsive-antisocial traits was significantly associated with ED. This interaction reflected the fact that the association between affective-interpersonal traits (specifically fearlessness) and magnitude of ED was negative for individuals with relatively weak impulsive-antisocial traits (specifically carefree nonplanfulness) but positive for those with relatively strong impulsive-antisocial traits. These results suggest significant differences in vulnerability to ED as a function of the strength of specific combinations of psychopathy-related traits in non-clinical samples.

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## 1. Introduction

Psychopathy is a personality disorder typified by specific clusters or dimensions of symptoms. Although the assumed number of different higher-order dimensions and their content differ among different conceptualizations and measurement instruments of psychopathy (see Skeem, Polaschek, Patrick, & Lilienfeld, 2011), there is some consensus that psychopathic features at least involve one dimension capturing affective-interpersonal traits (D1) and a second dimension indexing impulsive-antisocial tendencies (D2) across most instruments. Typically, D1 involves an interpersonal style characterized by manipulateness and social dominance, and affective deficits, such as a lack of empathy and remorse. D2 entails impulsive behavior, a lack of realistic long-term goals, and antisocial behavior. The distinction between D1 and D2 is also of importance given evidence supporting the dual-process perspective on psychopathy (Fowles & Dindo, 2009). This perspective

assumes distinct etiological pathways for the two trait clusters. D1 and D2 traits are held to be linked to an aberrant development of, respectively, defensive motivational neural systems and executive-regulatory neural mechanisms. Importantly, there is evidence that these traits are present in both forensic populations and among the general community, albeit with different extents of severity (Neumann, Schmitt, Carter, Embley, & Hare, 2012). Moreover, the tendencies seem to covary dimensionally with (neuro)cognitive impairments (Seara-Cardoso & Viding, 2014).

Psychopathy is associated with deficits in processing emotional stimuli in experimental paradigms. For example, relative to non-psychopathic participants, psychopathic individuals (i.e., convicted individuals diagnosed with clinical psychopathy according to the Psychopathy Checklist-Revised [PCL-R], Hare, 1991), show impaired aversive classical conditioning (Rothenmund et al., 2012), fail to display an enhanced startle response after a negative prime stimulus (Vaidyanathan, Hall, Patrick, & Bernat, 2011), seem deviant in the neural response to emotional facial expressions (Contreras-Rodríguez et al., 2014), and fail to show faster lexical decision times and enhanced event-related brain responses for emotional compared to neutral words (Williams, Harpur, & Hare,

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1991). In some of these paradigms, the observed deficits are specifically linked to D1 rather than D2 (Patrick, 1994; Vaidyanathan et al., 2011). The same holds for self-reported psychopathic trait dimensions measured in non-clinical samples (e.g., López, Poy, Patrick, & Moltó, 2013).

In the above-mentioned paradigms, the emotional stimulus is either task relevant or the imperative stimulus. Here, psychopathy-related emotional deficiencies are associated with a blunting of behavioral and neural responses that are commonly observed in both non-psychopathic offenders and non-clinical samples in these paradigms. However, impaired emotional processing may benefit performance in tasks in which emotional stimuli potentially function as distracters for performing some cognitive operation unrelated to the processing of the emotional stimuli. One example is an emotional distraction (ED) task with task-irrelevant affective pictorial stimuli. Mitchell, Richell, Leonard, and Blair (2006) used affectively positive, neutral, and negative pictures that were presented shortly before and after a target stimulus while the participant had to map each target stimulus to one of two simple motor responses. Relative to trials with neutral pictures, offenders without psychopathy displayed enhanced response latencies on trials with positive and negative pictures, whereas participants with psychopathy did not. This suggests that the individuals with psychopathy were distracted less by the emotional stimuli while performing the target task than were controls.

In their analyses, Mitchell et al. (2006) did not differentiate between different dimensions of psychopathy. This leaves the question whether the reduced emotional distraction was also specifically associated with D1 unanswered. One may hypothesize that, in at least some variants of the ED task, D2 traits may also affect performance. For example, this may be the case if the emotional distraction is embedded within a task in which performance is highly dependent on executive/behavioral control, as in go/no-go, or Stroop-type tasks (e.g., Sadeh et al., 2013). Moreover, ED tasks involving the spatially and/or temporally separated presentation of target and non-target stimuli (as in the Mitchell et al. study), are likely to involve the conscious choice to focus attention on targets but not on non-target stimuli. Presumably this is less the case for standard lexical decision tasks or tests of startle response modulation, which may be assumed to primarily engage automatic processes. Deficiencies in control mechanisms related to D2 traits could be expressed in ED tasks as a relative increased distractibility by emotional stimuli.

The foregoing considerations suggest that the two trait clusters have opposing effects on ED, with D1 traits having an attenuating, and D2 traits an enhancing effect, which, depending on the (task-) context, may be either adaptive or maladaptive. One could further argue that in clinical psychopathy, characterized by profound deficits related to both D1 and D2, D1-related deficits may 'overrule' the effect of D2-related deficits. Concordantly, there is evidence for D1 traits having a 'protective' effect with respect to D2-related behavioral traits in the framework of reactive aggression (Reidy, Shelley-Tremblay, & Lilienfeld, 2011; see also Vervoort et al., 2010, for discussion of a similar notion). Specifically, if emotional pictures are processed in the same way as neutral pictures, no difference in cognitive processing speed concerning the target task should be observed in the presence of the two types of distracting stimuli, regardless of variations in D2 traits. This would also explain the previously reported significant (negative) association between total scores on psychopathy measurements (e.g., the PCL) and ED (e.g., Mitchell et al., 2006). However, individuals without psychopathy, although showing variations in D1 traits, will never display such profound reductions in affective processing as in clinical psychopathy. In this case, sensitivity to ED might well depend on the severity of D2 traits. Thus, reduced ED associated with relatively strong D1 traits may only become significantly

expressed if not suppressed by strong disinhibitory tendencies that are reflected in D2 traits. Reversely, weak D1 traits combined with strong D2 traits may be associated with a particularly strong distractibility. These considerations highlight that ED may not be primarily driven by the individual dimensions, but rather by their interactions. However, it still remains to be shown how this prediction for ED maps on to the dimensions of psychopathy in both clinical and non-clinical populations.

The purpose of the present study was to examine the association between aspects of non-clinical psychopathy and ED during executive processing. To this end, we used an ED task involving a categorization task in combination with high- or low-arousal pictures as distracters. We focused on the arousal dimension of emotional stimuli rather than on their valence, given clear evidence that, in the framework of ED, the former dimension is more important than the latter (Vogt, De Houwer, Koster, Van Damme, & Crombez, 2008). Moreover, we recruited participants from the community to assess the generalizability of the results reported by Mitchell et al. (2006), who contrasted the performance of incarcerated participants with and without clinical psychopathy. In general, there is increasing evidence of the theoretical usefulness of examining variations in psychopathy-related traits in the general population for research on psychopathy (Hall & Benning, 2006). The participants were screened for psychopathy-related traits using a commonly used instrument. Given the proposal that the interaction between psychopathy-related traits may be of added explanatory value for the interplay between executive and affective processing, we specifically focused on interaction effects of these traits in explaining variation in ED. A further characterization of the association between the different aspects of psychopathy and sensitivity to interruption of cognition and behavior by emotional stimuli may inform theory and treatment measurements.

## 2. Method

### 2.1. Participants

The participants were 30 males and 52 females (mean age = 22.3 years, SD = 8.9; range = 17–61), primarily consisting of students (90%). The mean estimated verbal IQ, based on The Dutch Adult Reading Test (NLV; Schmand, Lindeboom, & Van Harskamp, 1992), of the participants was 108.1 (SD = 7.3; range = 93–127). The participants were recruited via the social network of the student-assistants that collected the data and via the electronic student experiment-participation registration system of Radboud University. Participants were told that the study was on the relationship between the response on a number of questionnaires and cognitive tasks. All participants gave their written informed consent and either received course credit or participated without receiving any compensation.

### 2.2. Material

A Dutch translation of the 187-item PPI (Jelicic, Merckelbach, Timmermans, & Candel, 2004) was used to assess psychopathy-related traits. Each item was answered on a four-point Likert scale. The PPI consists of 8 subscales measuring common personality traits and 3 validity scales (Lilienfeld & Andrews, 1996). The 8 primary subscales have been shown to load onto two factors labeled as Fearless Dominance (PPI-FD, overlapping with D1 traits) and Self-Centered Impulsive Antisociality (PPI-IA, overlapping with D2 traits). Based on prior research (Uzieblo, Verschuere, & Crombez, 2007), the score for PPI-FD was the sum of the z-transformed scores on the social potency (24 items), fearlessness (19 items), and stress immunity (11 items) subscales. The PPI-IA score included the

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