



# Deficient aversive-potentiated startle and the triarchic model of psychopathy: The role of boldness



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## ABSTRACT

This study examined the contribution of the phenotypic domains of boldness, meanness, and disinhibition of the triarchic conceptualization of psychopathy (Patrick, Fowles, & Krueger, 2009) to deficient aversive-potentiated startle in a mixed-gender sample of 180 undergraduates. Eyeblink responses to noise probes were recorded during a passive picture-viewing task (erotica, neutral, threat, and mutilation). Deficient threat vs. neutral potentiation was uniquely related to increased boldness scores, thus suggesting that the diminished defensive reaction to aversive stimulation is specifically linked to the charm, social potency and venturesomeness features of psychopathy (boldness), but not to features such as callousness, coldheartedness and cruelty traits (meanness), even though both phenotypes theoretically share the same underlying low-fear disposition. Our findings provide further evidence of the differential association between distinct psychopathy components and deficits in defensive reactivity and strongly support the validity of the triarchic model of psychopathy in disentangling the etiology of this personality disorder.

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## 1. Introduction

Psychopathy is a multifaceted personality disorder that is characterized by a cluster of interpersonal, affective, lifestyle and antisocial traits and behaviors, including deception, manipulation, irresponsibility, poor behavioral control, shallow affect, a lack of empathy, guilt or remorse, and a range of unethical and antisocial behaviors, that are not necessarily criminal (Hare, 2007). Although multiple psychological theories have attempted to explain the psychopathy construct, controversy about its definition and nature remains (cf. Skeem & Cooke, 2010).

For a long time, the dominant theoretical perspective on psychopathy has conceptualized this personality disorder as a unitary syndrome that arises from a core underlying pathology or deficit. One of the more influential and supported etiological theories included in this unitary-syndrome perspective is the low fear hypothesis, which proposes that psychopaths display a deficit in emotional reactivity that specifically relates to neurobiological systems that modulate fear—that is, psychopathic individuals may be marked by an under-reactivity of the brain's aversive/defensive motivational system (Lykken, 1995). The low fear hypothesis of

psychopathy has been supported by different psychophysiological correlates and diverse experimental procedures. One of the most reliable indicators of fear reactivity deficits in psychopathy is a blunted startle reflex potentiation (Patrick, 1994). Startle reflex is an automatic defensive reaction to a sudden, intense event (Lang, Bradley, & Cuthbert, 1990). Research in normal individuals has widely demonstrated that the magnitude of the startle blink response is modulated by the affective valence of the stimulus context in which it is evoked (Lang et al., 1990); the startle blink response is normally attenuated during exposure to appetitive contexts (startle inhibition), and it is increased under aversive conditions (startle potentiation). Consistent with the unitary view of psychopathy, multiple studies have demonstrated that incarcerated psychopaths do not show the typical startle potentiation during aversive stimulation processing (Levenston, Patrick, Bradley, & Lang, 2000; Pastor, Moltó, Vila, & Lang, 2003; Patrick, Bradley, & Lang, 1993).

Later, dual-process models of psychopathy emerged (Fowles & Dindo, 2006, 2009; Patrick & Bernat, 2009), challenging the unitary view of psychopathy. The dual- or two-process conceptualization posits that separate neural mechanisms differentially contribute to the affective-interpersonal and impulsive-antisocial components of psychopathy, namely, *trait fearlessness*, which reflects a deficit or under-reactivity of the brain's aversive/defensive motivational system, and *externalizing vulnerability*, which reflects

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impairments in the frontocortical systems that mediate anticipation, planning, and inhibitory control (for empirical evidence, see, for example, Carlson, Tháí, & McLarnon, 2009; Heritage & Benning, 2013; López, Poy, Patrick, & Moltó, 2013; Moltó, Poy, Segarra, Pastor, & Montañés, 2007; Patrick, Durbin, & Moser, 2012; Patrick & Lang, 1999; Venables, Hall, Yancey, & Patrick, 2015). Consistent with this perspective, studies examining the differential contribution of psychopathy components to reduced startle potentiation have demonstrated that this deficit is specifically related to the interpersonal and affective features of psychopathy, but not to its externalizing features. More importantly, this association has been confirmed in different samples, even when assessing affective-interpersonal traits via different psychopathy measures. In this regard, the deficient startle potentiation in psychopaths has been related to Hare Psychopathy Checklist-Revised (PCL-R; Hare, 2003) Factor 1, which encompasses the interpersonal and affective features of psychopathy, in incarcerated men (Patrick, 1994; Vaidyanathan, Hall, Patrick, & Bernat, 2011) and women (Verona, Bresin, & Patrick, 2013), as well as in mixed-gender community populations (Vanman, Mejia, Dawson, Schell, & Raine, 2003). Additionally, this deficit has been associated with the Fearless Dominance factor of the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005) in community men (Benning, Patrick, & Iacono, 2005; estimated from Multidimensional Personality Questionnaire; Tellegen & Waller, 2008) and women (Anderson, Stanford, Wan, & Young, 2011), as well as in mixed-gender community populations (Poy et al., 2012). Therefore, research results suggest that the startle potentiation deficit (as a valid indicator of deficient fear reactivity) is specifically linked to the core affective and interpersonal features of psychopathy, irrespective of the sample characteristics (criminal, non-criminal) and gender. Furthermore, this finding suggests that only the charm, fearlessness, emotional detachment and low anxiety traits of psychopathy reflect an underlying weakness in the brain's core aversive/defensive motivational system.

It is remarkable that defensive deficits in psychopathy have been associated with indicators of emotional and interpersonal traits from different psychopathy measures (PCL-R Factor 1 and PPI-R Fearless Dominance), even though they do not seem to assess the affective/interpersonal features of the disorder in the same manner. First, PCL-R Factor 1 is described by selfishness, callousness, and the remorseless use of others (Hare, 1991, 2003), whereas the PPI-R Fearless Dominance is defined by low trait anxiety, social dominance, and fearless risk taking (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003). Second, PCL-R Factor 1 and PPI-R Fearless Dominance show small- to medium-sized correlations (Baskin-Sommers, Zeier, & Newman, 2009; Benning, Patrick, Blonigen, Hicks, & Iacono, 2005; Berardino, Meloy, Sherman, & Jacobs, 2005; Malterer, Lilienfeld, Neumann, & Newman, 2010), and although related, PCL-R Factor 1 and PPI-R Fearless Dominance only share a small amount of variance (4%; Marcus, Fulton, & Edens, 2013). Last, PCL-R Factor 1 does not measure anxiety and fear directly in any of its items (Hare, 2003) and is weakly and inconsistently correlated with anxiety and anxiety-related scales (Hare, 1991, 2003; Sandvik, Hansen, Hystad, Johnsen, & Bartone, 2015; Schmitt & Newman, 1999; Vitale, Smith, Brinkley, & Newman, 2002; Weizmann-Henelius, Viemerö, & Eronen, 2004). On the other hand, PPI-R Fearless Dominance directly assesses the traits of fearlessness and stress immunity, which are closer to classic descriptions of primary psychopathy than PCL-R (cf. Marcus et al., 2013). In contrast to PCL-R Factor 1, PPI-R Fearless Dominance shows negative associations with anxiety indices and questionnaires (Benning et al., 2003; Benning et al., 2005; Edens & McDermott, 2010; Lilienfeld & Widows, 2005; Patrick, Edens, Poythress, Lilienfeld, & Benning, 2006; Ross et al., 2007;

Uzieblo, Verschuere, & Crombez, 2007; Uzieblo, Verschuere, Van den Bussche, & Crombez, 2010).

Hence, although both PCL-R Factor 1 and PPI-R Fearless Dominance evaluate the affective and interpersonal traits of psychopathy, it seems that these instruments assess different configurations of interpersonal-affective characteristics. This predicament brings into question whether both clusters of affective-interpersonal traits – PCL-R Factor 1 and PPI-R Fearless Dominance – are equally related to the low fear temperament of psychopathy or, by contrast, one of them might be particularly relevant over and above the other to understand defensive reactivity deficits in psychopathy. Likewise, it is also possible that the contribution of each particular affective-interpersonal cluster to psychopathy-related deficits varies depending on the characteristics of the sample. For example, some affective-interpersonal traits might be more relevant to explain psychopaths' fear deficit in successful individuals (psychopaths that refrain from serious antisocial behavior), but not in unsuccessful individuals (and vice versa). Thus, examining the contribution of simpler configurations of affective-interpersonal psychopathy traits – instead of clustering them in a single component – to psychopathy-related deficits may help to clarify the specific psychopathy features that are particularly related to trait fearlessness.

The recently proposed triarchic conceptualization of psychopathy (Patrick, Fowles, & Krueger, 2009) could be useful to disentangle whether the above mentioned defensive deficit is related to both clusters of psychopathic personality features or, by contrast, whether it is specifically linked to one of them. Thus, this model classifies the affective and interpersonal traits of psychopathy into two distinct phenotypes, namely, *boldness* and *meanness* (and adds a third phenotype, *disinhibition*, which is related to the externalizing tendencies of the disorder). These three constructs have distinctive phenotypic identities and can be conceptualized, measured, and understood separately (although they are interrelated at some levels empirically, as well as in terms of their mutual connections with the phenomenon of psychopathy; Patrick et al., 2009). The triarchic conceptualization of psychopathy describes *disinhibition* as a general trend towards impulse control problems, including a lack of planning and foresight, impaired regulation of affect and impulses, an insistence on behaviors that involve immediate gratification, and a deficient control of behavior. In turn, *boldness* encompasses a propensity to remain calm in situations involving pressure or threat, the ability to easily recover from stressful events, high self-confidence, social effectiveness, and tolerance for unfamiliarity or dangers. Overall, this construct reflects the Cleckley traditional descriptions of psychopathy of social efficacy, the apparent absence of anxiety or neurotic psychopathology, a diminished affective responsiveness and certain punishment immunity (Cleckley, 1976; Cleckley, 1941; Cleckley, 1976; Cleckley, 1976). Finally, *meanness* describes a set of attributes including low empathy, indifference and lack of attachment relationships, rebelliousness, sensation seeking, tendency to exploit others, and cruelty. In contrast to boldness, which emphasizes the description of non-criminal psychopathy, meanness is related to descriptions of criminal psychopaths (cf. McCord & McCord, 1964).

Etiologically, the triarchic model suggests that boldness and meanness are distinct phenotypic manifestations of the psychopaths' trait fearlessness; that is, both constructs share a fearlessness genotype as an etiological substrate (Patrick et al., 2009) that evolves into a boldness or meanness phenotype depending on certain developmental factors (such as a difficult temperament, or a failure of secure attachment). Then, the triarchic model provides a novel conceptualization of psychopathy that considers the affective-interpersonal component of psychopathy in terms of more elemental constructs or clusters. On the one hand, boldness encompasses the charm, persuasiveness, imper-

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