



# Personality mediators of psychopathy and substance dependence in male offenders

Anthony A.B. Hopley<sup>a</sup>, Caroline Brunelle<sup>b,\*</sup>

<sup>a</sup> Department of Psychology, University of New Brunswick, Fredericton Campus, 38 Dineen Drive, Room 123, Keirstead Hall, Fredericton, NB, Canada E3B 5A3

<sup>b</sup> Department of Psychology, University of New Brunswick, Saint John Campus, P.O. Box 5050, Saint John, NB, Canada E2L 4L5

## ARTICLE INFO

**Keywords:**  
Psychopathy  
Substance dependence  
Impulsivity  
Offenders  
Personality

## ABSTRACT

Psychopathy and substance dependence (SUD) is highly prevalent in incarcerated populations and tends to co-occur in the same individuals. The factors underlying this relationship are not clearly understood. The primary purpose of this study was to investigate whether two personality models mediate the relationship between psychopathy and substance misuse in male offenders. Ninety-two inmates in provincial correctional centers in New Brunswick completed questionnaires, including the Sensitivity to Reward Sensitivity to Punishment Questionnaire to measure behavioral activation and behavioral inhibition, the Substance Use Risk Profile Scale to measure anxiety sensitivity, introversion/hopelessness, sensation seeking and impulsivity, and the Psychopathic Personality Inventory–Revised to assess psychopathy levels. Results revealed that high impulsivity indirectly mediated the relationship between psychopathy and stimulant dependence. In addition, low anxiety sensitivity indirectly mediated the relationship between psychopathy and opioid dependence. Finally, impulsivity indirectly and inconsistently mediated the relationship between psychopathy and alcohol dependence. These results suggest that individuals with psychopathic traits are at increased risk of misusing certain drugs due to underlying personality-based differences.

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## 1. Introduction

Psychopathy and substance misuse tend to co-occur in the same individuals, with both disorders affecting a significant proportion of offenders (Hare & Neumann, 2009; Hemphill, Hart, & Hare, 1994; Rutherford, Alterman, & Cacciola, 2000). The rates of psychopathy in those with a substance use disorder vary from 5 to 40% (Crocker et al., 2005), while the prevalence of psychopathy in the general population approximates 1% (Neumann & Hare, 2008). Reversibly, psychopaths also demonstrate higher prevalence rates of alcohol and drug misuse. Specifically, psychopathy has been associated with alcohol, cannabis, inhalant, stimulant, and opioid misuse (Edens & McDermott, 2010; Rasmussen, Storsaeter, & Levander, 1999; Rutherford et al., 2000; Walsh, Allen, & Kosson, 2007).

However, psychopathy is a heterogeneous disorder of a dimensional nature (Guay, Ruscio, Knight, & Hare, 2007; Gudonis, Derefinko, & Giancola, 2009). Psychopathy is typically perceived as being composed of two dimensions, an interpersonal-affective component and an antisocial-deviance component (Hare, 2003; Lilienfeld & Andrews, 1996; Lilienfeld & Widows, 2005; Uzieblo, Verschuere, & Crombez, 2007) and both are differentially associated with addictive

disorders. In general, there is more support for an association between substance abuse and dependence with the antisocial component of psychopathy than with the interpersonal-affective component (Rutherford et al., 2000; Taylor & Lang, 2006). Indeed, the antisocial deviance factor score has been associated with substance misuse in both community and incarcerated samples (Blonigen et al., 2010; Crocker et al., 2005; Smith & Newman, 1990). Nevertheless, there is some support for a relationship between the core personality features of psychopathy and addiction. Indeed, the interpersonal-affective factor has been positively associated with cocaine dependence (Walsh et al., 2007) as well as with alcohol abuse and dependence (Edens & McDermott, 2010; Reardon, Lang, & Patrick, 2002) in male offenders. However, more evidence supports the idea that the antisocial component of psychopathy may account for the relationship between psychopathy and substance misuse (Rutherford et al., 2000; Taylor & Lang, 2006).

As substance misuse and psychopathy are risk factors for criminal recidivism and that currently both conditions respond poorly to commonly used therapeutic interventions, it is urgent to better understand which underlying variables may contribute to the co-occurrence of psychopathy and substance use disorders (Erickson & Butters, 2005; Gudonis et al., 2009; Hare & Neumann, 2009; Taylor & Lang, 2006).

Certain personality traits may be potential contributors to the relationship between psychopathy and substance misuse. A personality model worthy of exploration is Gray's (1987) reinforcement sensitivity theory. This model stipulates that human behavior is guided mainly by two motivational systems, the Behavioural Activation System

\* Corresponding author at: University of New Brunswick Saint John Campus, P.O. Box 5050, Saint John, New Brunswick, Canada, E2L 4L5. Tel.: +1 506 648 5797; fax: +1 506 648 5780.

E-mail addresses: a.hopley@unb.ca (A.A.B. Hopley), cbrunell@unbsj.ca (C. Brunelle).

(BAS) and the Behavioural Inhibition System (BIS). The BAS is hypothesized to regulate approach behaviors (e.g., in response to reward cues) while the BIS is responsible for withdrawal behaviors (e.g. in response to punishment or non-reward cues; Gray, 1987). Gray's (1987) reinforcement sensitivity theory has received support as a potential contributor to substance abuse, with both BIS and BAS levels being associated with substance misuse in offenders and non offenders (Brunelle, Douglas, Pihl, & Stewart, 2009; Franken, Muris, & Irina, 2006; O'Connor & Colder, 2005; O'Connor, Stewart, & Watt, 2009; Sher, Bartholow, & Wood, 2000; Simons & Arens, 2007; Taylor, Reeves, James, & Bobadilla, 2006).

The role of behavioral inhibition and activation in psychopathy has also been investigated. In an attempt to map the BIS and BAS constructs to psychopathy, Wallace, Malterer, and Newman (2009) measured BIS and BAS levels in a large sample of male inmates, and discovered that the interpersonal-affective factor of psychopathy was associated with a low BIS, whereas the antisocial deviance factor was linked to high BAS activity. This finding was replicated in several studies incorporating both BIS and BAS, where primary psychopaths (those high on the interpersonal-affective factor of psychopathy) demonstrated weak BIS and normal/high BAS reactivity, whereas secondary psychopaths (those high on the antisocial deviance factor) demonstrated stronger BAS reactivity (Newman, MacCoon, Vaughn, & Sadeh, 2005; Ross, Benning, Patrick, Thompson, & Thurston, 2009; Ross et al., 2007). Psychopathy has been theorized as a dysfunction in BIS activity leading to cognitive inflexibility and response modulation deficits, paired with, in part, an increase in BAS activity, resulting in dysfunctional impulsivity (Corr, 2010). The reviewed literature clearly suggests a contribution of behavioral inhibition and activation in both psychopathic and addictive features. However, to our knowledge, no previous study has investigated the role of BIS and BAS levels in the relationship between psychopathy and substance misuse.

Another recently developed motivational model of personality may also be useful in understanding the association between psychopathy and substance use. This model, put forth by Conrod, Pihl, et al. (2000), postulates that each of four separate personality types, anxiety sensitivity (AS), introversion-hopelessness (I/H), sensation seeking (SS), and impulsivity (IMP), is associated with a specific motive for use that results in preferential misuse of specific substances. AS concerns a fear of anxiety-related bodily sensations, therefore, individuals high in AS are sensitive to the anxiolytic effects of alcohol and benzodiazepines, and consequently engage in self-medication to minimize uncomfortable internal states (Conrod, Pihl, et al., 2000). I/H refers to the tendency to expect negative outcomes, and individuals with depression and alcoholism tend to exhibit higher levels of I/H and will consequently gravitate towards substances with analgesic properties, including opioids and alcohol, in an effort to mediate both interpersonal and punishment sensitivity (Conrod, Pihl, et al., 2000). SS captures the tendency to engage in novel and stimulating experiences (Conrod, Pihl, et al., 2000). Sensation Seekers are posited to be sensitive to the euphoric effects of substances, and demonstrate an increased likelihood to preferentially misuse alcohol due to its psychostimulant properties (Conrod, Pihl, et al., 2000). Finally, IMP refers to a tendency to respond to rewarding cues with little regard for long-term consequences. It is viewed as a self-regulation deficit, resulting in a lack of inhibition in the face of negative consequences if substances are immediately reinforcing, and is associated with stimulant and polysubstance misuse (Conrod, Pihl, et al., 2000). The Substance Use Risk Profile Scale (SURPS) was designed to measure these personality dimensions (Woicik, Stewart, Pihl, & Conrod, 2009). The initial model was partially replicated when SS, as assessed via the SURPS, was linked to sensitivity to the positively rewarding properties of alcohol in a community sample (Brunelle et al., 2004).

Conceptually, the models proposed by Gray (1987) and Conrod, Pihl, et al. (2000) overlap to some degree. Learning occurs through

the involvement of both excitatory and inhibitory systems (Corr, Pickering, & Gray, 1995) and as a result, substance use may occur through either positive reinforcement (e.g., enhancement) or negative reinforcement (i.e., coping) processes (Cooper, Agocha, & Sheldon, 2000). These reinforcement specific pathways are directly related to Gray's (1987) model where BIS is described as the aversive system, and BAS, as the appetitive system (Avila, 2001). However, the models differ in the level at which they seek to explain substance dependence (Conrod, Pihl, et al., 2000; Gray 1987). Specifically, I/H and AS are lower order dimension of the punishment system while IMP and SS could be considered lower order factors of the reward system (Woicik et al., 2009). Importantly, lower order factors have been found to be more strongly related to substance misuse than more general traits (Woicik et al., 2009). In fact, these lower order factors have recently been shown to have excellent validity in predicting substance use and misuse in adolescent samples (Castellanos-Ryan & Conrod, 2011; Krank et al., 2011; Mackie, Castellanos-Ryan, & Conrod, 2011).

Although relatively few studies have investigated how the four personality dimensions as measured by the SURPS relate to substance misuse in offenders, there is support for AS, I/H, SS and IMP (i.e., measured with a variety of instruments) to play a role in substance use (Acton, 2003; Chakroun, Johnson, & Swendsen, 2010; Derefinko & Lynam, 2007; Gunnarsson, Gustavsson, Tengstrom, Franck, & Fahlke, 2008; Horvath, Milich, Lynam, Leukefeld, & Clayton, 2004; Lukasiewicz et al., 2008; Ruiz, Pincus, & Schinka, 2008; Schmidt, Buckner, & Keough, 2007; Sher et al., 2000; Stewart, Karp, Pihl, & Peterson, 1997; Tcheremissine, Lane, Cherek, & Pietras, 2003; Tull, Schulzinger, Schmidt, Zvolensky, & Lejuez, 2007).

To our knowledge, no studies have directly investigated the role of the SURPS in psychopathy. However, Conrod, Pihl, et al. (2000) found that female substance abusers with high IMP scores were more likely to suffer from antisocial personality disorder. In addition, IMP was associated with both conduct disorder symptoms and substance misuse, while SS was associated solely with substance misuse in a community sample of adolescents (Castellanos-Ryan, & Conrod, 2011). Finally, Brunelle et al. (2009) found female offenders to have higher IMP and SS scores on the SURPS in comparison to controls. Additionally, IMP was the strongest predictor of the likelihood of incarceration, suggesting that IMP may be the SURPS dimension most likely to be associated with psychopathy and criminal behavior.

However, other studies have investigated the role of the personality dimensions of I/H, AS, SS, and IMP in psychopathy using other instruments than the SURPS. In a sample of mentally ill offenders, hopelessness was especially found to correlate positively and moderately with the antisocial deviance factor of psychopathy (Gray et al., 2003). This may be driven by the relationship between hopelessness and impulsivity, traits which are frequently comorbid in both depression and bipolar disorder (Swann, Steinberg, Lijffijt, & Moeller, 2008; Valtonen et al., 2009). AS has been negatively and moderately correlated to the interpersonal-affective factor of psychopathy, indicating that the more callous or lacking in empathy the participants were, the less they displayed fears of bodily sensations (Lilienfeld & Penna, 2001). However, it has been found that after controlling for state anxiety and the antisocial deviance factor, there was no significant relationship between AS and the interpersonal-affective factor of psychopathy in a sample of male psychopaths (Hale, Goldstein, Abramowitz, Calamari, & Kosson, 2004). Therefore, the relationship between anxiety and psychopathy remains equivocal. SS has also been found to be associated with the antisocial deviance factor of psychopathy (Crocker et al., 2005; Ray, Poythress, Weir, & Rickelm, 2009). However, indices of SS frequently incorporate items relating to IMP, which renders the conclusion that SS is uniquely related to antisocial deviance unclear (Caseras, Avila, & Torrubia, 2003; Magid, MacLean, & Colder, 2007). Finally, psychopaths have demonstrated higher levels of impulsivity

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