



Investigating the multivariate relationship between impulsivity and psychopathy using canonical correlation analysis[☆]



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ABSTRACT

Background: Impulsivity is generally considered a core feature of psychopathy, however one problem with understanding the association between these constructs is that both are multifaceted. Existing research often treats one or both of these constructs as unidimensional with important information regarding the complex nature of the relationship being lost. To clarify this issue the present study employs a canonical correlation analysis (CCA) which allows for the comparison of two multifaceted measurement scales simultaneously.

Methods: Respondents ($n = 970$) completed the Barratt Impulsiveness Scale (BIS-11) and the Psychopathic Personality Inventory (PPI). CCA was performed to explore the strength and nature of the association between impulse control and psychopathy.

Results: There was a large correlation ($r = 0.57$) between BIS-11 and PPI total scores. Further exploration using CCA showed that 70.2% of the variance was shared between the subscales, and three significant canonical functions emerged. These were found to be interpretable and suggest that impulsivity relates to the broader psychopathy domain in a complex fashion, and that non-planning impulsivity may be the primary trait which distinguishes between psychopathy subtypes.

Discussion: The findings support a complex multi-dimensional relationship between impulsivity and psychopathy. The simple impulsivity-psychopathy correlation has much less explanatory power than has a multivariate approach.

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1. Introduction

Impulsivity or 'impulse control' is central to the study of personality. Impulse control is considered a core trait within most of the dominant theories of personality, and there are also numerous theories of impulsivity specifically. One of the key areas of personality theory where impulse control is discussed is within forensic or offending populations. There are substantial differences in definitions of impulsivity but one generally accepted definition is "a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individuals or to others" (Moeller et al., 2001). This definition suggests the potentially pathological nature of the construct. This implies the likelihood of negative outcomes which may befall people with impulsive traits or those displaying impulsive behaviours.

Psychopathy has been a construct of interest since Cleckley's (1941) seminal work 'the Mask of Sanity' which he published in 1941 (Hare & McPherson, 1984). Since then, psychopathy has become one of the

most widely researched personality constructs, especially in forensic populations. The distinctive features of psychopaths are egocentricity, deceitfulness, shallow emotions, lack of empathy, stimulation seeking, impulsivity, and a tendency to ignore or violate social conventions and rules (Hare, 2003). Alternative definitions of psychopathy have been put forth in the literature, but notably the role of impulsivity is consistently identified as a key facet of the construct. Hare (2003) regards impulsivity as "one of the hallmarks of psychopathy". Hart and Dempster (1997) stated that impulsivity is a cardinal feature of psychopathy and Blaszczynski, Steel and McConaghy (1997, p.85) furthered this notion in their claim that "impulsivity and psychopathy are one and the same thing". Psychopathy has even been conceptualised as purely an externalising/disinhibitory disorder (e.g. Patrick, Hicks, Krueger, & Lang, 2005).

1.1. Relationship between impulse control and psychopathy

Despite the widely accepted association between impulsivity and psychopathy, a clear understanding of this relationship is hindered by the inconsistent definitions and the multifaceted nature of each construct. There is a debate in the literature over how many dimensions should constitute 'impulse control', however there is consensus that

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this is a multi-dimensional - not unidimensional - trait. The number of dimensions ranges from two (e.g. Dickman, 1990) to five (e.g. Lynam et al.). The most widely cited model of impulse control is Barratt's three factor model, measured by the self-report questionnaire the Barratt Impulsiveness Scale (BIS; Patton, Stanford, & Barratt, 1995). The three subscales comprising the BIS are: Attentional, Motor, and Non-Planning Impulsiveness. Evenden (1999, p.358), following an extensive literature review, concluded that "even though almost all authors are in agreement that impulsivity is multifactorial, there is little agreement to what these factors are even within a single field of research such as human personality traits". Thus, impulse control is now regarded as a multi-dimensional construct which must include measurement of its sub-dimensions for accurate assessment (Patton et al., 1995).

Similarly, most self-report measures of psychopathy use a two-factor structure (e.g. the Psychopathy Checklist-Revised comprises Factor 1: "selfish, callous and remorseless use of others", and Factor 2: "chronically unstable, antisocial and socially deviant lifestyle" (Hare & Vertommen, 1991)), however there is debate regarding the convergence of these factors. Another problem is that studies utilising the construct of psychopathy have generally worked with a unitary measure of the overall score, a now substantial body of literature suggests a multi-faceted conceptualisation is more appropriate (see Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003, for a review). Increasing evidence suggests that psychopathic personality, or psychopathy (Lewis, 1974), is not a monolithic construct but is instead a constellation of several partially independent traits (Skeem, Polaschek, Patrick, & Lilienfeld, 2011, as cited in Berg, Hecht, Latzman, & Lilienfeld, 2015). This erroneous reliance on a unitary definition of psychopathy may help to explain some conflicting research findings, for example in the inconsistent relationships reported between impulsivity and psychopathy (e.g. Karpman, 1948; Woodworth & Porter, 2002). One explanation would be that the multiple dimensions of psychopathy bear differing relationships with impulsivity and related constructs. There is a small body of research comparing the two constructs but this issue of multi-dimensionality has not typically been taken into account.

The psychopathic personality inventory (PPI, Lilienfeld & Andrews, 1996) and its revision (PPI-R, Lilienfeld & Widows, 2005) represent a measure of psychopathy which considers its multifaceted nature. Recent studies have demonstrated that seven of the eight PPI content scales operate as indicators of two higher order, and largely orthogonal, factors, labelled Fearless Dominance (FD; Benning, Patrick, Blonigen, Hicks, & Iacono, 2005) and Self-Centered Impulsivity (SCI; Lilienfeld & Widows, 2005). A second benefit of the PPI and PPI-R over similar scales is that they exclude items which explicitly measure anti-sociality, meaning that they offer a 'purer' measure of psychopathy.

Several studies have confirmed that (a lack of) impulse control is a key feature in psychopathy (e.g., Blackburn & Coid, 1998; Gray & Hutchison, 1964; Vitacco & Rogers, 2001). Impulsivity entails rapid, spontaneous, ill-planned, excessive and potentially maladaptive behaviour (Enticott & Ogloff, 2011) and has been related to various offences (Patton et al., 1995) and aggression (Halperin & Newcorn, 1998) as cited in de Tribolet-Hardy, Vohs, Mokros and Habermeyer (2014).

Some previous research has examined the relationship between the PPI and self-reported impulsivity. Ray, Poythress, Weir and Rickelme (2009) investigated the relationship between the FD and SCI subscales of the PPI-R and the UPPS impulsive behaviour scale (UPPS; Whiteside & Lynam, 2001) in a forensic sample. Results showed that all of the UPPS subscales were significantly associated with PPI-R total score. When this relationship was investigated for the subscales of the PPI-R, only the SCI was significantly associated with all of the UPPS scales; FD was strongly associated only with sensation seeking, weakly associated with (lack of) premeditation, unrelated to urgency, and negatively associated with (lack of) perseverance. The authors acknowledged some limitations of their study including its small sample size, and recommended that future research use alternative measures of impulsivity. The UPPS measures very

specific subtypes of impulsivity such as sensation seeking which have been shown through meta-analysis to bear non-significant correlation with measures of 'general impulsivity', such as the Barratt Impulsiveness Scale (BIS-11; Patton et al., 1995; Cross, Copping, & Campbell, 2011).

In a study among psychiatric inpatients, Edens and McDermott (2010) investigated the relationships between PPI-R total score, the SCI subscale, the FD subscale and impulsivity, as measured by the BIS-11, as well as a number of other criterion measures. They found that PPI-R and BIS-11 total scores were moderately correlated ($r = 0.32$, $p < 0.001$). A different pattern of correlations was evident however when the total BIS-11 score was compared with the two subscales. SCI was strongly and positively associated with impulsivity ($r = 0.32$, $p < 0.001$). FD was negatively, though not significantly, associated with impulsiveness ($r = -0.10$, $p > 0.05$). Having found extensive cross-loading of the fearlessness content scale, the authors computed an alternative version of the FD scale (which they labelled FD₂) substituting for the full fearlessness content scale a subscale which loaded uniquely on FD. The negative correlation between FD₂ and impulsivity was significant, albeit small ($r = -0.23$, $p < 0.01$). Furthermore a test of these dependant correlations indicated these opposing associations were significantly different from each other ($t(194) = 6.86$, $p < 0.001$). The magnitude of this difference was even more pronounced when examining FD₂. Such findings are consistent with previous research and with theoretical conceptualisations of primary and secondary psychopathy.

One limitation of Eden and McDermott's study is that they only reported the total score for impulsivity. Investigation of the correlations between all of the subscales of both measures would likely have provided a clearer picture of the nature of the associations of psychopathy and impulsiveness constructs. Indeed, in a recent review Poythress and Hall (2010, p.120) concluded that "the blunt assertion that 'psychopaths are impulsive' is no longer defensible, and that future models of psychopathy need to consider more complex associations among the various manifestations of these two constructs".

The present study addresses this gap, expanding on previous research by exploring the relationship between psychopathy and impulsivity while taking into account the multi-faceted nature of each construct in a large non-offending sample. The primary hypothesis of this study is that the set of impulsivity variables and the set of psychopathy variables are related to each other.

2. Method

2.1. Participants

Participants were drawn from a University (student) population. In total, 1149 responses were returned, however due to missing data (where 1 or more questions were left unanswered) the final $n = 970$. Of the sample, 69.4% ($n = 673$) respondents were female. Ages of participants ranged from 17 to 66 years ($M = 22.2$, $SD = 6.42$). The majority of respondents were Irish (88.6%). Two other nationalities comprised >1% of the total sample, these were British (2%) and American (1.9%).

2.2. Measures

2.2.1. Barratt Impulsiveness Scale, version 11 (BIS-11, Patton et al., 1995)

The BIS-11 is a widely used and well-validated self-report measure of impulsivity. It consists of 30 items which form three distinct scales, namely: Attentional, motor, and non-planning impulsiveness. Items were scored on a four-point Likert scale, with four indicating the most impulsive response. The higher the summed score from all responses, the higher the level of impulsivity. Eleven items were worded to indicate 'nonimpulsiveness' to avoid response sets such as acquiescence.

Internal consistency of the BIS-11 has generally been reported as good, often with Cronbach's alpha values > 00.8 (e.g. Spinella, 2007; Stanford et al., 2009; but see also Von Diemen, Szobot, Kessler, &

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