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Impulsivity and borderline personality as risk factors for suicide attempts among opioid-dependent individuals

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Abstract

The study aimed to examine the association of impulsivity and screening positively for borderline personality disorder (BPD+) as risk factors for suicide attempts among opioid-dependent individuals. The study used a case-control design with 775 opioid-dependent cases and 306 non-opioid-dependent controls. Cases were more likely than controls to screen BPD+ and to be classed as highly impulsive. Significant risk for lifetime suicide attempt was associated with screening BPD+ and also with high impulsivity. A number of risk factors were identified for suicide attempts among those with either high impulsivity or among those who screened BPD+: being female, a diagnosis of an anxiety disorder and a diagnosis of illicit drug dependence (other than opioid dependence). Opioid dependence was not a unique risk factor for suicide attempts among either the BPD+ group or the high impulsivity group. Although opioid dependence was not a unique risk factor for suicide attempts among those who screened BPD+, cases presented with multiple risk factors at substantially higher rates than controls. This research also highlights the importance of assessing impulsivity, in both clinical settings and research, particularly among those with a history of suicidal behaviour.

Keywords

Borderline personality disorder; substance use disorder; attempted suicide; opioid dependence

1. Introduction

Borderline personality disorder (BPD) is characterised by patterns of intense, volatile moods, unstable interpersonal relationships, chronic feelings of emptiness, and fears of being alone or abandoned (American Psychiatric Association, 2000; Gunderson, 2001). We have previously shown that screening positively for BPD (BPD+) was a risk factor for suicide attempts (Maloney et al., 2007). In this paper we explore this relationship further by examining the association of impulsivity and screening BPD+ with risk for suicide attempts.

The prevalence of BPD among the Australian general population has been estimated to be around 2% (Jackson & Burgess, 2000), with this estimate obtained using the same instrument

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Conflicts of interest: None

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as the current study. BPD often co-occurs with other disorders including substance use disorders (Dulit et al., 1990). Studies which have examined opioid dependent individuals have found rates of BPD ranging from 19% (Trull et al., 2000; Darke et al., 2004b) to as high as 46% (Trull et al., 2000; Darke et al., 2004b); the higher estimate was obtained via the use of the same instrument used for the current study.

The term impulsivity is used to refer to behaviours involving haste, spontaneity, impatience, or a lack of consideration for the consequences of an action (Dawe & Loxton, 2004). Impulsivity is an important feature of a number of psychiatric disorders, including substance use disorders and BPD (Dawe & Loxton, 2004). Most studies examining the relationship between impulsivity and substance use have focused on cocaine (Moeller et al., 2002a) or psycho-stimulant users (Moeller et al., 2002b; Butler & Montgomery, 2004). Very few studies have examined the relationship between impulsivity and opioid dependence (Kirby et al., 1999; Roy, 2004). The only study to use a case-control design to examine impulsivity and opioid dependence (Kirby et al., 1999) excluded controls with a history of substance abuse (including alcohol). Most opioid dependent individuals are polydrug users, excluding controls with a history of substance abuse makes it difficult to determine whether observed differences are specific to opioid dependence.

Studies have found that BPD and impulsivity are both related to attempted suicide (Dougherty et al., 2004). Only one study, however, has explored the relationship between impulsivity and suicide attempts among opioid-dependent individuals (Roy, 2004). No differences in impulsivity scores were found when those who did and did not attempt suicide were compared. Additionally, only one study has examined attempted suicide among individuals with comorbid BPD and opioid dependence (Darke et al., 2004a).

Not only is there a paucity of research among opioid-dependent individuals, but few studies use a control group to strengthen the findings. The current study compares an opioid-dependent case group with a non-opioid-dependent control group. This design enabled opioid dependence to be controlled for. Additionally, an attempt was made to control for social disadvantage. The study aimed to:

1. To determine the prevalence of high impulsivity among cases and controls, and to identify characteristics associated with its occurrence;
2. To determine the prevalence of screening BPD+ and examine the characteristics associated with doing so among cases and controls;
3. To explore the risk factors associated with suicide attempts among those with high impulsivity, and additionally, those screening BPD+.

2. Method

2.1 Procedure

This study utilised data collected as part of an ongoing, large retrospective case-control study examining genetic and environmental factors (e.g. childhood trauma) contributing to opioid dependence liability. Cases and controls were required to have an adequate understanding of English (essential for informed consent and the structured interview used), and to be aged 18 years old or over. Additionally, cases had to have participated in pharmacotherapy maintenance treatment for opioid dependence at some point in their lives, with no minimum time of enrolment required. This requirement was used as a marker for opioid dependence. Controls were not eligible if they had used opioids illicitly more than 5 times over their lifetime.

Cases were recruited from both public and private opioid maintenance treatment clinics in New South Wales, Australia, with flyers and posters used to invite individuals to participate. Additionally, cases were drawn from the community through word of mouth and “snow ball” effects. Controls were recruited from employment centres and community centres, open street malls, and local press servicing the same geographical area as the opioid maintenance treatment clinics. Additionally, controls were recruited from a range of services which provide assistance to disadvantaged groups within the community, such as unemployment services. These recruitment strategies were used to select a control group with similar levels of social disadvantage to cases but minimal exposure to illicit opioid use. The strategy to recruit participants from the same geographical areas was used as a proxy measure for ethnicity. Data reported here were collected from December 2004 to September 2006. The major demographic characteristics were identified as similar to the NSW sample of heroin users enrolled in the Australian Treatment Outcome Study (ATOS) (Darke et al., 2004a).

All interviews were conducted by trained interviewers with graduate and postgraduate qualifications in psychology or social sciences; and who have received comprehensive training in the administration of the structured diagnostic interview used in the study. All participants were guaranteed any information given to the researchers would be kept strictly confidential. Ethics approvals were obtained from the institutional review boards of University of New South Wales, Washington University, Queensland Institute of Medical Research and, for cases, the committee responsible for oversight of research at their opioid maintenance treatment clinic. After being given a complete description of the study, written informed consent was obtained from all participants. All participants were reimbursed \$50 for out-of-pocket expenses.

2.2 Structured Interview

Researchers administered a structured interview containing sixteen sections to all participants. DSM-IV lifetime diagnoses of substance use disorders (dependence on cannabis, sedatives, opioids, stimulants, cocaine, nicotine and alcohol), DSM-IV diagnosis of lifetime post-traumatic stress disorder (PTSD), major depressive episode, ASPD, and panic disorder were obtained using sections adopted and modified from the Collaborative Study on the Genetics of Alcoholism (COGA) Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA-II) (Bucholz et al., 1994; Hesselbrock et al., 1999). The onset and recency of each diagnosis was also obtained for each lifetime psychological disorder.

The BPD screener was adapted from the International Personality Disorder Examination (IPDE) and was used in the Australian National Survey of Mental Health and Wellbeing (NSMHWB) (Loranger et al., 1994). Additionally, the performance of the BPD screener within the NSMHWB has been studied at length (Lewin et al., 2005). The screener uses the IC-10 criteria to assess whether a set of 10 borderline traits were ‘true’ or ‘false’ about the participants typical personality (World Health Organization, 1993). Participants were classified as screening positively for BPD if they endorsed three or more of the symptom criteria, and they indicated that the symptoms interfered with their life (Loranger et al., 1994).

Sections adapted from the Christchurch Trauma Assessment, used in the Christchurch Health and Development Study (Fergusson et al., 2000) elicited information related to childhood physical and sexual abuse.

Consistent with previous research (Darke et al., 2004a), attempted suicide was defined as deliberate self-harm with the intention of causing death. This section on attempted suicide was adapted from the COGA SSAGA-II (Bucholz et al., 1994; Hesselbrock et al., 1999) with additional questions included to assess intent and seriousness.

Participants also completed the Barratt Impulsiveness Scale version 11 (BIS-11), a paper based 30-item self-report scale. Participants rate their frequency on impulsive behaviours and traits (for example “I act on spur of the moment”) or non impulsive behaviours and traits (scored in reverse, for example “I am self-controlled”) (Patton et al., 1995). The BIS is the most frequently used self report measure of impulsivity (Dougherty et al., 2004), and has been found to be valid and reliable in a number of different languages (Patton et al., 1995; Moeller et al., 2002a). In order to make the scale more clinically useful the 75th percentile total BIS score for our sample was used as a cut off to differentiate between high impulsivity and low impulsivity (Doran et al., 2004). Although no established cut offs exist for the BIS-11, other studies have suggested the use of the 75th percentile score (Baca-Garcia et al., 2004). This percentile was not applied separately for men and women as validation studies suggest no gender differences exist in BIS scores (Patton et al., 1995; Fossati et al., 2001). The BIS was added to the project’s assessments after data collection had begun and thus 273 individuals who did not complete the BIS were excluded from the analyses. The major demographic characteristics of this group did not differ from those presented in this paper.

2.3 Statistical Analysis

T-tests were used for continuous variables, with means and standard deviations reported (SD). Odds ratios and 95% confidence intervals reported for non-dichotomous categorical variables (OR, 95% CI) to determine if differences existed between cases and controls. The focus of the study was on opioid dependence. The study assessed four other illicit drug dependence groups, namely cannabis, sedatives, stimulants, and cocaine. These were recoded into one variable, ‘illicit drug dependence (other than opioid dependence)’. Multiple logistic regressions with backwards elimination were used to determine the risk factors for screening BPD+ and high impulsivity. Additionally, the Phi coefficient and Cramer’s V statistic were used to determine to what degree screening BPD+ and high impulsivity were correlated. All statistical analyses were conducted using SPSS for Windows, version 14.0 (SPSS Inc, 2005). Additionally, all analyses were adjusted for age, gender and employment status.

3. Results

3.1 Sample characteristics

The sample consisted of 775 opioid-dependent cases and 306 non-opioid-dependent controls. Cases were significantly older than controls ($M=36.5$ ($SD=8.6$) vs. $M=34.1$ ($SD=9.8$), $t_{500}=-3.9$, $P<0.001$) and more likely to be male (61% vs. 43%, OR 2.07, 95% CI 1.59–2.72). Cases were also significantly more likely to have a prison history (54% vs. 5%, OR 23.99, 95% CI 13.77–41.76), to have completed 10 years of education or less (48% vs. 14%, OR 5.57, 95% CI 3.92–7.92) and to be unemployed at the time of the interview (83% vs. 52%, OR 4.32, 95% CI 3.23–5.78).

After adjusting for age, gender and employment status, cases were significantly more likely to have a lifetime illicit drug dependence (other than opioid dependence) (84% vs. 39%, aOR 9.68, 95% CI 6.86–13.60), and to be dependent on alcohol at some point in their lives (40% vs. 29%, aOR 1.41, 95% CI 1.04–1.91). Cases were also significantly more likely to screen BPD+ (58% vs. 35%, aOR 2.35, 95% CI 1.75–3.15) and to meet criteria for PTSD (35% vs. 18%, aOR 2.49, 95% CI 1.76–3.53) and ASPD (46% vs. 17%, aOR 3.46, 95% CI 2.44–4.90), compared to controls. Cases were significantly more likely to report the experience of physical (58% vs. 39%, OR 1.88, 95% CI 1.41–2.51) and sexual abuse (50% vs. 48%, aOR 1.40, 95% CI 1.04–1.89) as a child, after adjusting for age, gender and employment status. There were no significant group differences for a diagnosis of either panic disorder (23% for cases and 25% for controls, aOR 0.88, 95% CI 0.63–1.23) or a major depressive episode (58% for cases and

51% for controls, aOR 1.32, 95% 0.99–1.76). Among cases, the median length of opioid use career at the time of the interview was 14 years, with a median of 7 years opioid dependence.

3.2 Assessment of BPD and high impulsivity

After adjusting for age, gender and employment status, cases were significantly more likely to endorse each BPD symptom criterion, except intense relationships, and to screen BPD+ (58% vs. 35%), compared to controls (Table 1). Among the BPD+ participants, the most commonly reported borderline symptom reported was chronic feelings of emptiness (87%). Compared to controls, cases were significantly more likely to indicate that the BPD symptoms have interfered with their life (82% vs. 73%, OR 1.70, 95% CI 1.12–2.58). Among those who were BPD+, no significant differences were identified among either cases or controls for the age of onset or recency of BPD symptoms. The majority of both cases and controls reported that the onset of BPD symptoms preceded their first suicide attempt (75% among controls, and 79% among cases), with no gender differences. Additionally, the onset of BPD symptoms was found to precede the onset of heroin use in 73% of cases, with no gender differences.

Cases had significantly higher total BIS scores (73.0 vs. 67.2, $t_{519} = -7.4$, $P < 0.001$), and were more likely to be classed in the high impulsivity group compared to controls (32% vs. 17%, aOR 2.22, 95% CI 1.56–3.18).

3.3 Characteristics associated with high impulsivity and BPD

Two logistic regression analyses were conducted to determine which demographic and mental health characteristics were associated with high impulsivity and also with borderline traits (Table 2). A diagnosis of major depression, ASPD, unemployment, and illicit drug dependence (other than opioid dependence) were independently associated with high impulsivity and additionally, with borderline traits (Table 2). Younger age and BPD+ were found to be associated with high impulsivity. A correlation analysis demonstrated only a small to moderate correlation between BPD+ status and high impulsivity (Phi and Cramer's $V = 0.32$). Additionally, a reported history of childhood physical abuse, and an anxiety disorder diagnosis (either PTSD or panic disorder) were found to be associated with being BPD+. Opioid dependence was not uniquely associated with being BPD+ or with high impulsivity (Table 2).

3.4 Suicidal behaviour

Those who were BPD+ were significantly more likely to report lifetime suicide attempts, with differences in past year attempts only identified among controls (Table 3). Those with high impulsivity were significantly more likely to report both lifetime and 12-month suicide attempts (Table 3). The differences in levels of suicidal behaviour identified in Table 4 were observed among both cases and controls. This highlights that it may not be heroin dependence which really matters when examining suicide attempts among those with high impulsivity or among those with BPD.

The BPD+ participants were significantly more likely to indicate they really wanted to die (75% vs. 57%, OR 2.19, 95% CI 1.30–3.69), and their attempt was serious enough to warrant hospital attention (63% vs. 44%, OR 2.19, 95% CI 1.32–3.63), compared to others.

3.5 Risk factors for suicide attempts

Two regression analyses were conducted to determine the characteristics that were associated with a history of suicide attempts. A number of risk factors were identified for suicide attempts among those with either high impulsivity or among those who were BPD+: being female, any anxiety disorder and illicit drug dependence (other than opioid dependence) (Table 4). BPD+ status and an anxiety disorder were risk factors for suicide attempts among those with high

impulsivity. A history of childhood sexual abuse and at least one major depressive episode were risk factors for suicide attempts among those who were BPD+ (Table 4). Opioid dependence was not identified as a unique risk factor for suicide attempts among either the BPD+ group or the high impulsivity group (Table 4).

4. Discussion

This study explored impulsivity and BPD symptoms as risk factors for suicide attempts among opioid-dependent individuals and controls. The design of the current study controlled for the effects of opioid dependence. Overall, the findings highlight the importance of assessing impulsivity and comorbidity when determining risk for suicidal behaviour.

The controls in the current study had substantially elevated levels of impulsivity, especially when we compare the mean total BIS scores with a more normative sample of students ($M=64.1$), or a “healthy” control group ($M=46.4$) (Kirby et al., 1999; Fossati et al., 2001). The controls in a previous study were matched to heroin dependent individuals on age, gender and education level, not employment status (Kirby et al., 1999). Employment status was used in the current study as a marker of social disadvantage. The controls in the current study presented with a severe clinical profile. That is, surprisingly high levels of depression, substance use and childhood abuse were reported among the control group. It is possible that the elevated levels of impulsivity observed were related to elevated rates of psychological disorders seen among the control group. Given the severe clinical profile observed, unemployment appears to have been a good proxy for social disadvantage.

The finding that cases were more likely to have significant borderline traits is consistent with prior studies identifying a relationship between opioid dependence and BPD (Trull et al., 2000; Darke et al., 2004b). Despite this, opioid dependence was not uniquely related to BPD. Further studies in this area are warranted to clarify these findings. These findings have, however, strengthened our understanding of BPD and substance use comorbidity by directly assessing the contribution of opioid dependence independent of other known risk factors.

Although opioid dependence was not a unique risk factor for suicidal behaviour, cases still had all the known risk factors for high impulsivity and screening BPD+ (e.g. anxiety disorders, non-opioid illicit drug dependence, childhood sexual abuse) at substantially higher rates than controls. It appeared then that the elevated risk of attempting suicide was increased due to higher levels of each of the risk factors assessed, rather than opioid dependence per se.

These findings carry clinical implications. There is a high suicide rate among BPD patients (8%) (Black et al., 2004), particularly those who do not stay in treatment, and suicide is a major cause of mortality among heroin users (Darke et al., 2006). Our results suggest that the assessment of BPD and high impulsivity among opioid-dependent individuals should be prioritised, given that multiple risk factors for suicide attempts are found at substantially higher rates in this population. BPD can be quite treatment intensive, especially if other psychiatric disorders are occurring concurrently. Prior research, for example, has recognised the tendency for BPD and PTSD to co-occur (Steil et al., 2007). It is possible, for example, that drug use may be self medicating BPD-related feelings of emptiness or PTSD symptoms which can both stem from common underlying childhood problems (Gunderson, 2001).

It could be argued that the relationship between BPD and suicide attempts is an artefact of the “self-harm” criterion within the BPD diagnosis. It is important to highlight that when this criterion was removed from the analysis, BPD was still a predictor of suicide attempts, a finding supported by previous studies (Darke et al., 2004b). Additionally, it could be argued that given impulsivity is a core construct within the BPD diagnosis, this study is assessing the same

construct twice. The result, however, that only a small to moderate correlation exists between BPD and high impulsivity, challenges this argument.

Given the nature of BPD, it is possible to question the intent of the BPD+ participants. The results do not support this, however. Additionally, consistent with the literature (Darke et al., 2005), among BPD+ participants, the most commonly reported borderline symptom reported was chronic feelings of emptiness. Linking in with this is the finding that a major depressive episode was a significant risk factor for suicide attempts among the BPD+ group. Comorbid BPD and depressive moods have been identified in the literature as increasing suicidal risk (Soloff et al., 1994). These findings highlight the substantial levels of distress experienced by the BPD+ group, which maybe contributing to the suicidal behaviour expressed.

Impulsivity can be easily assessed through self-report surveys which can be routinely administered in treatment settings. Individuals (including drug users) make choices which are strongly influenced by the delay to receipt of a reward; impulsive individuals seek immediate rewards. If an individual is assessed as “highly impulsive”, the outcomes of treatment could potentially be improved by providing immediate tangible rewards for abstinence (e.g. vouchers for clean urines), rather than highlighting more long-term consequences of substance dependence, such as homelessness, the threat of jail or losing custody of children (Kirby et al., 1999). Impulsivity is typically a trait that predisposes to ill-considered choices (Moeller & Dougherty, 2002). The aim of treatment does not necessarily need to be for impulsivity to be eliminated but for it to become more functional (in which rapid but inaccurate responses can be beneficial, for example “*people have admired me because I can think quickly*”) rather than dysfunctional (in which the behaviour aids and promotes drug use, BPD and suicidal behaviour, for example “*I often say whatever comes into my mind without thinking first*”) (Dickman, 1990).

A number of limitations exist in the current study. The case and control groups were not balanced entirely in terms of age, gender and employment status. These factors were statistically controlled for in all analyses. Additionally the reliance on self-report and the amount of recall bias introduced in assessing lifetime prevalence could be highlighted as a limitation. These measures, however, are commonly used in studies on illicit drug users and have been shown to be adequately valid and reliable (Darke, 1998). It is important to acknowledge that the assessment of BPD in this study was limited as it does not provide for a diagnosis for BPD but only screens for a potential ICD-10 diagnosis, which could have inflated the prevalence. Other studies have used this screener, however, among similar populations and its performance in the NSMHWB has been studied at length (Darke et al., 2005; Lewin et al., 2005).

The degree of psychopathology and adversity reported by our control group was surprising; the risk estimates we have therefore presented here may be conservative because we have overly controlled for life adversity. As lifetime measures of psychopathology were used it is difficult to determine whether attempted suicide preceded the occurrence of the risk factors assessed. While other lifetime drug use disorders were controlled for in the analyses, it was not possible however, to control for concurrent polydrug use. The study did not screen for bipolar disorder. Given the literature supporting the co-occurrence of BPD and bipolar disorder (Zimmerman & Mattia, 1999), our inability to account for this should be highlighted as a limitation.

Although it is not possible to generalise these findings to DSM-IV due to differences in the classification of BPD, it is important to highlight that substantial overlap does exist with ICD-10. For example, identity disturbances, involvement in unstable relationships and difficulties controlling anger are all prominent features of both classification systems (World

Health Organization, 1993; American Psychiatric Association, 2000). It is possible to suggest, however, that the assessment used in this study of screening BPD+ can highlight to clinicians that further assessment is warranted. It is also possible that we may have lost some statistical power by using a dichotomous measure of the BIS. It is, however, quite clinically useful to be able to describe an individual as highly impulsive or not, using established cutoffs. It is also unclear if our results are generalisable to other populations of opioid users, including those who have never received methadone maintenance treatment or those who are non-dependent. Studies have demonstrated a proximal risk in the use of psychoactive drugs associated with suicide (Darke et al., 2008). This study is limited in that it could not account for these toxicological factors in examining the relationships between BPD/impulsivity and attempted suicide.

Despite these limitations, the study found that impulsivity and borderline traits were both important risk factors for suicide attempts independent of opioid dependence. This study has shown that opioid-dependent individuals remain an important target for clinical intervention as they are likely to suffer from multiple conditions that all serve to increase risk of suicide attempts in addition to being clinical targets in their own right. Impulsivity and BPD remain important targets for both clinical intervention and future research, especially among those with a history of suicidal behaviour.

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Table 1

Prevalence of BPD symptoms

	Case (n = 775)		Control (n = 306)		Group comparison Adjusted OR (95% CI) [^]
	Males (n=471)	Females (n=302)	Males (n=131)	Females (175)	
% Poor self-concept	50	46	38	33	1.44 (1.08–1.94) [*]
% Fear of aloneness/abandonment	28	31	19	18	1.63 (1.15–2.31) [*]
% Intense relationships	36	33	28	31	1.25 (0.94–1.67) ^{ns}
% Argue or fighting	54	66	43	47	1.88 (1.40–2.52) ^{**}
% Self-harm/threatening suicide	34	50	31	33	1.52 (1.12–2.06) [*]
% Lack of persistence/impulsive	49	55	36	35	1.77 (1.32–2.34) ^{**}
% Aggressive	40	43	34	19	1.99 (1.45–2.73) ^{**}
% Feeling empty	67	74	47	47	2.35 (1.75–3.14) ^{**}
% Very moody	51	62	44	40	1.75 (1.31–2.34) ^{**}
% Reckless behaviour	65	63	43	37	2.81 (2.09–3.77) ^{**}

^{*} $P < 0.05$

^{**} $P < 0.001$

[^] Adjusted for age, gender and employment status

^{ns} =not significant

Table 2
Clinical characteristics associated with high impulsivity and BPD+

	High Impulsivity (n=303)	BPD+ (n=556)
OR and 95% CI [^]		
Demographics		
Age	0.97 (0.96–0.99) [*]	0.99 (0.98–1.01) ^{ns}
Unemployment	1.59 (1.09–2.32) [*]	1.43 (1.04–1.97) [*]
Mental health		
Major depression	1.41 (1.03–1.95) [*]	2.28 (1.71–3.05) ^{**}
ASPD	1.55 (1.14–2.10) [*]	1.89 (1.39–2.57) ^{**}
Anxiety disorder diagnosis ^{##}	1.13 (0.82–1.55) ^{ns}	1.59 (1.19–2.12) [*]
Screening positively for BPD	3.08 (2.21–4.30) ^{**}	N/A
High impulsivity	N/A	3.03 (2.17–4.25) ^{**}
Illicit drug dependence (other than opioid dependence) [#]	3.14 (2.00–4.93) ^{**}	1.73 (1.25–2.41) [*]
Opioid dependence	1.18 (0.77–1.79) ^{ns}	1.39 (0.97–1.99) ^{ns}
Family background		
Childhood physical maltreatment	0.93 (0.67–.28) ^{ns}	1.82 (1.37–2.41) ^{**}

^{*} $P < 0.05$

^{**} $P < 0.001$

[^] OR from multiple logistic regressions including all variables listed here: age, gender, employment status, high impulsivity, ASPD diagnosis, BPD, major depression diagnosis, illicit drug dependence, opioid dependence, anxiety disorder diagnosis (PTSD or panic disorder), alcohol dependence, childhood sexual maltreatment and physical maltreatment.

[#] Includes diagnosis of cannabis, sedative, stimulant or cocaine dependence

^{##} Includes diagnosis of PTSD or panic disorder

^{ns} =not significant

Table 3
Proportion attempting suicide among those with borderline traits and in high impulsivity

	Cases				Controls			
	BPD+		BPD+		BPD+		BPD+	
	Yes (n=449)	No (n=326)	Comparisons OR (95% CI) [^]		Yes (n=107)	No (n=199)	Comparisons OR (95% CI) [^]	
% Suicide attempts (lifetime)	42	19	3.08 (2.21–4.31)**		43	12	5.50 (3.10–9.75)**	
% Multiple lifetime suicide attempts	29	10	3.51 (2.30–5.37)**		28	7	4.62 (2.23–9.56)**	
% Suicide attempts (12-month)	5	3	2.04 (0.90–4.65) ^{ns}		8	2	5.29 (1.37–20.41)*	
	High impulsivity				High impulsivity			
	Yes (n=251)	No (n=523)	Comparisons OR (95% CI) [^]		Yes (n=52)	No (n=254)	Comparisons OR (95% CI) [^]	
% Suicide attempts (lifetime)	41	29	1.73 (1.25–2.40)*		48	18	3.91 (2.00–7.67)**	
% Multiple lifetime suicide attempts	27	18	1.68 (1.16–2.42)*		37	9	4.83 (2.26–10.30)**	
% Suicide attempts (12-month)	6	3	2.17 (1.03–4.55)*		12	2	4.83 (1.33–17.65)*	

* $P < 0.05$

** $P < 0.001$

[^] Adjusted for age, gender and employment status

^{ns} = not significant

Table 4

Risk factors for suicide attempts for those with high impulsivity and BPD

	High impulsivity (n=303)	BPD+ (n=556)
	OR and 95% CI [^]	
Female	1.76 (1.04–2.93) [*]	1.52 (1.04–2.23) [*]
Anxiety disorder diagnosis ^{##}	3.08 (1.83–5.16) ^{**}	1.66 (1.13–2.43) ^{**}
Illicit drug dependence (other than opioid dependence) [#]	3.07 (1.11–8.50) [*]	1.73 (1.02–2.93) [*]
Screening positively for BPD	3.84 (1.90–7.75) ^{**}	N/A
Childhood sexual maltreatment	1.47 (0.84–2.58) ^{ns}	1.56 (1.05–2.31) [*]
Major depressive episode	1.14 (0.62–2.11) ^{ns}	2.23 (1.45–3.41) ^{**}
High impulsivity	N/A	1.37 (0.95–1.98) ^{ns}
Opioid dependence	1.72 (0.81–3.57) ^{ns}	1.27 (0.75–2.13) ^{ns}

^{*}
P < 0.05^{**}
P < 0.001[^]
OR for multiple logistic regressions including all variables listed here: age, gender, employment status, high impulsivity, ASPD diagnosis, BPD, major depression episode, illicit drug dependence, opioid dependence, anxiety disorder diagnosis (PTSD or panic disorder), alcohol dependence, childhood sexual maltreatment and physical maltreatment. Note each regression was performed among a higher risk sub-sample[#]
Includes diagnosis of cannabis, sedatives, stimulants or cocaine dependence^{##}
Includes a diagnosis of PTSD or panic disorder^{ns}
=not significant