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Modifying the risk associated with an impulsive temperament: A prospective study of drug dependence treatment

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HIGHLIGHTS

- Impulsive personality predicts poor drug treatment outcome.
- Increases in mindful awareness and control improve drug treatment outcomes.
- Impulsive traits do not interfere with acquiring mindful awareness and control

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ABSTRACT

The evidence linking the personality trait of impulsivity and substance misuse is well established. Importantly, impulsivity not only predicts substance misuse problems but has an association with duration in treatment, likelihood of completing treatment and time to relapse. Treatment that focuses on increasing awareness and acceptance of thoughts and emotions may potentially address impulsive behaviour and in this respect improve treatment outcomes for substance misuse. The current paper investigated the relationship between the facet of impulsivity that taps into poor inhibitory control and treatment outcome. In addition, there was a specific focus on ascertaining the impact of an increase in awareness and attentional control measured in 144 adult substance users receiving treatment in a residential therapeutic community. Impulsivity predicted poorer treatment outcome (measured as drug use severity). Increases in awareness and acceptance of emotions and thoughts during treatment were related to better outcome although this was not associated with baseline levels of impulsivity. Clinical and theoretical implications are discussed.

1. Introduction

There is now extensive evidence linking impulsive personality traits to the development and maintenance of substance misuse problems (Dawe, Gullo, & Loxton, 2004; Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001; Moss & Lynch, 2001; Sullivan & Rudnik-Levin, 2001), with emerging evidence suggesting that the most relevant facet of impulsivity may be related to disinhibition rather than reward drive. Such impulsive traits are characterised by an inability to inhibit a prepotent response in the light of negative consequences and a failure to exert cognitive control over actions. Traits that are related to the broader construct of "disinhibition" – such as sensation seeking, impulsivity, and behavioural undercontrol – have been found to both prospectively predict substance misuse disorders in adulthood (Caspi, 2000; Fergusson, Boden, & Horwood, 2007), and are reported to be higher in people with substance misuse problems (Grau & Ortet, 1999; Kambouropoulos & Staiger, 2009; Sher, Bartholow, & Wood, 2000). While the preponderance of studies has focused on alcohol use disorders, it is important to note that the relationship between impulsive traits and problematic substance misuse holds across substances. For example, impulsivity has been associated with a higher frequency of cannabis use and with cannabis problems (Simons & Carey, 2002; Simons, Gaher, Correia, Hansen, & Christopher, 2005; von Sydow, Lieb, Pfister, Höfler, & Wittchen, 2002; (Dévieux et al., 2002; Vangsness, Bry, & LaBouvie, 2005)) and ecstasy use (Egan, Kambouropoulos, & Staiger, 2010). This association also occurs across cultures with self-reported impulsivity higher in users and former users of heroin in India (Narayan, Shams, Jain, & Gupta, 1997) and China (Zhang, Zhou, Li, & Shen, 2008). The evidence for a clear relationship between

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impulsivity and substance misuse has additional support from studies conducted in the laboratory using behavioural tasks (see Reynold, Ortengren, Richards, & de Wit, 2006 for a review). For example, substance misusers will typically show a preference for small, immediate rewards over larger delayed rewards (Kirby, Petry, & Bickel, 1999; Madden, Petry, Badger, & Bickel, 1997; Mitchell, 1999; Petry, 2002). Finally, recent evidence from neuroimaging studies indicates that excessive substance use deleteriously affects prefrontal neural systems responsible for impulse control (e.g., Cardenas, Studholme, Gazdzinski, Durazzo, & Meyerhoff, 2007; Goldstein & Volkow, 2011; Verdejo-García & Bechara, 2009; Yücel & Lubman, 2007). Thus, a heightened trait level of impulsivity may confer a predisposition toward substance use (McGue, Iacono, Legrand, Malone, & Elkins, 2001; Tarter et al., 2003) and ongoing chronic consumption may further exacerbate rash impulsive behaviour by impairing prefrontal neural areas (e.g., Clark, Roiser, Robbins, & Sahakian, 2009; Goldstein & Volkow, 2011; Jentsch & Taylor, 1999).

There is also an association between impulsive traits and treatment outcome. For example, Patkar et al. (2004) reported that two measures of impulsivity, Sensation Seeking (Zuckerman, 1993) and the Barratt Impulsiveness Scale-11 (BIS-11; Barratt, 1965) scores, were associated with both the number of days in treatment and negative urines and predicted drop out from treatment. Moeller et al. (2001) found that high scores on the BIS-11 were associated with shorter duration in treatment for a small sample of cocaine users ($N = 35$). Similar findings were reported by Winhusen et al. (2013), with psychomotor stimulant users who dropped out from residential treatment reporting higher scores on the motor control subscale of the BIS-11 and a strong trend towards a higher total BIS-11 score compared to those who completed treatment ($p = .53$). However, Bankston et al. (2009) failed to find an association between length of stay and impulsiveness measured using the BIS-11. Novelty-seeking (a facet of impulsivity) was also predictive of relapse in those receiving treatment for alcohol dependence (Meszaros et al., 1999) as well as higher treatment attrition in heroin dependent users (Helmus, Downey, Arfken, Henderson, & Schuster, 2001; Roll, Saules, Chudzynski, & Sodano, 2004). Finally, behavioural measures of impulsivity have been investigated with higher levels of delay discounting associated with shorter periods of abstinence in opiate addicts (Passetti et al., 2011; Passetti, Clark, Mehta, Joyce, & King, 2008), although the Stroop scores (measure of behavioural inhibition) were not associated with treatment outcome in the study by Winhusen et al. (2013).

On balance, the evidence thus far would indicate that impulsive personality traits are likely to negatively impact on treatment outcome and that treatment programs need to carefully address the behavioural consequences that include premature departure from treatment, decisions to use substances in high risk situations, and an awareness of underlying emotions and thought processes that result in poor decision making around substance use (see Staiger, Kambouropoulos, & Dawe, 2007). Awareness and acceptance of emotions and thoughts are the proposed mechanisms underlying many cognitive behavioural and group therapy programs in substance abuse treatment settings. This state of awareness or "mindfulness" is contrasted with states of mind in which attention is not focused on the present moment and behaviour occurs automatically and indeed at times impulsively. In many forms of substance abuse treatment, including individual therapy, 12-step or therapeutic communities, disengaging the emotions associated with the urge to use a substance from the behavioural response to that urge is a particular focus of the management of addiction. There is growing evidence that mindfulness based interventions are associated with reductions in substance use and preliminary evidence that there are associated improvements in both self report measures of mindfulness and craving (Chiesa & Serretti, 2013). The culture of the therapeutic community, which focuses on acceptance and a non-judgemental environment, in addition to the daily repetition and practice of new behaviours within the community, may indeed contribute to the cultivation of emotional awareness and acceptance (i.e., metacognitive insight), which may positively impact longer term treatment outcomes.

In summary, there is now a growing interest in the potential role that impulsivity plays in treatment outcome with recent evidence linking low inhibitory control to poor treatment completion (Winhusen et al., 2013), shorter stays in residential treatment (Bankston et al., 2009) and abstinence post treatment (Passetti et al., 2011; Sargeant, Bornovalova, Trotman, Fishman, & Lejuez, 2012). Further, while there is growing evidence that mindfulness-based approaches are associated with reductions in substance use (Chiesa & Serretti, 2013) these findings are far from consistent and leave open the question as to the potential mechanisms underpinning improvement. Hence, the overall aim of this study is to examine the relationship between self report measures of behavioural inhibition, the improvement in acceptance and management of emotional states indexed by a standardised measure of mindfulness and treatment outcome in a group of individuals undergoing residential treatment for illicit drug abuse. Impulsivity was assessed using the I7 (Eysenck, Pearson, Easting, & Allsopp, 1985), a measure designed to specifically measure level of impulse control and disinhibition which has been shown to load on the same "impulsivity" factor as other measures previously associated with treatment outcome such as the Barrett impulsiveness scale and Zukerman's sensation seeking scale (see Dawe & Loxton, 2004 for a review). Specifically, we hypothesised that: (1) high impulsivity at the outset of treatment would be associated with greater severity of drug dependence at admission and at three months post discharge; (2) increases in awareness and acceptance will be associated with an improvement in outcome, measured as drug use severity; and (3) that an improvement in awareness and acceptance will moderate the relationship between impulsivity and treatment outcome.

2. Method

2.1. Participants

The sample consisted of 144 illicit substance users, all of whom met *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000) criteria for drug dependence and were currently in residential drug treatment. Those who had a primary alcohol problem and fulfilled DSM-IV-TR criteria for alcohol dependence were excluded from this study. Dependent drinkers were excluded as this study is part of a larger evaluation of an alcohol misuse prevention program for illicit substance users which took part in an inpatient therapeutic community (see Staiger, Richardson, Long, Carr, & Marlatt, 2013 for full rationale). Participants reporting current psychotic symptoms or a major neurological disorder were excluded from the study (see Table 1 for sample description).

2.2. Design and intervention

Participants were part of a randomised controlled study testing whether an additional focus on the prevention of alcohol use problems in addition to the existing residential treatment program conferred additional protection from relapse over standard residential treatment for drug dependence. The residential program was consistent with a therapeutic milieu approach focussing on skill development in the area of emotion regulation, impulse control, interpersonal skills, self-responsibility and a general mindful awareness of emotions. The alcohol treatment component consisted of five sessions focussing specifically on drink refusal skills, mindfulness, challenging alcohol expectancies and relapse prevention. There was no significant difference in long term outcome for those receiving the additional alcohol treatment component in comparison to standard care (i.e., basic alcohol education around the harms of drinking to excess). Thus, the current paper focuses on the role of impulsivity with a focus on acceptance and awareness as a potential mechanism of change for the total sample.