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Short Communication

Assessing the role of impulsivity in smoking & non-smoking disordered gamblers

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HIGHLIGHTS

- Tobacco use is especially prevalent among disordered gamblers (DGs)
- Similar facets of trait impulsivity have been implicated in both DG and smoking
- DGs who smoke daily displayed significantly higher negative urgency scores than those who are non-smokers or occasional smokers
- Results suggest that negative urgency may be a key underlying mechanism in the maintenance of co-morbid DG and tobacco dependence

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ABSTRACT

Background: Co-morbidity with other addictive behaviors is common in disordered gambling (DG). In particular, tobacco dependence has been found to be among the most prevalent disorders co-morbid with DG. While the extant literature has firmly established the co-occurrence of DG and smoking, there is a paucity of research examining factors that differentiate DGs who smoke from those who do not.
Objectives: To address this empirical gap, the current study tested whether dimensions of trait impulsivity as measured by the UPPS-P Impulsive Behavior Scale (positive urgency, negative urgency, lack of premeditation, lack of perseverance, and sensation seeking), discriminated between non-DGs and DGs based on their present smoking status: non-smoker, occasional smoker, and daily smoker.
Methods: To this end, 564 community gamblers were recruited through a crowdsourcing platform (Amazon's Mechanical Turk) and completed an online survey, assessing problem gambling severity, tobacco use, and trait impulsivity.
Results: MANOVA analyses revealed significant main effects for both gambling severity and smoking status groups. Importantly, a significant gambling by smoking interaction was also found. Pairwise comparisons revealed that DGs who were daily smokers scored higher on negative urgency than those who smoked occasionally or not all. Furthermore, among non-DGs, smoking status failed to discriminate between mean scores on negative urgency. No other significant interaction effects were found for the remaining UPPS-P impulsivity facets.
Conclusions: Results suggest that individual components of trait impulsivity, and more specifically negative urgency, successfully differentiate DGs who do not smoke, or just smoke occasionally, from DGs who smoke daily. These findings suggest that the degree of trait impulsivity may potentially distinguish between DGs and DGs who are dually addicted to other substances such as tobacco.

1. Introduction

Disordered gambling (DG) and tobacco use are highly co-morbid addictive behaviors. Indeed, a recent meta-analysis of predominant co-morbid psychopathologies among DGs found that tobacco dependence had the highest mean prevalence of all addictive behaviors at 60.1% (Lorains, Cowlishaw, & Thomas, 2011). In addition, DGs who smoke are more likely to experience increased problem gambling severity (Grant, Kim, Odlaug, & Potenza, 2008; Petry & Oncken, 2002) and poorer mental health outcomes (Odlaug, Stinchfield, Golberstein, &

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Grant, 2013) than non-smoking DGs. Furthermore, laboratory research suggests that acutely administered nicotine via cigarettes can augment the average size of bets on a video lottery terminal among regular gamblers who also smoke (Barrettt, Collins, & Stewart, 2015). Thus, current evidence suggests that co-morbid tobacco use among DGs may have deleterious effects at both the event and syndrome levels. While the association between DG and smoking is well-established, the causal direction of this relationship has yet to be determined, and it is feasible that a separate underlying pathology influences both behaviors. Further to this, very little is currently known in regards to which psychological factors may help to differentiate DGs with, versus DGs without, co-morbid tobacco dependence. This information is crucial for the development of evidence-based therapies, especially given the current lack of guidelines for treatment of DGs with co-morbid psychopathologies (Dowling, Merkouris, & Lorains, 2016).

Impulsivity is a complex and multi-faceted construct comprised of personality, cognitive, and behavioral features (Hodgins & Holub, 2015; Sharma, Markon, & Clark, 2013). Historically, the conceptualization of trait impulsivity in particular has been a topic of considerable debate. Contemporary definitions typically describe trait impulsivity as an enduring personality characteristic exemplified by a lack of ability to constrain inappropriate behavior, to plan accordingly for future events, and to account for the consequences of actions (Dawe, Gullo, & Loxton, 2004; Dawe & Loxton, 2004). Whereas newer impulsivity models, notably the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001), contend that trait impulsivity is more accurately conceptualized as a multidimensional construct. Subsequently, the UPPS has become one of the most widely utilized measures of impulsivity in the addictions literature. The UPPS-P (Cyders et al., 2007; Lynam, Smith, Whiteside, & Cyders, 2006) is an extension of the original scale and measures five distinct facets of trait impulsivity: *positive urgency* (i.e., lack of control during states of positive affect), *negative urgency* (i.e., lack of control during states of negative affect), *lack of premeditation* (i.e., inability to assess consequences prior to action), *lack of perseverance* (i.e., inability to remain focused on tasks), and *sensation seeking* (i.e., tendency to enjoy and seek out new and exciting experiences). It has been suggested that the UPPS-P model has the potential to clarify the influence of these distinct aspects of impulsivity across addictive behaviors (Miller & Lynam, 2013).

A sizeable body of research evidence suggests that higher levels of trait impulsivity are implicated across addictive disorders (Sharma et al., 2013; Verdejo-García, Bechara, Recknor, & Pérez-García, 2007) including tobacco use (Bloom, Matsko, & Cimino, 2014; Mitchell, 1999; Spillane, Combs, Kahler, & Smith, 2013). This is also the case for behavioral addictions such as gambling, with self-reported impulsivity consistently found to be higher among DGs compared to non-DGs (Blaszczynski, Steel, & Mcconaghy, 1997; Hodgins & Holub, 2015; Kräplin et al., 2014). Providing support for the important role of impulsivity in the development of DG, trait impulsivity is heavily emphasized in the prominent 'Pathways Model' of DG (Blaszczynski & Nower, 2002). This model describes three distinct pathways, which ultimately lead to the development of DG. Notably, Pathway 3 gamblers often present with a history of childhood trauma as well as underlying biological influences including impulsivity, attentional deficits, and antisocial personality traits. This combination often makes them more susceptible to developing gambling problems (Blaszczynski & Nower, 2002; Nower & Blaszczynski, in press). The Pathways Model has received considerable empirical support with research indicating that Pathway 3, the 'antisocial impulsivist' gambler, as being more likely to present with co-morbid psychiatric disorders including substance abuse (Milosevic & Ledgerwood, 2010; Moon, Lister, Milosevic, & Ledgerwood, (in press); Nower, Martins, Lin, & Blanco, 2013). Yet, despite strong links between impulsivity and DG, and the association between Pathway 3 and co-morbid substance use, the role of impulsivity in co-morbid DG and tobacco use remains poorly understood.

One recently conducted study investigated the extent to which performance on response impulsivity (i.e., reduced performance on motor inhibition tasks) vs. choice impulsivity (i.e., delayed discounting of rewards) differed in a German sample of gamblers and tobacco users (Kräplin, Behrendt, Scherbaum, Dshemuchadse, Bühringer, & Goschke, 2015). In this study, four groups of participants were recruited: a healthy control group, nicotine dependent (ND) smokers, DGs without ND, and comorbid DG with ND. Not surprisingly, DGs demonstrated greater response impulsivity than controls. Further, participants with both comorbid DG and ND displayed greater choice impulsivity than those with ND alone. Finally, DGs without ND, exhibited heightened choice impulsivity versus those with only ND. These findings provide initial evidence that reduced performance on at least one facet of behavioral impulsivity (i.e., choice impulsivity) may be specific to DG regardless of smoking status.

In relation to the UPPS-P model, several recent studies have reported that positive and negative urgency in particular may be especially prominent traits among DGs (Blain, Gill, & Teese, 2015; Canale, Vieno, Griffiths, Rubaltelli, & Santinello, 2015; Grall-Bronnec et al., 2012). Specifically, both aspects of urgency have been found to reliably differentiate between DGs and non-DGs (Billieux et al., 2012; Lorains et al., 2011; Michalczuk, Bowden-Jones, Verdejo-García, & Clark, 2011). However, a meta-analysis on the UPPS in gambling found that negative urgency and lack of premeditation were more strongly associated with DG than other facets including positive urgency (MacLaren, Fugelsang, Harrigan, & Dixon, 2011). The influence of negative urgency on DG has been further established in subsequent research studies (e.g., Farstad et al., 2015; Haw, 2015; Yan, Zhang, Lan, Li, & Sui, 2016). The UPPS-P model has also been used to differentiate between smokers and non-smokers. For instance, the results of several recent studies suggest that, similar to DG, positive and negative urgency are associated with tobacco dependence (Pang et al., 2014; Spillane et al., 2013; Spillane, Smith, & Kahler, 2010). A recent investigation revealed that specific UPPS-P dimensions also distinguish subgroups of smokers, with increased negative urgency most strongly associated with daily smoking and lack of premeditation with non-daily smoking (Lee, Peters, Adams, Milich, & Lynam, 2015). The aggregate of these findings highlight the likely role of the urgency dimensions in the initiation of addictive behavior.

Relatedly, a separate line of research suggests that the urgency subscales of the UPPS-P are associated with the initiation of alcohol use as well as co-morbid drinking and smoking. For instance, in one study with young adults, negative urgency, sensation seeking, and premeditation were all positively associated with problematic drinking. However, only negative urgency mediated the relationship between drinking motives (coping and enhancement) and problematic drinking (Adams, Kaiser, Lynam, Charnigo, & Milich, 2012). Furthermore, Doran and Trim (2013) found that while both sensation seeking and negative urgency were associated with drinking and smoking individually, negative urgency uniquely predicted co-morbid alcohol and tobacco use. Importantly, these findings indicate that distinct impulsivity dimensions, specifically negative urgency, not only predict singular addictive behaviors, but also may effectively distinguish between co-morbid use and/or dual addictions. However, to our knowledge, distinct facets of impulsivity as measured by the newer UPPS-P model have not been previously compared between DGs with and without co-morbid tobacco use.

The aim of the present research was to assess whether facets of trait impulsivity differ according to gambling severity and smoking status. To this end, we assessed whether UPPS-P impulsivity dimensions would differ between gamblers (DGs and non-DGs) who are non-smokers, occasional smokers, and daily smokers. Based on the extant literature, it was hypothesized that DGs would score significantly higher than non-DGs on UPPS-P subscales. We hypothesized that elevated scores on the UPPS-P subscales would be especially pronounced among DGs who smoke. In particular, it was predicted that the urgency dimensions