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Direct and indirect relationships between Factor 2 psychopathy, behavioral activation, positive alcohol expectancies, and alcohol use

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ABSTRACT

There is a well-established relationship between Factor 2 psychopathy and heavy alcohol use. Very few studies, however, have examined potential mediators of this relationship. As a result, it is difficult to develop intervention strategies that target early steps in the psychopathy/alcohol use pathway. The present study tested two structural equation models linking Factor 2 psychopathy to alcohol use through the influence of both behavioral activation and positive alcohol expectancies in a sample of college undergraduates ($N = 196$). The study was also one of the first to utilize both self-report and laboratory measures of behavioral activation. Findings indicate that both behavioral activation (as assessed by self-report but not laboratory measures) and positive alcohol expectancies fully account for the relationship between Factor 2 psychopathy and alcohol use.

1. Introduction

1.1. Factor 2 psychopathy and alcohol use

Factor 2 psychopathy (FTP) is a condition characterized by impulsivity, negative emotionality, aggression, and antisocial behavior (Karpman, 1941). FTP has been consistently associated with heavy alcohol use in forensic (Walsh, Allen, & Kosson, 2007), community (Neumann & Hare, 2008), and college student (Sylvers, Landfield, & Lilienfeld, 2011) samples. To date, however, very few studies have examined mediators of the FTP/AU relationship. As a result, it is difficult to develop intervention strategies that target early steps in the psychopathy/alcohol use pathway. The goal of the current study was to examine two potential mediators of the Factor 2 psychopathy/alcohol use relationship: the behavioral activation system and positive alcohol expectancies.

1.2. The behavioral activation system

The behavioral activation system (BAS; Gray & McNaughton, 2000) is a biologically based motivational system that regulates approach behavior to appetitive stimuli. Individuals with a strong BAS are particularly sensitive to and motivated by rewards. A large number of studies suggest that both Factor 2 psychopathy (Ross, Molto, Poy, Segarra, Pastor & Montanes, 2007; Wallace, Malterer, & Newman, 2009) and heavy alcohol use (Kambouropoulos & Staiger, 2007; O'Conner & Colder, 2005) are associated with a strong BAS. Additionally, the BAS may mediate the relationship between Factor 2 psychopathy and alcohol use. Specifically, Factor 2 psychopathy may be associated with a strong BAS, which may, in turn, predict a strong response to the rewarding properties of alcohol.

Notably, the vast majority of research on the BAS has relied on self-report surveys. This is problematic in that self-report measures of the BAS require insight into one's approach motivations and how they compare to normative experience. Moreover, most existing BAS studies report associations between self-report measures of the BAS and self-report measures of other outcomes. As a result, it is not clear whether the results of these studies are affected by shared method variance. To date, only two behavioral measures of the BAS have been tested multiple times; the Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Anderson, 1994) and the Card Arranging Reward Responsiveness Objective Test (CARROT; Powell, Al-Adawi, Morgan, & Greenwood, 1996). Notably, studies utilizing these behavioral tasks have yielded inconsistent results (Davis, Patte, Twees, & Curtis, 2007; Kambouropoulos & Staiger, 2004, 2007; Suhr & Tsanadis, 2007) and there is a clear need for additional multi-method studies using alternative measures of the BAS.

1.3. Positive alcohol expectancies

A second potential mediator of the Factor 2 psychopathy/alcohol use relationship is positive alcohol expectancies (PAEs). Positive alcohol expectancies are beliefs that alcohol use will accomplish a desired goal for the user (e.g. tension reduction or performance enhancement; Goldman, Brown, & Christiansen, 1987). A large body of literature

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suggests that PAEs are both cross sectionally and prospectively associated with heavy drinking (Carey, 1995; Nicolai, Moshagen, & Demmel, 2012). Positive alcohol expectancies may also mediate the relationship between the behavioral activation system and heavy alcohol use. More specifically, individuals with a strong behavioral activation system, who are highly motivated by reward, may be particularly sensitive/attentive to alcohol's reinforcing properties. As a result, these individuals may easily develop positive alcohol expectancies, which may, in turn, lead to frequent heavy drinking (Corbin, Iwamoto, & Fromme, 2011; Jones, Corbin, & Fromme, 2001).

To date, only two studies have examined the degree to which alcohol expectancies mediate the relationship between the behavioral activation system and alcohol use. While both studies (Lopez-Vergera et al., 2012; Wardell, Read, Colder, & Merrill, 2012) demonstrated indirect paths from the behavioral activation system to alcohol use through positive alcohol expectancies, the literature in this area remains sparse. Moreover, these studies relied solely on self-report measures of BAS, which may be hampered by a lack of insight or concerns about social desirability.

1.4. The current study

The current study used structural equation modeling to examine the degree to which both behavioral activation and positive alcohol expectancies accounted for the relationship between Factor 2 psychopathy and alcohol use. Based on theory and previous research, we hypothesized that Factor 2 psychopathy, behavioral activation, and positive alcohol expectancies would all directly predict alcohol use; we also hypothesized a direct path from Factor 2 psychopathy to positive alcohol expectancies. Additionally, we hypothesized a significant indirect path from Factor 2 psychopathy to alcohol use through both the behavioral activation system and positive alcohol expectancies.

2. Method

2.1. Participants

Two hundred and two undergraduates were recruited from an upper level psychology course at a large, midwestern university. Of these 202 participants, 196 completed all study measures. Participants ranged in age from 19 to 43 with a mean age of 23.74 ($SD = 3.81$). Participants were predominantly female (66.8%) and were ethnically diverse; 46.4% Caucasian/White, 17.9% African American/Black, 16.8% Arab/Chaldean, 8.7% South Asian, 2.6% Hispanic/Latino, 1.5% East Asian, 0.5% American Indian, and 5.6% 'other'.

2.2. Measures

2.2.1. Psychopathy

The Psychopathic Personality Inventory—Revised (PPI-R; Lilienfeld & Widows, 2005) is a 154-item, self-report measure that can be used to assess the continuum of psychopathic personality traits in student and community samples. Items are rated on a four-point scale and cover various psychopathic personality domains. The PPI-R yields a total score and two main factor scores (fearless dominance [which reflects Factor 1 psychopathy], and self-centered impulsivity [which reflects Factor 2 psychopathy]). The internal reliabilities for both Factor 1 (fearless dominance $\alpha = 90$) and Factor 2 (self-centered impulsivity $\alpha = 90$) psychopathy in the current sample were excellent.

2.2.2. Behavioral activation

Behavioral activation was assessed using both a self-report measure (the BAS scale) and a laboratory measure (the Columbia Card Task). The BAS scale is a 13-item scale consisting of three subscales: Drive (four items), fun-seeking (four items), and reward responsiveness (five items). These 13 items were rated on a four-point Likert-type scale. The BAS scale has shown adequate test–retest reliability and has been found to be a valid indicator of sensitivity to appetitive stimuli (Carver & White, 1994). Internal reliability for the overall BAS score in the current sample was good ($\alpha = .84$).

The Columbia Card Task (CCT; Figner, Mackinlay, Wiklening, & Weber, 2009) is a computerized laboratory task that has been associated with the BAS (Penolazzi, Gremigni, & Russo, 2012). There are 'hot' and 'cold' versions of the CCT, however, only the 'hot' version was used in this study. The hot version of the CCT presents participants with a total of 32 cards that are faced down. Cards are either gain cards (associated with winning points) or loss cards (associated with losing points). Participants are instructed to turn over cards, one at a time, with the goal of maximizing their point total (which is continuously displayed at the top of the computer screen). Additionally, at the beginning of each trial, participants are provided with three game parameters to facilitate their decision making: Gain amount (the value of the winning cards), loss amount (the value of the losing cards), and loss probability (the number of losing cards). Each time participants select a gain card, the appropriate number of points is added to their total. However, as soon as participants select a loss card, the trial is automatically terminated and the loss amount associated with the card is subtracted from the participants' total. Participants can choose to stop turning over cards at any time during a trial and receive their payoff. Participants in the current study were randomly administered 27 trials of the hot CCT in random order. The outcome variable (shown to be an indicator of behavioral activation) was the average number of cards turned over across all 27 experimental trials.

2.2.3. Positive alcohol expectancies

Positive alcohol expectancies (Kushner, Sher, Wood, & Wood, 1994) were assessed with 35 items rated on a four-point, Likert-type scale. These items make up four subscales: Tension reduction (nine items), social lubrication (eight items), activity enhancement (nine items), and performance enhancement (nine items). This scale was empirically derived by Kushner et al. (1994) from longer alcohol outcome expectancy measures in order to briefly assess a wide range of positive alcohol expectancies. Internal reliability for the overall PAE scale in the current sample was excellent ($\alpha = .95$).

2.2.4. Alcohol use

Quantity and frequency of alcohol use (AU) was assessed with the following two questions: "In the past year, how often have you had some type of beverage containing alcohol?" and "In the past year, when you drank, how many drinks did you usually have on one occasion?" The bivariate correlation between these two items in the current sample was $r = .64$.

2.2.5. Short-term memory

Reduced short-term memory (STM) capacity has been associated with disinhibited behavior in externalizing disorders such as Factor 2 psychopathy (Endres, Rickert, Bogg, Lucas, & Finn, 2011). As a result, STM was treated as a covariate in the current study and assessed using the N-Back task (Jaeggi, Buschkuel, Perrig, & Meier, 2010). In the N-Back task participants are shown stimuli (eight shapes in total) and asked to respond (i.e., press a key) if the stimulus currently being viewed matches a previously presented stimulus seen *n* times back. Participants in the present study were administered 12 trials in random order. The outcome variable was the total number of false hits (FH) subtracted from the total number of correct hits (CH) divided by the total number of trials ([CH − FH] / 12).

2.3. Procedure

The study was administered to undergraduate college students in groups of 5–14. There were at least two researchers present at each group administration to monitor study procedures and answer questions. Self-report measures (PPI-R, BAS, PAE) were completed first,