



# Stress moderates the relationships between problem-gambling severity and specific psychopathologies



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## ABSTRACT

The purpose of this study was to examine the extent to which stress moderated the relationships between problem-gambling severity and psychopathologies. We analyzed Wave-1 data from 41,869 participants of the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC). Logistic regression showed that as compared to a non-gambling (NG) group, individuals at-risk gambling (ARG) and problem gambling (PPG) demonstrated higher odds of multiple Axis-I and Axis-II disorders in both high- and low-stress groups. Interactions odds ratios were statistically significant for stress moderating the relationships between at-risk gambling (versus non-gambling) and Any Axis-I and Any Axis-II disorder, with substance-use and Cluster-A and Cluster-B disorders contributing significantly. Some similar patterns were observed for pathological gambling (versus non-gambling), with stress moderating relationships with Cluster-B disorders. In all cases, a stronger relationship was observed between problem-gambling severity and psychopathology in the low-stress versus high-stress groups. The findings suggest that perceived stress accounts for some of the variance in the relationship between problem-gambling severity and specific forms of psychopathology, particularly with respect to lower intensity, subsyndromal levels of gambling. Findings suggest that stress may be particularly important to consider in the relationships between problem-gambling severity and substance use and Cluster-B disorders.

## 1. Introduction

Gambling is a widespread recreational activity in many countries, with up to 80% of the population participating in some gambling activities (Kessler et al., 2008; Wardle et al., 2011). Although most individuals gamble recreationally and do not develop gambling-related problems, a smaller, but significant, percentage of gamblers develop problem-gambling concerns including debt, financial problems, and loss of relationships and/or jobs (Clarke et al., 2006; Hodgins et al., 2011). Gambling behavior may be conceptualized along a clinical continuum, ranging from no gambling to gambling disorder, previously called pathological gambling (PG) in earlier versions of the *Diagnostic and Statistical Manual* (Shaffer et al., 1999; American Psychiatric Association, 2002; Petry, 2005). A recent report estimated that 12-month prevalence rates of gambling disorder ranged from 0.5% in Denmark and in the Netherlands to 7.6% in Hong Kong, with an

average across jurisdictions of 2.3% (Williams et al., 2012). The first wave of the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC) was conducted in the United States in 2001–2002. A total of 43,093 adults were interviewed, and past-year and lifetime estimates of PG in the sample were 0.2% and 0.4%, respectively; past-year estimates of problem/pathological gambling (PPG) were found to be 0.7% in men and 0.4% in women (Petry et al., 2005; Desai and Potenza, 2008). In contrast, other research has suggested higher prevalence estimates, although in some of these studies screening measures were employed to generate estimates, which thus may lead to inflated estimates (Shaffer and Hall, 2001; Williams et al., 2012). Recently, gambling disorder was reclassified in the *Substance-Related and Addictive Disorders* section of the DSM-5 (American Psychiatric Association, 2013), due to multiple parallels between substance-use and gambling disorders (Potenza, 2006; Petry et al., 2014).

Psychological models for PG have been proposed, and many have

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considered stress as an important factor (Blaszczynski and Nower, 2002; Sharpe, 2002). Stress has been defined (Lazarus, 1996) as an event that, “occurs when an individual perceives that the demands of an external situation are beyond his or her perceived ability to cope with them.” Recently Nower and Blaszczynski (2017) validated a new etiological instrument to assess people with gambling problems, in which stress-coping and childhood maltreatment variables represent two important factors that assist in identifying different subgroups of individuals with pathological gambling, highlighting the importance that stress could have in the pathophysiology of the disorder. The association of stressful life events with psychiatric disorders has been widely studied, especially for depressive disorders (Tao et al., 2011; Anders et al., 2012; Rueda and Valls, 2016). Moreover, stress is a well-known factor that contributes to the development, maintenance and relapse of several externalizing disorders, including in addictions the use of alcohol (King et al., 2003; Dawson et al., 2005; Keyes et al., 2012; Young-Wolff et al., 2012) and drugs (Blanco et al., 2014; Myers et al., 2014). Generally, stress may trigger cravings (Sinha, 2007), and daily stress has been linked to urges to gamble (Elman et al., 2010). In addition, problem gamblers, especially women, often gamble as a way to deal with anxiety and negative emotions (Coman et al., 1997). These findings may be attributable in part to stress systems, particularly as early life trauma has been linked to gambling problems later in life (Hodgins et al., 2010), particularly for women seeking treatment for problem gambling (Petry and Steinberg, 2005). Additionally, findings from population-based surveys indicate relationships between problem-gambling severity and a broad range of psychopathologies (Cunningham-Williams et al., 1998; Desai and Potenza, 2008; Kessler et al., 2008). For example, previous work has linked problem-gambling severity to other psychiatric comorbidities, including mood (Bischof et al., 2013; Lister et al., 2015), anxiety (Giddens et al., 2012; Bischof et al., 2013), and substance-use disorders (Ledgerwood et al., 2009; Bischof et al., 2013). Moreover, studies have evaluated whether some comorbidities disorders could moderate the relationship between problem-gambling severity and other psychiatric disorders. In several prior studies of NESARC data (Grant et al., 2009a; Brewer et al., 2010; Giddens et al., 2012), other psychiatric disorders (relating to tobacco use, alcohol use and anxiety, respectively) moderated the relationships between problem-gambling severity and psychopathology, with weaker relationships typically observed in the groups with psychopathology. These findings suggest that these co-occurring disorders in part account for some of the relationship between problem-gambling severity and psychopathology. Other work suggests that alcohol-use disorder may influence the relationship between pathological gambling and other psychiatric comorbidities, particularly for Cluster B personality disorders (Abdollahnejad et al., 2014). However, despite the evidence of association between stress and gambling disorder on the one hand, and gambling disorder and other psychiatric comorbidities on the other hand, to date, little is known about how stress may moderate the relationships between problem-gambling severity and psychopathologies, particularly in general U.S. adult community samples.

Some studies of stress and gambling have focused on adolescent and/or adult university student samples, with some findings indicating that adverse life events in the previous year were related to an increased likelihood to be engaged in addictive behaviors including gambling (Lee et al., 2012). Furthermore, more severe gambling has been linked to a greater number of stressful or major negative life experiences (Bergeron et al., 2006). However, another study found no clear relationship between gambling and stressful events during the past year, suggesting that stress may influence gambling behaviors in certain groups or under certain circumstances (Lightsey and Hulsey, 2002). Along these lines, a positive relationship between gambling behaviors and being the victim of violence has been found among young men, but not in women (Froberg et al., 2013). A separate study also found that only negative experiences that had directly affected youth were associated with monthly gambling, while adverse events

that happened to significant others were only related to occasional gambling (Storr et al., 2012).

Although existing studies suggest relationships between stress, gambling and psychopathology, multiple knowledge gaps exist in the literature. As many findings are derived from convenience samples of adolescents, university samples, or treatment-seeking individuals, data from large population-based samples would aid in determining relationships to guide public health recommendations around reducing the negative effects of problem gambling. Therefore, we investigated relationships between stress, problem-gambling severity and psychopathologies in the NESARC. We hypothesized that greater problem-gambling severity would be associated with higher reported stress and with more psychopathology in both high- and low-stress groups. Given that stress has been linked to multiple Axis-I and Axis-II disorders in a number of studies, we expected that stress would moderate relationships between problem-gambling severity and psychopathologies, particularly mood, anxiety and substance-use disorders. We also hypothesized that stress would account for some of the variance in the relationship between elevated problem-gambling severity and psychopathologies. In particular and consistent with prior findings that specific psychopathologies moderated the relationship between problem-gambling severity and other psychopathologies by weakening relationships (Grant et al., 2009a; Brewer et al., 2010; Giddens et al., 2012), we hypothesized that with weaker relationships would be observed between problem-gambling severity and other psychopathologies in a high-stress versus a low-stress group. Furthermore, we expected that these effects would be observed at both intermediate and high levels of problem-gambling severity.

## 2. Method

### 2.1. Sample

We analyzed data from Wave 1 of the NESARC (Desai and Potenza, 2008; Grant et al., 2009a; Brewer et al., 2010). The NESARC is a nationally representative survey of non-institutionalized U.S. adults aged 18 years and older. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV), a structured diagnostic interview which has shown good test–retest reliability and validity of DSM-IV diagnoses (Grant et al., 2003; Ruan et al., 2008) and was administered face-to-face to respondents by lay interviewers. A more thorough description of the NESARC methodology is described in detail elsewhere (Grant et al., 2004; Grant and Dawson, 2006). The overall survey response rate was 81% for Wave 1 (Grant et al., 2009b). Our sample consists of 41,935 participants who provided data on gambling behavior and perceived stress.

### 2.2. Measures

Sociodemographic variables included in our analysis were gender (male/female), age (as a continuous variable), race/ethnicity (white, black, other and Hispanic, each determined independently), marital status (married or cohabitating; divorced, separated, or widowed; or never married), education level (less than high school, high school only, college degree or higher than a college degree), employment status (full-time, part-time, other), and annual income (< \$20000, \$20000–\$34999, \$35000–\$69999, and ≥ \$70000). Gambling behavior was assessed through the AUDADIS-IV interview. Specifically, all participants were asked if they ever have gambled at least five times in any year during their lifetime. Those who responded affirmatively were screened with the 15 items that assessed for PG, and consistent with DSM-IV, AUDADIS-IV diagnoses of PG, required meeting at least five of the 10 DSM-IV criteria. Both lifetime and past-year gambling behaviors were investigated. In our study, we focused on the past-year timeframe. Past-year and lifetime prevalence of the majority of the psychiatric disorders were assessed in the AUDADIS-IV questionnaire. Specifically,

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