Stressful Life Events and Gambling: The Roles of Coping and Impulsivity Among College Students

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Abstract

Substantial research has found a robust relationship between stressful life events and increased negative health outcomes and a greater predisposition to various forms of substance use and gambling behavior; however, less is known about the individual factors that explain this relationship. The present study examines the moderating factors of gambling to cope and individual impulsivity factors (e.g., perseverance, premeditation, and negative urgency) on the relationship between stressful life events over the past year and gambling problems among a sample of college students. Participants included 653 total students (48.57 % female; $M = 26.31$ years old; $SD = 8.35$ years) enrolled in universities across the United States who scored three or higher on the South Oaks Gambling Screen, an indicator of risk for problematic gambling. We found a positive relationship between stressful life events and gambling problems. Gambling to cope moderated the link between stressful life events and gambling problems such that for those higher in gambling to cope, stressful life events had little impact on gambling problems while those at lower to moderate levels of gambling to cope saw a positive relationship between stressful life events and gambling problems. Moreover, we found two significant three-way interactions between stressful life events, gambling to cope, and impulsivity factors of perseverance and premeditation in predicting problems. These findings suggest that prevention and/or treatment strategies should consider how gambling to cope and impulsivity factors in conjunction with an individual's report of stressful life events relate to problematic gambling and associated consequences.

Keywords

gambling; stressful life events; impulsivity; gambling to cope

It is estimated that approximately 75% of college students have gambled in the past year (Barnes, Welte, Hoffman, & Tidwell, 2012). Recent studies have shown that although problematic gambling is relatively uncommon in the general population, rates of problematic gambling are rising among college students. In fact, Nowak and Aloe (2014) examined 18 studies conducted between 2005 and 2013 and estimated that among college students

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who exhibit symptoms of gambling disorder, 10.23% are likely to have a gambling disorder. Problem gambling and exhibiting symptoms of a gambling disorder have been associated with numerous negative health, social, and psychological consequences including disruption of work and education, criminal arrest, financial difficulties, interpersonal relationship disturbances, concordant use of alcohol and other drugs, depression, anxiety, and other psychiatric disturbances (Bergevin, Gupta, Derevensky, & Kaufman, 2006; Gupta & Derevensky, 2000; Neighbors, Lostutter, Cronce, & Larimer, 2002; Frank, Lester, & Wexler, 1991; Kapsomenakis, Simos, Konstantakopoulos, & Kasselimis, 2018). Furthermore, difficulties with emotional regulation are prevalent among individuals with a gambling disorder. These problems manifest themselves as a lack of emotional clarity and higher levels of impulsivity traits (Sancho et. al., 2019).

Given the rise in gambling legalization and increased availability of easily accessible gambling via online gambling, sports betting, and card games, college gambling is increasingly prevalent (Blinn-Pike, Worthy, & Jonkman, 2007, Nowak & Aloe, 2014). College attendance represents a pivotal time in development known as *emerging adulthood* (Arnett, 2000). This period in late adolescence is a markedly stressful time period in which young adults discover their sense of identity, oftentimes through engaging in risky behaviors, substance use, and identity exploration. It is a critical time for college students who engage in risky gambling behaviors and consequently experience gambling-related problems (Blinn-Pike, et al., 2007; Neighbors, et al., 2002).

Stressful Life Events and Gambling Problems

Previously experiencing stressful life events may predict the onset of maladaptive behaviors such as substance use (Keyes, Hatzenbuehler, Grant, & Hasin, 2012), problematic drinking (Fenton, et al., 2013), and gambling disorder (Blaszczynski & Nower, 2002; Nower & Blaszczynski, 2004; Sharma & Sacco, 2015). A national survey examining the relationship between adverse childhood experiences and gambling outcomes found that physical neglect, emotional abuse, sexual abuse, and physical abuse during childhood were robustly correlated with gambling outcomes (Sharma & Sacco, 2015). Additionally, Imperatori et. al (2017) found a positive association between childhood trauma and gambling severity among casino gamblers.

A report of experiencing a threatening, deviant, or violent stressful event within the last year, was associated with increased odds of frequent gambling (Storr, Lee, Derevensky, Ialongo, & Martins, 2012). Further qualitative studies suggest that social factors such as social trauma, physical abuse, sexual abuse, and poverty may play a critical role in influencing gambling behaviors such that gambling may be a method of coping with psychosocial stressors (Hagen, Kalishuk, Currie, Solowoniuk, & Nixon, 2013). Although much of the work on gambling behaviors has been conducted among clinical samples, little work has examined the relationship between stressful life events and gambling problems among college students who may be more at an increased risk for problematic gambling.

Gambling to Cope

Stressful past life events coupled with struggles in emerging adulthood and the pressure to perform well academically may predispose some individuals to engage in problematic gambling as a coping mechanism. The pathway model (Blaszcynski & Nower, 2002; Nower & Blaszczynski, 2004) suggests that a gambling disorder may be a result of emotional dysregulation, childhood abuse, and substance abuse. This model theorizes that gambling disorders arises from early life stressors, which suggests that gambling is a way of coping with stress and emotional issues (Blaszcynski & Nower, 2002; Nower & Blaszczynski, 2004; Sharpe, 2002; Sharpe & Terrier, 1993; McCormick, 1994). Emotion-based, avoidant, and distraction coping orientations were found to be most prevalent among youth who were problem and pathological gamblers (Gupta, Derevensky, & Marget, 2004). Likewise, researchers have found that among over 2,100 adolescents, those who were identified as problem gamblers reported greater negative life events and those with greater gambling-related problems used more avoidance-focused coping (Bergevin, Gupta, Derevensky, & Kaufman, 2006; Gupta & Derevensky, 2000). Furthermore, according to Jacob's general theory of addiction, those who feel "unwanted or rejected" by close others, in particular, may be predisposed to use gambling as a coping motive to relieve stress (Jacobs, 1986).

Impulsivity in relation to gambling

The individual trait of impulsivity may exacerbate gambling problems, particularly for those who gamble to cope with stressors (Deleuze, et al., 2015). Consequently, those with greater impulsivity are more likely to gamble for emotional regulation purposes, such as to regulate their sense of loss of control, and to regulate an overwhelming desire for constant stimulation (Deleuze, et al., 2015). There are five major dimensions of impulsive behavior within the literature which may predispose individuals to develop an addiction to gambling: a lack of perseverance, a lack of premeditation, positive and negative urgency, and sensation seeking (UPPS-P; Cyders et al., 2007; Whiteside & Lynam, 2001).

A hallmark of lack of perseverance is the inability to remain focused on the task at hand. Premeditation has been defined as the tendency to act without consideration or without thinking first and has been previously linked to poor-decision-making abilities (Canale, Vieno, Griffiths, Rubaltelli, & Santinello, 2015; Canale, et al., 2017). These first two facets of impulsivity may be particularly interesting to examine within a college student demographic since they are indicative of a deficit in conscientiousness, an integral aspect of impulsivity which has been linked to poor academic performance (Rodriguez-Fornells & Maydeu-Olivares, 2000; Kipnis, 1971). Moreover, negative urgency is the proclivity to react rashly while experiencing heightened negative emotions whereas positive urgency is the tendency to react rashly to positive emotions (Canale, et al., 2015). Research looking at individual impulsivity traits found those who are higher on the positive urgency dimension demonstrated greater enhancement coping motives which were positively related to gambling problems (Canale, et al., 2015). Similarly, Haw (2015) demonstrated that negative urgency was a strong predictor of problem gambling while Kim, Poole, Hodgins, Mcgrath, & Dobson (2018) found associations between both positive and negative urgency

and problem gambling such that the relationship between negative urgency and problematic gambling was explained through coping motives.

Finally, sensation seeking has been found to be positively associated with problematic gambling and alcohol use among adolescents (Martínez-Loredo, Grande-Gosende, Fernandez-Artamendi, Secades-Villa, & Fernandez-Hermida, 2019). Sensation seeking factors such as novelty seeking and boredom susceptibility predict problematic gambling (Harris, Newby, & Klein, 2015). Adolescents and young adults are relatively impulsive compared to older adults, but impulsivity tends to wane over time (Steinberg, Graham, O'Brien, Woolard, Cauffman, & Banich, 2009; Eppinger, Nystrom, & Cohen, 2012). Given the fact that facets of impulsivity have been clearly linked with gambling problems (Blaszcvnski & McConaghy, 1997; McCormick, 1994), we expect that emerging adults who report experiencing more life stress and have higher levels of impulsivity, may resort to gambling to cope and consequently, have greater gambling problems.

The Present Study

The present study aims to examine the impact of stressful life events over the last year on problematic gambling among college students, controlling for gambling frequency. We investigated gambling to cope and impulsivity factors (e.g., perseverance, premeditation, and negative urgency) as potential moderating factors on the relationship between stressful life events and gambling to cope. Specifically, we hypothesized that stressful life events would be positively associated with gambling problems (H1). Moreover, the relationship between impact of stressful life events and problematic gambling would be moderated by gambling to cope, such that those who were higher on gambling to cope and reported greater life stress would experience greater gambling problems (H2). Likewise, we predicted the relationship between stressful life events and gambling problems would be moderated by impulsivity (e.g., lack of premeditation, lack of perseverance, and greater negative urgency) such that those who are lower in perseverance and premeditation, and higher on negative urgency would have greater gambling problems (H3). Finally, we expected a three-way interaction between gambling to cope, life stress, and facets of impulsivity to emerge. That is, we expected gambling to cope would moderate the association between life stress and problems such that stressful life events would be positively related to gambling problems, especially among those who reported higher levels of gambling to cope. Furthermore, this moderating effect would be stronger among those who are higher in facets of impulsivity (e.g., lack of premeditation, lack of perseverance, and greater negative urgency) relative to those who are lower in impulsivity (H4).

Methods

Participants and Procedure

Participant recruitment and screening.—Participants were recruited from 17 four-year college institutions across the different regions of the United States in 2015 for a multi-wave project, with some recruited through MTurk, Facebook, and referrals. Participants were identified through publicly available university directory lists. Universities were stratified by enrollment numbers (small: 2,000–8,000; medium: 8,0001–15,000; and large:

15,001+) and region of the United States (Northeast, Midwest, South, West) as defined by the U.S. census. Lists of student email addresses were obtained and emails were divided randomly into cohorts of 2,000. Following, email invitations were sent to students to participate in a brief online screening survey. Eligibility criteria included being at least 18 years old and having a score of 3 or higher on the South Oaks Gambling Screen (SOGS; Lesieuer & Blume, 1987), which is an indicator of risk for problematic gambling (see Measures section). In total, 6849 students completed the screening survey and 1501 students were eligible and invited to complete the first survey of a multi-wave project. Participants included a total of 653 students who scored at least 3+ on the SOGS at screening and completed the baseline survey. The distribution of SOGS scores at screening among these participants was: 38.6% scored 3–4, 37.6% scored 5–9, and 23.8% score 10+. Participants on average were $M = 26.31$ years old ($SD = 8.35$ years), 48.57 % identified as female.

Procedure.—This study received institutional review board approval (Study ID #14235-02). Undergraduate students were invited via email to complete a brief online screening survey. Informed consent was obtained. Participants were recruited to participate in a brief personalized normative feedback intervention to reduce gambling outcomes among at risk gambling students. Participants were given a $25 gift card after completing the first survey. Data presented in this manuscript is only from the first survey data.

Measures

Screening Criteria.—The South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) was used to identify eligible participants for the study. Participants were eligible for the current study if they scored 3+ in the measure. The choice of the inclusion criteria of a SOGS score of 3+ was based on the goal of testing the efficacy of the intervention which aimed at prompting students to evaluate their gambling behavior and outcomes after viewing the feedback. The SOGS is a widely used 20-item questionnaire designed to identify the presence of a gambling disorder. Example items include "When you gamble, how often do you go back another day to win back money you have lost?" and "Have you ever felt guilty about the way you gamble, or what happens when you gamble?" A score of 5+ on the SOGS has been used to identify probable pathological gamblers, with scores of 3–4 representing at-risk gamblers (Dube et al., 1996; Lesieur et al., 1991; Volberg & Steadman, 1989). The SOGS timeline was modified to measure gambling behaviors occurring in the last 6-months (Lesieur & Blume, 1993; Gambino & Lesiuer, 2006).

Gambling Problems.—The 20-item Gambling Problem Index (GPI; Neighbors, et al., 2002) was used to assess gambling problems. Participants were asked "How many times did the following things happen to you while you were gambling or because of your gambling during the last 3 months?" Response options were scored on a five-point scale: 0 "*Never*"; 1 "*One to Two Times*"; 2 "*Three to Five Times*"; 3 "*Six to 10 times*"; and 4 "*More than 10 times*". Example items include: "Missed out on other things because you spent too much money on gambling", "Missed a day (or part of a day) of school or work", and ""Kept gambling when you promised yourself not to." Cronbach's alpha for this measure was .97. Scores reflected the sum of the 20 items with a possible range from 0 to 80.

Gambling Frequency.—Gambling frequency was assessed using an item from the Gambling Quantity & Perceived Norms Scale (Neighbors, Lostutter, Larimer, & Takushi, 2002). Participants were asked, "Approximately how often do you gamble?" on a 10 point scale. Response options ranged from 0 indicating "*Never*" to 9 indicating "*Every Day*".

Stressful Life Events.—Items from the Holmes-Rahe Stress Inventory (Holmes & Rahe, 1967) was used to assess for stressful life events. The scale asks respondents to report whether they had experienced a list of 43 life events the last year. Each event was given a different 'weight' for stress called a Life Change Unit (LCU). The scale is considered the gold standard for stress assessment and has been correlated with a variety of health outcomes (Scully, Tosi, & Banning, 2000). Example events from the scale included: "Marriage," "Fired at work," "Change in living conditions," and "Change in eating habits." The scale used for this study was slightly modified. Items 'Vacation' and 'Christmas' were grouped together.

Dimensions of impulsivity.—The 59-item impulsive behavior scale (UPPS+P; Whiteside & Lynam, 2001; Cyders & Smith, 2007) was used to measure five distinct facets of impulsivity, three of which were used in the present research: perseverance, premeditation, and negative urgency. Response options coded on a four-point scale: 1 "*Agree Strongly*"; 2 "*Agree Some*"; 3 "*Disagree Some*"; and 4 "*Disagree Strongly*". By design (Cyders & Smith, 2007), items were scored so that higher values correspond to higher levels of impulsivity. Thus, perseverance, premeditation, and negative urgency actually assess lack of perseverance; lack of premeditation; and impulsivity responding to negative events, respectively. Perseverance was assessed by 10 items, e.g., "I am a person who always gets the job done," (Cronbach's alpha=.83). Premeditation was assessed by 11 items, e.g., "I usually think carefully before doing anything." (Cronbach's alpha=.85). Negative urgency was assessed by 12 items, e.g., "I often make matters worse because I act without thinking when I am upset," [reversed] (Cronbach's alpha=.89). Scores reflect the mean of items corresponding to each subscale with possible ranges from one to four.

Gambling to Cope.—The 3-item gambling to cope subscale of the Gambling Motives Scale (Neighbors, et al., 2002) was used to measure gambling to cope as a motive. Participants were asked, "Thinking of all the times you gambled in the past 3 months, how often would you say that you gambled for each of the following reasons?" Response options coded on a five-point scale: 0 "*Never/Almost Never*"; 1 "*Some of the time*"; 2 "*Half of the time*"; 3 "*Most of the time*"; and 4 "*Almost always/Always*". Items included "release from stress," "avoid responsibility," and to "shut the world out." Scores consisted of the sum of the three items and range from 0 to 12. Cronbach's alpha was .85.

Analysis Strategy

Analyses were constructed hierarchically following the proposed hypotheses. In Step 1, gambling problems were examined as a function of stressful life events, gambling to cope, lack of perseverance, lack of premeditation, and negative urgency, after controlling for gender and gambling frequency. Specifically, we predicted that stressful life events would be positively associated with gambling problems, which was evaluated from the coefficient

for stressful life events (H1). The product of stressful life events and gambling to cope was added at Step 2 (H2; e.g., gambling to cope would interact with stressful life events to predict problems). Two-way product terms between stressful life events and the three impulsivity subscales as well as two-way product terms between gambling to cope in the three impulsivity scales were added at Step 3 (H3; e.g., impulsivity would interact with stressful life events to predict problems). In Step 4, three-way product terms between stressful life events, gambling to cope, and each of the three impulsivity subscales (H4; e.g., a three-way interaction between gambling to cope, impulsivity, and stressful life events would emerge in predicting problems). The raw scores for stressful life events ranged from 208 to 1433.5 and were divided by 100 to facilitate interpretation of coefficients. All predictors were mean centered. Missing data was handled via listwise deletion such that participants were included if they had a stressful life events score, and those who were not missing did not differ on any of the other variables.

Following a generalized linear modeling approach, preliminary analyses were conducted to evaluate the appropriate distribution for modeling gambling problems as a count outcome (Cameron & Trivedi, 2013; Fox, 2015; Hilbe, 2014). The distribution of gambling problems exhibited a large positive skew, with scores consisting of integers ranging from 0 to 80. We used the COUNTFIT program in STATA15.0 to compare models of gambling problems with distributions specified as Poisson, negative binomial (NB), zero-inflated Poisson (ZIP), and zero-inflated negative binomial (ZINB). NB and ZINB models provided consistently better fit than Poisson or ZIP. The NB and ZINB provided similar fit values, which varied depending on which predictors were in the model. In the final model (Step 4) the AIC and BIC values (lower is better) were 3741 and 3824 for NB and 3665 and 3827 for ZINB, respectively. The AIC values favored the ZINB model whereas the BIC values, which provide a stronger penalty for extra parameters, favored the NB model. Given the similarity of fit and the absence of a theoretical rationale for distinct types of participants scoring zero, we selected the more parsimonious NB approach (Long & Freese, 2014). Robust standard errors were used for tests of parameter estimates.

Results

Descriptive Statistics and Zero-order Correlations

Tolerance checks were conducted and all tolerance values were all well above thresholds associated with multi-collinearity (i.e., .60 – .97). Descriptive statistics and zero-order correlations for study variables are presented in Table 1. Gambling problems were significantly and positively correlated with gambling frequency, gambling to cope, negative urgency, lack of perseverance, and lack of premeditation. Gambling frequency, included as a covariate, was positively associated with gambling to cope, and all three impulsivity subscales. Women reported more life stress than men. Stressful life events were positively correlated with all other variables with the exception of negative urgency and lack of perseverance. Gambling to cope was positively correlated with all variables with the exception of gender. The three impulsivity subscales were all positively correlated with each other.

Negative binomial models

Table 2 presents results from the NB models. Coefficients in the models were log-linked. When exponentiated, coefficients can be interpreted as incident rate ratios (IRR), which represent the expected proportional change in the outcome for each unit change in the predictor. Results from Step 1 indicated that gambling frequency, stressful life events, and gambling to cope, were uniquely associated with gambling problems. The IRR for the intercept reflected the expected number of gambling problems 7.86 for someone with mean scores (i.e., 0s) on all predictors. The IRR of 1.09 indicated that each unit increase on stressful life events (100 raw score units) was associated with a 9% increase in the expected number of gambling problems. Thus, the expected number of problems for an individual scoring one point higher than the mean on stressful life events/100 was 8.57 (7.86*1.09). Similarly, the expected number of gambling problems for a person who scored 2 points higher than the mean on stressful life events/100 was 9.34 (8.57*1.09).

The interaction between stressful life events and gambling to cope was tested at Step 2. The interaction was significant. Figure 1 presents the interaction between stressful life events X gambling to cope. The IRR of .98 for the interaction term indicates that the IRR for stressful life events decreased by .02 for each unit increase in gambling to cope. The graph presents predicted number of gambling problems based on parameter estimates and values of stressful life events between 0 and 6 (approximately 97% of scores) and gambling to cope scores of 0, 2, 5, and 8 (roughly corresponding to 30th, 50th, 70th, and 90th percentiles of gambling to cope scores). Values were plotted with standard error bars. The legend presents IRRs for stressful life events at each value of coping motives with 95% confidence intervals. Results indicated that the association between stressful life events and gambling problems diminished at higher levels of gambling to cope. Participants who most strongly endorsed gambling to cope had more gambling problems, regardless of level of stressful life events.

None of the other two-way interactions at Step 3 were significant. Thus, no evidence emerged for two-way interactions between stressful life events and impulsivity or between gambling to cope and impulsivity. Two of the three, 3-way interactions at Step 4 were statistically significant: 1) stressful life events X gambling to cope X lack of perseverance, and 2) stressful life events X gambling to cope X lack of premeditation. Figure 2 presents the interaction between stressful life events X gambling to cope X lack of perseverance. Estimated predicted values for gambling problems were based on parameter estimates using the same values for stressful life events and gambling to cope as described above with perseverance values of 1.2, 2.0, and 2.6 (roughly corresponding to the 10th, 50th, and 90th percentiles of perseverance scores). Results indicated that among participants with the highest levels of perseverance (lowest levels of lack of perseverance), there were no significant associations between stressful life events and gambling problems at any level of gambling to cope. In contrast, among participants who exhibited average and low levels of perseverance (medium and high values of lack of perseverance), the association between stressful life events and gambling problems diminished at higher levels of coping motives. Among these participants, those who most strongly endorse gambling to cope reported more gambling problems regardless of level of stressful life events.

Figure 3 presents the interaction between stressful life events X gambling to cope X lack of premeditation. Estimated predicted values for gambling problems were based on parameter estimates using the same values as described previously. Values of premeditation of 1.2, 2.0, and 2.6 (roughly correspond to the 10th, 50th, and 90th percentiles of premeditation scores). Interestingly, the pattern of findings for the stressful life events X gambling to cope X lack of premeditation was almost the mirror opposite of the interaction between stressful life events X gambling to cope X lack of perseverance. Among participants with higher and moderate levels of premeditation (lower and moderate levels of lack of premeditation) stressful life events was positively associated with gambling problems among participants who reported lower to moderate levels of coping motives. Participants with higher and moderate levels of premeditation who endorsed higher levels of gambling to cope reported more gambling problems regardless of stressful life events. Among students having the lowest levels of premeditation (highest levels of lack of premeditation), stressful life events were only associated with gambling problems among those reporting the highest levels of gambling to cope.

Discussion

This is one of few studies examining the linkage between stressful life events and subsequent gambling problems among at-risk college students. College is marked as an important, albeit stressful, time period of identity exploration. Many students may increase their risky behaviors as a result of living away from home for the first time (Egan et al., 2017). Those who engage in risky behaviors such as gambling to cope may experience more repercussions as a result of stressful life events. As gambling problems have been significantly associated with depression in emerging adults (Edgerton et al., 2018), these results highlight the importance of examining stressful life events and personality traits that may be precipitating college-aged students to engage in risky behaviors.

We found a link between stressful life events and gambling problems, over and above gambling frequency. Additionally, those who gamble to cope may be even more susceptible to experiencing greater gambling problems, regardless of their levels of impulsivity. These findings are consistent with previous work which has shown that stressful life events predict the onset of problematic gambling (Sharma & Sacco, 2015). It is plausible that since exposure to stressful life events triggers activation of negative emotions, lack of emotional regulation and effective coping skills may be important factors contributing to whether one engages in maladaptive behaviors, which contribute to increased gambling problems (Blaszcynski & Nower, 2002; Nower & Blaszczynski, 2004; Williams, Grisham, Erskine, & Cassedy, 2011; Verdejo-Garcia, Bechara, Recknor, & Perez-Garcia, 2007). In this case, gambling may be an escape for emotionally vulnerable gamblers, or those who specifically gamble as a coping mechanism. Our findings support this hypothesis.

Gambling to cope was found to moderate the link between stressful life events and gambling problems. We found that among those higher in gambling to cope, stressful life events had little impact on experiencing gambling-related problems. This suggests that those who endorse gambling to cope turn to gambling, irrespective of stressful events in their lives. Since distraction and avoidant coping styles were found to be prevalent among young adults

who were problematic gamblers (Gupta, Derevensky, & Marget, 2004), it is possible that these individuals regularly turn to gambling to cope as a way to detract from their negative emotions, regardless of what is going on in their lives. Further work is needed to test this possibility.

However, among those who exhibit lower to moderate levels of gambling to cope, stressful life events were associated with increases in gambling problems. This suggests that when experiencing stressful life events, these individuals turn to gambling to cope as a behavioral method of managing stressors, which consequentially, results in experiencing more gambling-related problems. In the same vein, Hagen, et al.'s (2013) qualitative study posited that gambling may be a maladaptive behavior in which people engage as a method of coping with psychosocial stressors. The study investigated maladaptive coping mechanisms in a sample of Aboriginal women living in Western Canada. Given that this population may be at a potentially higher risk of experiencing a trauma, Hagen, et al. (2013) found that among these women, gambling helped them escape from the trauma and high levels of social trauma (e.g. poverty, racism, etc.) contributed to problematic gambling among this group. Grubbs, Chapman, Milner, Gutierrez, & Bradley (2018) found a similar trend such that PTSD symptoms were related to greater gambling expectancies and coping motivations.

We found two, three-way interactions between stressful life events, gambling to cope, and impulsivity factors of perseverance and premeditation in predicting problems. In terms of the interaction between stressful life events X gambling to cope X lack of perseverance, the moderating effect of coping motives on the relationship between stressful life events and gambling problems appeared to weaken at higher levels of coping motives, especially for those higher in lack of perseverance. In other words, participants who lack or have moderate levels of perseverance and highly endorse gambling to cope, are likely to turn to gambling, and consequently experience problems, irrespective of stressful events that are occurring in their lives. Moreover, literature has found that lack of persistence is positively associated with boredom among young people (e.g., Magid & Colder, 2007; Thompson, Roemer, & Leadbeater, 2015); thus, this may be problematic in that these students may be habitually turning to gambling as a way to alleviate to their boredom and/or numb discomfort from even daily stressors.

With regard to the significant three-way interaction between stressful life events X gambling to cope X lack of premeditation, uncovered an opposite pattern of results. That is, results revealed higher endorsement of gambling to cope was more of the driving factor for why participants who were planners (e.g., were low in lack of premeditation) or possessed a moderate ability to plan experienced problems, irrespective of number of stressful life events. However, for those who endorsed lacking the ability to plan out their lives (e.g., those who were highest in lack of premeditation) and reported the highest levels of coping motives, greater number of stressful life events were associated with more gambling problems. This may be concerning as a meta-analysis of personality traits of pathological gamblers (MacLaren, Fugelsang, Harrigan, & Dixon, 2011) surveyed 44 studies and found a strong, consistent positive association between lack of premeditation and problem gambling ($d = .84$). Thus, students who are unable to plan out their lives and turn to gambling to cope

may be more susceptible to becoming pathological gamblers, if they have also experienced a large number of stressful life events.

Limitations

Some limitations should be noted in spite of this study's strengths. First, this is a cross-sectional study thus we cannot assume causal or directional inferences between stressful life events and gambling problems. Longitudinal studies may shed further light on whether the experience of trauma and other stressful life events may play an important role in contributing to gambling related problems. Secondly, this study was restricted to only those who endorsed 3+ on the SOGS which prior work has shown to be indicative of at risk gamblers (Dube et al., 1996; Lesieur et al., 1991; Volberg & Steadman, 1989). Third, this study focuses on college students; thus, results may only be generalizable to this sample. It is important to investigate these relationships with a more diverse sample. Fourth, we also found an opposite pattern in our hypothesized three-way interaction between stressful life events X gambling to cope X lack of premeditation. Interpretation should be proceeded with caution and this highlights the complexity of the relationship between impulsivity and gambling problems. Lastly, gambling to cope was found to moderate the relation between stressful life events and gambling problems such that those who were higher in coping had greater gambling problems, irrespective of their reports of stressful life events. The fact remains that there may be other psychosocial factors that contribute to the onset of problematic gambling which may lead to gambling-related problems including weak social support networks (Holdsworth, Nuske, & Hing, 2015), difficulties regulating negative emotions (Bonanno et al., 2007; Holdsworth, Nuske, & Hing, 2015), mental health concerns, and early exposure to gambling within family (Saugeres et al., 2012; Dowling et al., 2010). Future work should explore these factors in relation to stressful life events and gambling to cope.

Acknowledgments

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Implications and Future Directions

This study demonstrates the importance of researching the impact of stressful life events on emerging adults and sheds light on gambling to cope and individual impulsivity as factors in relation to gambling-related problems. Future research should focus on stressful life events as they relate to gambling disorder and adverse gambling consequences. It may be the case that stressful life events predispose individuals to lower psychological well-being, and unhealthy behaviors such as problematic gambling. For example, problematic gambling and gambling disorders have been consistently linked to negative mental health outcomes such as depression and anxiety (Gupta & Derevensky, 2000; Neighbors, Lostutter, Cronce, & Larimer, 2002; Frank, Lester, & Wexler, 1991; Kapsomenakis, Simos, Konstantakopoulos, & Kasselimis, 2018). Sharma and Sacco (2015) found a strong correlation between childhood abuse and gambling outcomes to the extent that individuals who reported trauma during childhood, such as physical, emotional or sexual abuse, were at a 40 to 100% increased risk for a problematic gambling disorder.

Additionally, the literature would benefit from examining psychological outcomes and other risky behaviors. According to Jacob's Theory of Addiction (Jacobs, 1986), those who engage in risky behaviors have difficulty regulating their emotions and are more likely to develop gambling and drinking problems due to their use of these maladaptive behaviors as coping mechanisms. It is possible that emotion regulation could explain the relationship between stressful life events and gambling problems such that greater stressful life events promote difficulty in emotion regulation, resulting in problematic gambling behavior. Since to our knowledge this association has yet to be studied, future work should explore this possible link. Moreover, clinicians should work with clients in mitigating the negative psychological effects of stressful life events, as this may reduce the use of gambling as a coping strategy and in turn result in a reduction of gambling problems. Emerging adulthood, a critical phase in adolescent development, carries a likelihood to engage in risky behaviors, including gambling (Blinn-Pike, et al., 2007; Neighbors, et al., 2002). Additionally, rates of problematic gambling are on the rise among college students who are a particularly vulnerable demographic. Our findings suggest that prevention strategies, which take into consideration how stressful life events (in conjunction with impulsivity factors and gambling to cope) can influence problem gambling, may be beneficial in reducing gambling behavior and gambling problems.
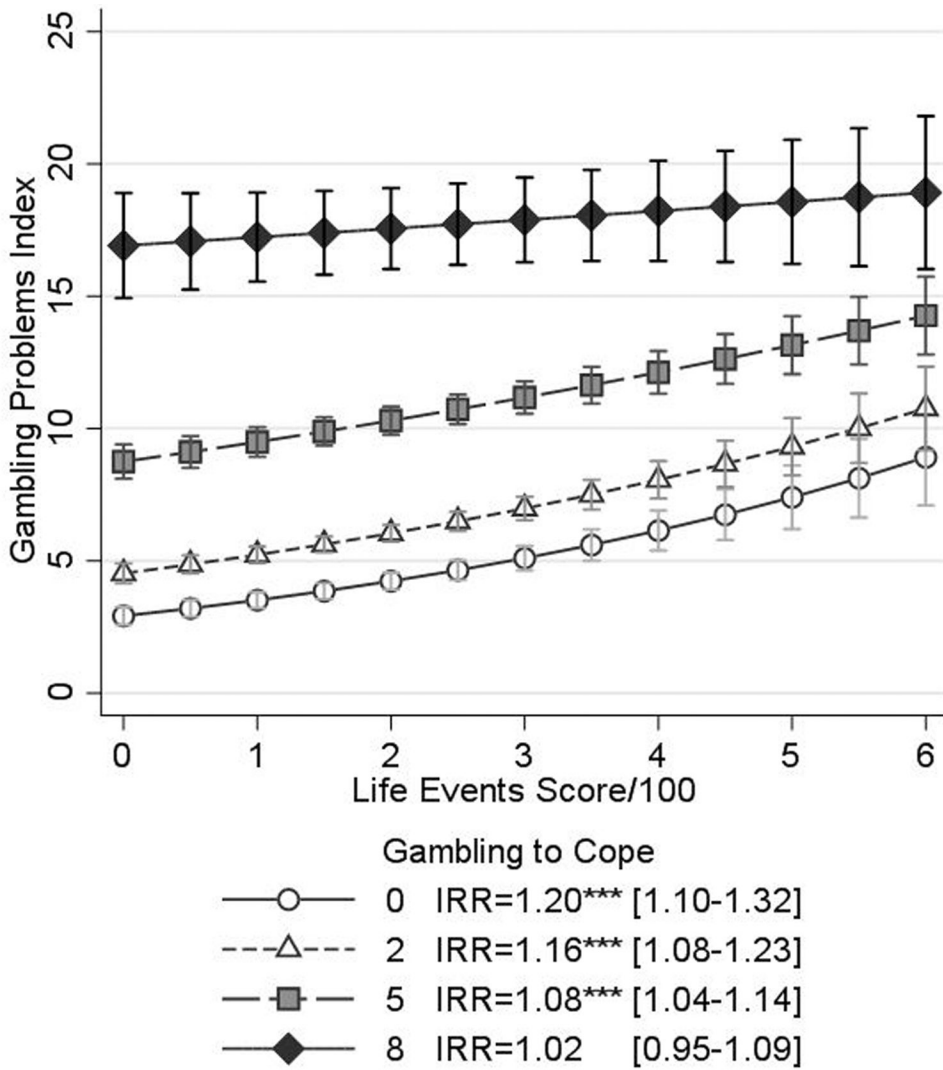
Figure 1.

Gambling problems index: Life stress x gambling to cope interaction

Note. IRR= incident rate ratio (i.e., the expected proportional change in gambling problems for each unit increase in the predictor).
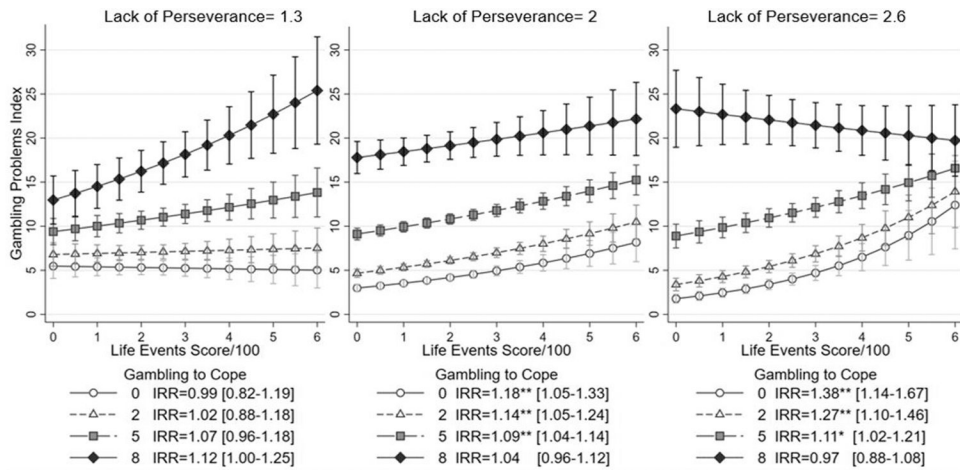
Figure 2.
Gambling problems index: Life stress x gambling to cope x lack of perseverance interaction
Note. IRR= incident rate ratio (i.e., the expected proportional change in gambling problems for each unit increase in the predictor).

Figure 3.

Gambling problems index: Life stress x gambling to cope x lack of premeditation interaction

Note. IRR= incident rate ratio (i.e., the expected proportional change in gambling problems for each unit increase in the predictor)
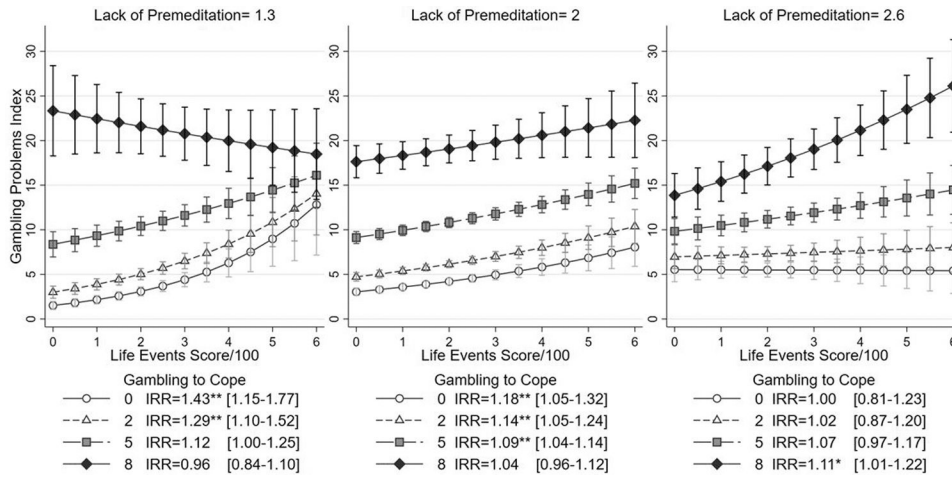
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Table 1.

Descriptive statistics

	Count	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)
							Correlations			
(1) Gender (Male)	653									
(2) Gambling Problems	653	12.00	16.36	−0.08						
(3) Gambling Frequency	653	3.76	6.24	−0.01	0.55 ***					
(4) Life Stress	596	2.08	1.77	−0.11 **	0.26 ***	0.11 **				
(5) Gambling to Cope	608	3.44	3.44	−0.02	0.58 ***	0.36 ***	0.15 ***			
(6) Negative Urgency	624	1.98	0.51	0.02	0.23 ***	0.09 *	0.03	0.29 ***		
(7) Lack of Perseverance	624	2.00	0.50	0.04	0.25 ***	0.14 **	0.02	0.27 ***	0.59 ***	
(8) Lack of Premeditation	624	2.61	0.59	−0.13 **	0.37 ***	0.20 ***	0.17 ***	0.37 ***	0.34 ***	0.22 ***

Note.

*
$p < .05$.

**
$p < .01$.

***
$p < .001$. Gender (Male) refers to the reference group

Table 2.

Results for gambling problem index as a function of stressful life events, coping motives, and dimensions of impulsivity

	Predictor	b	SE, b	Z	p	IRR	IRR 95% CI
Step 1	Intercept	2.062	0.050	41.55	0.000	7.86	7.13–8.66
	Gender (Male)	−0.016	0.064	−0.25	0.805	0.98	0.87–1.12
	Gambling Frequency	**0.060**	**0.009**	**6.28**	**0.000**	**1.06**	**1.04–1.08**
	Stressful Events/100 (Stress)	**0.086**	**0.026**	**3.27**	**0.001**	**1.09**	**1.04–1.15**
	Gambling Coping Motives (Cop)	**0.177**	**0.016**	**10.99**	**0.000**	**1.19**	**1.16–1.23**
	Lack of Perseverance (Pe)	−0.093	0.129	−0.72	0.470	0.91	0.71–1.17
	Lack of Premeditation (Pr)	0.139	0.122	1.15	0.252	1.15	0.91–1.46
	Negative Urgency (Nu)	**0.313**	**0.097**	**3.23**	**0.001**	**1.37**	**1.13–1.65**
Dispersion	ln(alpha)	0.076	0.074	1.02	0.308	1.08	0.93–1.25
Step 2	**Stress X Cop**	**−0.021**	**0.008**	**−2.51**	**0.012**	**0.98**	**0.96–1.00**
Step 3	Stress X Pe	0.043	0.068	0.63	0.530	1.04	0.91–1.19
	Stress X Pr	−0.039	0.071	−0.55	0.585	0.96	0.84–1.11
	Stress X Nu	−0.025	0.053	−0.47	0.638	0.98	0.88–1.08
	Cop X Pe	0.047	0.034	1.36	0.173	1.05	0.98–1.12
	Cop X Pr	−0.055	0.031	−1.78	0.075	0.95	0.89–1.01
	Cop X Nu	−0.044	0.024	−1.80	0.072	0.96	0.91–1.00
Step 4	**Stress X Cop X Pe**	**−0.046**	**0.015**	**−3.02**	**0.003**	**0.96**	**0.93–0.98**
	Stress X Cop X Pr	**0.048**	**0.019**	**2.59**	**0.010**	**1.05**	**1.01–1.09**
	Stress X Cop X Nu	0.002	0.011	0.15	0.880	1.00	0.98–1.02

Note. IRR= incident rate ratio (i.e., the expected proportional change in gambling problems for each unit increase in the predictor).