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Abstract

Although substantial research suggests that motivations have been found to mediate the relationships between impulsivity traits and various forms of substance use, no studies have examined how gambling motives may mediate the relationships between impulsivity traits and problem gambling. The primary purpose of this study was to test an integrative model linking impulsivity traits and gambling problems, evaluating the mediating effects of gambling motives. Participants were 594 students (73% male; mean age =19.92; SD=2.91) enrolled in public high schools or universities. Young people who tend to act rashly in response to extremely positive moods, showed higher enhancement and coping motives, which in turn were positively related to gambling problems. Individuals with higher levels of sensation seeking were more likely to have higher levels of enhancement motives, which in turn were also positively related to gambling problems. The model was examined in several groups, separately for the level of perceived gambling risk/benefits (lower perceived gambling risk, higher perceived gambling risk, lower perceived gambling benefits, and higher perceived gambling benefits). There were significant differences between these groups for this division. These findings suggest that prevention and/or treatment strategies might want to consider the model's variables, including impulsivity traits and gambling motives, in accordance with individual levels of perceived gambling risk/benefits.

Keywords: gambling; impulsivity; gambling motives; gambling risk; gambling benefits, problem gambling.

1. Introduction

Problem gambling among youth is an emerging public health issue in many countries (Molinaro et al., 2014) although in some countries such as the UK has been an area of concern for over 25 years (Griffiths, 1989). It has been associated with significant psychosocial and health problems (Blinn-Pike, Worthy, & Jonkman, 2010), and a recent Italian study (Bastiani et al., 2013), estimated past-year prevalence rate of 2.3% problem gambling among young adults (15-24 years) compared to 2.2% among older adults. In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), 'gambling disorder[1]' was re-classified as an addictive disorder, representing a new official category of behavioral addictions (Hasin et al., 2013). As a consequence of this reclassification, there may be a substantial increase in the study of gambling disorder from a variety of perspectives, including an examination of gambling disorder's personality correlates (Miller et al., 2013).

Among the diverse etiological contributions of the personality correlates, impulsivity is one of the most robust characteristics associated with addictions (including gambling disorder). A broad and growing body of literature suggests that: (i) impulsivity is not a unitary construct, but reflects multiple facets of personality that each contribute to rash and potentially dangerous behavior, such as problem gambling (Cyders & Smith, 2008); (ii) proximal mechanisms, for example motivations, have been found to mediate the relationships between impulsivity traits and various forms of substance use (e.g. Adams, Kaiser, Lynam, Charnigo, & Milich, 2012); (iii) perceptions about the benefits of alcohol could be a viable factor in explaining the different associations between impulsivity, motives and behaviors (Coskunpinar & Cyders, 2012). To date, no studies have examined how gambling motives may mediate the relationship between impulsivity traits and problem gambling, and how these relationships may differ in subgroups of young people in accordance with their levels of perceived gambling risk and benefits. The current study aimed to address this gap in the literature. Understanding the links between impulsivity traits, gambling motives, and

gambling-related outcomes related to individual levels of perceived gambling risk/benefits may help in developing appropriate evidence-based treatment and prevention strategies.

1.1. Multiple personality pathways to impulsive, risky behavior

Impulsivity (i.e., the tendency to act rashly or without adequate forethought) has been consistently associated with pathological gambling (see MacLaren and collegues 2011, for a recent review). Early conceptualizations of impulsivity focused on unidimensional definitions (e.g., Eysenck & Eysenck, 1978), but successive refinement of these aspects of personality has revealed several related but nonetheless putatively distinct dimensions (Patton, Stanford, & Barratt, 1995; Whiteside & Lynam, 2001). For example, the UPPS-P Impulsive Behavior Scale (Cyders et al., 2007; Whiteside & Lynam, 2001) is one of the most widely used measures of the impulsivity construct. The five UPPS-P impulsivity-related constructs have been identified (Cyders & Smith, 2007) as: negative **U**rgency, lack of **P**ersistence, lack of **P**lanning, **S**ensation-seeking, and **P**ositive urgency. Negative urgency is associated with impulsive behavior under conditions of negative affect (e.g., anger, anxiety); lack of persistence is the inability to remain focused on a task while distracted; lack of planning is the tendency to act without thinking ahead, sensation-seeking is the tendency to seek out novel and thrilling experiences; and positive urgency is expressed under conditions of positive affect (e.g., joy, elation). Among the dimensions of trait impulsivity, negative urgency is related to pathological gambling clinical samples (Torres et al., 2013). Sensation-seeking and positive urgency are related to frequency of gambling among college students (Cyders & Smith, 2008; Fischer & Smith, 2008). Therefore, the model in the present study predicted a direct connection between impulsivity facets and gambling problems.

1.2. Motives as mediators of the personality-behavior relationship

According to the Acquired Preparedness model of alcoholism risk, a possible mechanism through which personality traits may nurture drinking behavior is through drinking motives (Smith & Anderson, 2001; Settles, Cyders, & Smith, 2010). Considering individual motives for engaging in substance use (e.g., alcohol use) may allow for a better understanding of how certain personality traits put individuals at risk for problematic drinking (Cooper, 1994). Research supports the possibility that multiple facets of impulsivity (i.e., positive and negative urgency, sensation-seeking) contribute to rash and potentially dangerous behavior, such as problematic drinking (e.g., King, Karyadi, Luk, & Patock-Peckham, 2011), through, in part, drinking motives (e.g., Adams et al., 2012).

With respect to gambling, previous findings indicate that probable pathological gamblers score higher on some gambling motives (i.e., coping, enhancement, and social) than the non-pathological gamblers (e.g. Stewart & Zack, 2008). While all three motives are positively correlated with problem gambling in non-clinical populations (e.g., college students), only high enhancement motives for gambling were particularly predictive of problem gambling (Lambe, Mackinnon & Stewart, 2014). Although previous research supports the direct effects of gambling motives on gambling behavior, to date, no studies have investigated the possibility that motives mediate the relations between personality traits and gambling behavior.

1.3. Risk/Benefit perception as moderators of the personality-motives-behavior relationship

One important mechanism that may explain the association between drinking motives and alcohol outcomes involves individuals' perception of how beneficial or risky alcohol use is. A recent study (Coskunpinar & Cyders, 2012) suggested that perceptions relating to the benefits of alcohol could be a viable factor in explaining the different associations between impulsivity, motives and behaviors. In addition, a recent review on risk perception of gambling echoes this direction, and suggested that future research could examine the influence of individual differences on risk perception of gambling (Spurrier & Blaszczynski, 2014). Interestingly, previous studies have suggested that attitudes and perceptions towards gambling may influence gambling behavior (e.g., Orford, Griffiths, Wardle, Sproston, & Erenset, 2009; Wood & Griffiths, 2004), but no studies have investigated how gambling-oriented perceptions influence the effects of impulsivity traits and gambling motives on gambling behaviors.

1.4. The present study

Consistent with the theoretical backgrounds reviewed, the current study considers the potential mediating role of gambling motives in the association between impulsivity traits and gambling problems in a sample of young Italian people. It is hypothesized that two traits – sensation-seeking and positive urgency – will relate to problem gambling through unique mediation pathways. More specifically, consistent with the previous studies on problematic alcohol use, it is hypothesized that (i) the relationship between positive urgency and gambling problems is mediated by enhancement motives (Coskunpinar & Cyders, 2012), and (ii) the relationship between sensation-seeking and gambling problems is mediated by enhancement motives (Adams et al., 2012). These relationships are tested in different subgroups of young

people in accordance with their levels of perceived gambling risk and benefits. Therefore, the present study examines the potential differences and similarities between four groups of young people with (i) lower perceived gambling risk, (ii) higher perceived gambling risk, (iii) lower perceived gambling benefits, and (iv) higher perceived gambling benefits.

2. Method

2.1. Participants and data collection

A total of 1,070 young people participated in the study. Since gambling motives were not applicable among abstainers, only individuals who endorsed gambling activity in year prior to the study were included in the analysis (53.4%). There were no differences in terms of age between non past-year gamblers (M=19.76, SD=2.97) and past-year gamblers (M=19.90, SD=2.92), $F(1,1069) = .604$, $p=.43$, although there was a difference in term of gender, $\chi 2$ (1, N=1070) = 46.33, $p<.001$, with more past-year gamblers being male (73.4%) than non past-year gamblers (53.4%). The model was tested on a final sample of 594 students (73% male; mean age =19.92 years; SD=2.91) attending 4th and 5th grade of secondary school (n=385) or those in the first years of college (n=209). The institutional review committee at University of Padova gave ethical approval for the study. The data were collected using standard questionnaires, completed on a voluntary basis in the school or college classroom. Parental permission to participate for minor students and informed consent for everyone was obtained.

2.2. Measures

2.2.1. Impulsivity

Two of the most widely used impulsivity scales are the *UPPS-P Impulsive Behavior Scale* (Whiteside and Lynam, 2001) and the *Barratt Impulsiveness Scale* (BIS-11, Patton et al., 1995). Both scales are highly correlated with each other ($r = 0.67$), but correlations between their subscales are weak and inconsistent, supporting the notion that the measures cover different aspects of impulsivity (Meule et al., 2011). In the present study, impulsivity was assessed using the short UPPS-P (Billieux et al., 2012; Italian version: Aiello, D'Orta, Timpanaro, & Khazaal, 2014). The UPPS-P is a 20-item scale that evaluates five different impulsivity facets (four items per dimensions) labeled as negative urgency (tendency to experience strong impulses under conditions of negative affect), positive urgency (tendency toward rash action in response to very positive mood), lack of premeditation (tendency to fail to think and reflect on the consequences of an act before engaging in that act), perseverance

(difficulties remaining focused on a task that may be long, boring, or difficult), and sensation-seeking (the tendency to enjoy and pursue exciting activities and an openness to trying new experiences that may or may not be dangerous. All items are scored on a Likert scale from 1 ("I agree strongly") to 4 ("I disagree strongly"). Average scores were calculated for each scale. All scales demonstrated adequate internal consistency in the present sample: negative urgency (α=.77, CI=.73/.79); positive urgency (α=.74, CI=.70/.77); premeditation (α=.82, CI=.79/.84); perseverance (α=.85, CI=.83/.87); sensation seeking (α=.82, CI=.79/.84).

2.2.2. Gambling motives

The Gambling Motives Questionnaire (GMQ; Stewart & Zack, 2008) was translated into Italian by the authors following procedures recommended by Geisinger (1994). This 15-item scale is specifically designed to assess individuals' reasons for engaging in gambling. There are five items in each of three subscales: Social (e.g., "because it's what most of your friends do when you get together"), Coping (e.g., "to forget your worried") and Enhancement (e.g., "because it's exciting"). Relatively frequency of gambling was rated from 1 to 4 (1= "almost never/never"; 2= "sometimes"; 3= "often"; 4= "almost always"). Average scores were calculated for each scale. Internal consistency for each scale was adequate in the present sample: enhancement (α=.83, CI=.81/.85); coping (α=.83, CI=.81/.85); social (α=.70, CI=.65/.74).

2.2.3. Modified perception of risk and benefit questionnaire

This questionnaire on perceived risk and benefit was based on a scale by Siegel et al. (1994, 19 items) and a subscale of the Domain-Specific Risk-Taking [DOSPERT] (gambling, 3 items) scale (Weber, Blais & Betz, 2002). The items depict risk behaviors in the areas of driving, health, drugs, law-breaking and gambling. Two assessments are obtained: perception of extent of risk for each behavior; and perception of extent of benefit from each risk behavior. Internal reliabilities were 0.86 (CI=.84/.88) and 0.89 (CI=.88/.90), respectively. The original items were translated into Italian by the authors following procedures recommended by Geisinger (1994). The final list included 22 items – 19 from the Siegel et al. (1994) inventory and three from the DOSPERT gambling subscale (Weber, Blais & Betz, 2002). Items are answered using a 5-point Likert Scale from 1 ("Not at all") to 5 ("Extremely"). To test the hypothesis, only the three items from the DOSPERT scale measuring perceived risk/benefits of gambling were considered for the analysis. The three-item gambling-risk-perception scale resulted in a Cronbach's alpha of .76 (CI=.72/.79). The

three-item gambling-benefits-perception scale resulted in a Cronbach's alpha of .71 (CI=.67/.75).

2.2.4. Gambling Behavior

Gambling behavior was assessed using the South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA; Winters, Stinchfield, & Fulkerson, 1993; Italian version: Chiesi, Donati, Galli & Primi, 2013). Participants were initially asked to indicate the frequency of gambling in a list of gambling activities (e.g., cards for money, bets on sports teams). Following this they were presented with twelve "yes-no" items assess negative feelings and behaviors associated with gambling and are score 1 or 0, respectively. The sum of these items is the total SOGS–RA score, referred to as the "narrow" criteria (Winters, Stinchfield, & Kim 1995). There is a lack of consensus regarding appropriate cutoff scores for determining the problem gambling status of adolescents (e.g., Derevensky, Gupta, & Winters, 2003; Ladouceur, Ferland, Poulin, Vitaro, & Wiebe, 2005). Hence, total SOGS–RA score (gambling problems) served as the primary dependent variable. To counteract skewness, the data were log-transformed according to procedures recommended by Tabachnick and Fidell (2001). Nonetheless, categorical definitions of adolescent problem gambling facilitate comparison across studies. In reporting past-year prevalence rates, Winters et al.'s (1993) original scoring system was used. A SOGS–RA score of 0-1 is labeled "no problem," 2-3 merits an "at-risk" label, and 4 or more indicates "problem" gambling. The internal consistency of the SOGS–RA was .72 (CI=.69/.75). Following the standardized questionnaires of the European School Survey Project on Alcohol and Other Drugs project (Hibell et al. 2012), questions regarding gambling occasions ("On how many occasions (if any) have you bet money? – In your life and in the last 12 months") were also included.

2.3. Statistical Analyses

Structural equation modeling (SEM) was used to test the primary hypotheses. SEM analyses were conducted using R (R Development Core Team, 2012) Package lavaan (Rossell, 2012) and utilized a single observed score for each construct examined in the model. The final structural model was constructed in a stepwise fashion. At the first step, direct associations were considered from each personality trait to the gambling problems outcome variable to determine which traits were related to gambling problems and therefore candidates for mediation. The second step examined relations between personality traits identified at the first step and gambling motives. The third step tested for significant effects of gambling

motives on gambling problems, controlling for impulsivity. Thus, standardized parameters were estimated using the maximum likelihood method (Satorra & Bentler, 1988). To evaluate the adequacy of the model the R2 of each endogenous variable and the total coefficient of determination (CD^2, Bollen, 1989; Jöreskog & Sörbom, 1996) were considered.

There are multiple ways to assess for mediation (Beaujean, 2008). The present study used a SEM approach because it allows for simultaneous equation (relationship) estimation (MacKinnon, 2008). For the mediation effect, laavan uses the normal approximation method, and is based on the delta method (Casella & Berger, 2002). The stepwise fashion of the model (described above) pays respect to Baron and Kenny's (1986) three prerequisite conditions for testing mediation effects: (a) the predictor variable must be linked to the mediating variable, (b) the mediating variable must be linked to the outcome variable, and (c) the predictor variable must be linked to the outcome variable.

Finally, to test the model on the different groups the multi-group approach was used (Jöreskog & Sörbom, 1996; see, e.g., Byrne, 1989). The analyses were performed on four samples, using a median split into low and high subgroups on values of perceived gambling risk/benefits. This approach allows one to estimate the parameters simultaneously on different sub-groups. To more adequately evaluate multigroup comparisons, a series of more restrictive models to compare the final model with other alternative models was conducted within a nested model comparison framework (Widaman & Reise, 1997). Each model represents a different hypothesis of invariance to be tested[3]. The following hypotheses were compared: configural invariance (the same model is fitted in all groups without any equality constraints on the model parameters); invariance of the regressions (constraining regression parameters to be equal across groups); partial invariance of regression parameters (constraining regression parameters to be equal with the exception of the parameters that are more different between lower and higher perceived gambling risk/benefits).

3. Results

In the past-year gamblers sample, 443 (74.6%) had no gambling problem; 99 (16.7%) were at-risk gamblers, and 52 (8.8%) were problem gamblers. The mean score on the gambling problems was .50 (SD=.62). Descriptive statistics of all the variables considered for inclusion in the model are outlined in Table 1.

3.1. Step 1: Personality to gambling problems

Throughout the results, β is used to represent the estimated standardized direct effect. In the first step, positive urgency (β=.15, p=.003) and sensation-seeking (β=.15, p<.001) were significantly and positive associated with gambling problems. Negative urgency, perseverance, and premeditation were not significantly related to gambling problems. Given these results, positive urgency and sensation seeking were identified as candidates for mediation effects in subsequent analyses.

[INSERT ABOVE HERE TABLE 1]

3.2. Step 2: Personality to gambling motives

In the second step, associations were investigated simultaneously from the two personality traits identified in the first step to gambling motives. Positive urgency was significantly related to enhancement motives (β=.19, p<.001) and social motives (β=.20, p<.001). Additionally, positive urgency was also significantly related to coping motives (β=.13, p=.004). Sensation seeking was also significantly related to enhancement motives (β=.10, p=.020). Significant relationships were retained for the next step.

3.3. Step 3: Personality, gambling motives, and gambling problems

In the third step, the direct relationships from personality to gambling problems that were found to be significant in Step 1 were reintroduced into the model along with significant associations from personality to motives and from motives to gambling problems. The direct relationships for both positive urgency and sensation seeking remained statistically significant. Figure 1 shows the estimated standardized parameters. The squared multiple correlations indicate that the model accounts for a modest portion of the variance in study variables, more specifically: 6% of the variance in enhancement motives, 4% in coping motives, 3% in social motives, and 23% in gambling problems. Moreover, the total coefficient of determination (CD) was .16.

[INSERT ABOVE HERE FIGURE 1]

Table 2 shows the decomposition of effects of impulsivity traits on gambling problems. The direct effect of positive urgency on gambling problems was significant and positive (.14). Along with the direct effects, positive urgency also has an indirect relationship with gambling problems (.10) through its effect on coping motives (.05) and enhancement motives (.05). Higher levels of positive urgency were associated with stronger endorsement of both coping motives and enhancement motives, which, in turn, were associated with higher gambling

problems scores. The direct effect of sensation-seeking on problem gambling was significant and positive (.13). Along with the direct effects, sensation-seeking also has an indirect relationship with problem gambling through its effect on enhancement motives (.03). Higher levels of sensation-seeking were associated with stronger endorsement of enhancement motives, which was associated with higher gambling problems scores.

[INSERT ABOVE HERE TABLE2]

After evaluating the model in the total sample, the model was tested separately in the different sub-groups: perceived gambling risk/benefits (higher and lower). The results of the comparisons across these models are presented in Table 3. In relation to the differences in perceived gambling risk, the values across configural invariance and invariance of the regressions significantly changed ($\Delta\chi^2_{[9]} = 18$, p=.03). It is therefore important to analyze and compare the parameters of the model in the different subgroups. Table 4 presents all the parameters included in the model, the R^2, and the CD for each of the variables. Following this phase, further analysis allowed for partial invariance of regression parameters (freeing regression parameters that strongly indicated noninvariance across groups). The values across the configural invariance and the partial invariance of regression parameters did not significantly change ($\Delta\chi^2_{[6]} = 8$, p=.19) suggesting that the model described by partial invariance fits the data better than the other model (same model in all groups). Therefore, some of the findings from the comparison of parameters across subgroups are of particular interest. More specifically, positive urgency is more related to social motive, sensation-seeking is more related to gambling problems and enhancement motive in young people who perceive fewer risks of gambling than young people who perceived higher risks of gambling for whom these relationships are not significant.

In relation to the differences in perceived gambling benefits, the values across configural invariance and invariance of the regressions significantly changed ($\Delta\chi^2_{[9]} = 22$, p=.005). It is therefore important to analyze and compare the parameters of the model in the different subgroups (see Table 4). Following this phase, further analysis allowed for partial invariance of regression parameters (freeing regression parameters that strongly indicated noninvariance across groups). The values across the configural invariance and the partial invariance of regression parameters did not significantly change ($\Delta\chi^2_{[4]} = 8$, p=.10) suggesting that the model described by partial invariance fits the data better than the other model (same model in all groups). Therefore, positive urgency is more related to gambling problems and social

motive, sensation-seeking is more related to gambling problems, and social motive is more related to gambling problems in young people who perceive greater benefits than young people who perceive fewer benefits of gambling for whom these relationships are not significant. Finally, the relationship between positive urgency and enhancement motive was significantly stronger at higher levels of benefit perception.

[INSERT ABOVE HERE TABLES 3 and 4]

4. Discussion

The aim of the present study was to extend gambling research by differentiating the mechanisms of risk for gambling problems associated with impulsivity traits. In doing so, the study also served as a partial replication of some previous research on substance use (e.g., Adams et al., 2012; Conskunpinar & Cyders, 2012) by demonstrating the links between impulsivity traits, gambling motives, and gambling-related outcomes. The results showed that in a sample of young Italian people, sensation seeking and positive urgency worked through different pathways to increase gambling-oriented problems, indicating that relationships between different aspects of impulsivity and gambling problems. A discussion of the more specific findings now follows.

4.1. Impulsivity and gambling-related problems

The finding that sensation seeking predicts greater numbers of gambling problems supports existing theories of sensation seeking, which suggest that individuals with high levels of sensation seeking are motivated by behaviors that provide stimulation and reward (Brunelle et al., 2004; Zuckerman, 1994). The finding that positive urgency is a significant predictor of gambling-related problems supports the findings of previous research (Cyders & Smith, 2008; Fischer & Smith, 2008). This finding suggests that individual differences in the number of gambling problems are directly associated with positive affect. Variability in young people gambling seems to follow individual differences in rash acts during very positive emotional states, as opposed to rash acts during negative emotional states. Indeed, negative urgency did not significantly predict gambling-related problems in our sample. This result could be considered with the results of a recent study where negative urgency was unique in independently covarying with gambling severity in a sample of pathological gamblers (Torres et al., 2013). This is also consistent with previous reports that negative urgency is a sign of overpathologization in addictive processes (e.g., Michalczuk et al., 2011) rather than a characteristic of non-pathological behavior (e.g. at-risk, problem gambling).

Finally, lack of premeditation and perseverance did not significantly predict gambling-related problems and suggests that the emotional components of impulsivity (e.g., positive urgency and sensation seeking) may have greater influence on the gambling problems than the non-emotional components of impulsivity (lack of perseverance/premeditation). In this direction, previous studies have shown that automatic affective responses to substance-related stimuli may influence substance use behavior more strongly than reflective or 'explicit' cognition (Stautz & Cooper, 2014; Wiers & Stacy, 2006).

4.2. Gambling motives and their mediating effects

The finding that the relationship between sensation seeking and gambling problems was partially mediated by enhancement motives is consistent with previous studies, where gamblers with high levels of enhancement motives for gambling, were also characterized by high levels of sensation-seeking and gambled for the 'high' and feelings of excitement that gambling can create (Bonnaire et al., 2009; Stewart et al. 2008; Vachon & Bagby, 2009). In addition, this finding supports the theory that sensation seekers are likely to endorse enhancement motives in an attempt to experience greater thrill and stimulation from their environment (Cooper et al., 2000; Gullo, Dawe, Kambouropoulos, Staiger, & Jackson, 2010). Consequently, high levels of sensation seeking were associated with high levels of enhancement motives, which in turn were associated with high levels of gambling problems.

The finding that the relationship between positive urgency and gambling problems was partially mediated by enhancement motives, supports Settles and colleagues (2010) research that found positive urgency led to increased alcohol use through expectations that alcohol enhances positive affect. Thus, young people who tend to act rashly in response to extremely positive moods are more likely to form strong reasons that gambling brings positive and arousing effects, which in turn lead to increased gambling problems.

An additional unpredicted indirect pathway was found through the results relating to coping motives. Generally, negative urgency (not positive urgency) is thought to lead to increased drinking quantity indirectly as well, by leading to increased motives to drink to cope with subjective distress, which in turn lead to increased drinking quantity (Fisher, Anderson, & Smith, 2004; Settles, Cyders, & Smith, 2010). It seems likely that this inconsistency is due to the result that negative urgency did not predict gambling-related problems in the multivariate analysis.

4.3. Differences and similarities in perceived gambling risk\benefits

Inside this integrated perspective, perceived gambling risk/benefit related similarities and differences were also investigated, advancing the paucity of knowledge regarding this issue (Conskunpinar & Cyders, 2012). Results indicated that some regression parameters were significant only in young people who perceive greater benefits and fewer risks of gambling. This reflects previous studies that have found higher participation in risk behaviors were associated with the perception of greater benefits and fewer risks (e.g., Hampson, Severson, Burns, Slovic, & Fisher, 2001). More specifically, as for lower levels of gambling risk and higher levels of gambling benefit similarities, sensation-seeking was positively related to gambling problems in both groups . Previous studies have found that perception of lower risk among gamblers is associated with several factors, such as sensation seeking and self-worth (Derevensky, Sklar, Gupta, & Messerlian, 2010; Orford et al., 2009; Tao et al., 2011). Overall, these findings suggest that particular individual factors (e.g., sensation-seeking) predispose gamblers to develop particular beliefs associated with greater exposure to risk and harm. Positive urgency was positively associated with social motives in young people who perceived lower gambling risk and higher gambling benefits. It is possible that in individuals with more favorable attitudes towards gambling, positive urgency with its emphasis on rash action while experiencing a positive mood, interact with positive and arousing experiences (i.e., drinking makes one more attractive, horny, and social) (Cyders et al., 2007).

As for lower levels of gambling risk and higher levels of gambling benefit differences, sensation-seeking was positively related to enhancement motive in individuals with lower gambling perceived risk. This is consistent with previous research which showed young problem gamblers use gambling as a means of generating excitement that they perceive is missing from their lives (Getty, Watson, & Frisch, 2000; Griffiths, 1995; Gupta & Derevensky, 2000; McCormick, 1994). Positive urgency was positively related to gambling problems and enhancement in individuals who perceived higher levels of gambling benefits. The findings may be interpreted in relation to research by Conskunpinar and Cyders (2012) that found as benefit perception levels increased, the indirect effect of positive urgency on problematic alcohol consumption through enhancement motives changed.

Finally, an interesting result was the positive relation between social motive and gambling problems in young people who perceived higher levels of gambling benefits. Past researchers have found that social motives do not generally predict problem gambling (Dechant & Ellerly 2011; Lambe, Mackinnon & Stewart, 2014; Stewart & Zack, 2008). The results here suggest that gambling for social reasons may be more risky for an individual with higher benefit

perception. It is likely that individuals with higher levels of perceived gambling benefits may be considered as extrinsically motivated gamblers who were more likely to do so because of external rewards such as money and social approval (Chantal et al., 1995).

4.4. Clinical Implications

As highlighted by the discussion above, it is useful to consider two specific pathways when addressing impulsivity in problem gambling prevention or intervention. Young people who are high in sensation seeking and positive urgency engage in gambling to increase positive feelings. According to Adams et al. (2012), some potential ways of intervening may involve (i) working with young people on considering not only positive and immediate consequences of gambling, but also on effects that are less salient in the moment (e.g., economic losses and strained relationships with family members and friends), and (ii) providing alternative behaviors to gambling (e.g., sport) to enhancing positive sensation. On the other hand, positive urgency was also associated with coping motives, which in turn related to gambling problems. Individuals who score high on coping motives may, according to Adams et al. (2012), benefit from a type of intervention, aimed at educating them to focus on the negative social and emotional consequences of engaging in gambling to cope, as well as training in adaptive strategies for coping with negative effect (e.g., yoga).

It is also possible that different strategies may be required for young people as the present study found that specific relationships between impulsivity traits, gambling motives, and gambling problems, were only significant in young people who perceived lower gambling risk and higher gambling benefits. This may help in developing problem gambling treatment and prevention strategies suggesting that if benefit perception can be minimized, the direct effect (of positive urgency on gambling problems, enhancement motive and social motive, positive urgency on social motive, sensation seeking on gambling) could also be minimized. In addition, if risk perception can be maximized, the direct effect (of sensation seeking on enhancement motive and gambling problems; positive urgency on social motive) could also be reduced.

4.5. Limitations and future directions

The findings of the present study must be understood in the context of the study's limitations. First, a significant limitation of the current study was the cross-sectional design. Examining these relations in a longitudinal study would allow for a clearer understanding of the relationship among impulsivity traits, gambling motives, and gambling outcomes and how

these relations change over time. Secondly the majority of the sample participants were males and students. It is important to investigate this risk model with a more diverse sample. Thirdly, although it was demonstrated that gambling motives contributed significantly to mediate the relationship between impulsivity and problem gambling, the fact remains that much of the variance in gambling motives remained unexplained. In explaining the potential effect of motives on addictive behaviors, most studies use numerous causal factors, only one of which is impulsivity. Other unconsidered factors associated with youth (i.e. extroversion, neuroticism and anxiety, Kuntsche, Knibbe, Gmel, & Engels, 2006; mood states, Goldstein, Stewart, Hoaken, & Flett, 2014) or the community (different countries; Molinaro et al., 2014) may also predict motives. Fourthly, all data were self-report and are therefore subject to the standard limitations of this type of data (e.g., social desirability biases, memory recall biases, etc.). Lastly, future research should aim to develop and to examine the effectiveness of treatment approaches tailored to specific impulsive personality traits and gambling motives.

Despite these limitations, as our review of the literature suggests, the present study is likely to be the first that has sought to clarify the mediating effects of gambling motives on the relationship between impulsivity traits and gambling problems. In particular, the findings give support to the idea that young people who tend to act rashly in response to extremely positive moods show higher enhancement and coping motives, which are, in turn, positively related to gambling problems. Individuals with higher levels of sensation seeking are more likely to have higher levels of enhancement motives, which, in turn, are also positively related to gambling problems. The model was examined in several groups, separately for the level of perceived gambling risk/benefits. There were significant differences between these groups for this division. Therefore, those interested in promoting responsible gambling (and decreasing gambling problems) might want to consider the model's variables, including impulsivity traits and gambling motives, in accordance with individual levels of perceived gambling risk/benefits.

Footnotes

[1] Gambling disorder is a recognized mental health condition that is characterized by difficulty limiting gambling expenditure, chasing losses, lying about gambling, and severe negative consequences of excessive gambling (APA, 2013). Two categories of gambling disorders are salient in published work: pathological gambling and problem gambling. Pathological gambling is medically defined, with diagnostic criteria described in both the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision (DSM-IV-TR) and the International Classification of Diseases, 10th revision (ICD-10). Both classification systems summarize pathological gambling from an atheoretical perspective (i.e., they list only objective and behavioral diagnostic

criteria), and both classify pathological gambling within an impulse disorder section. Problem gambling is a more general term that incorporates subclinical conditions where an individual experiences significant negative consequences as a result of gambling, and as such this is an appropriate term to use in relation to harm minimization policies (Neal, Delfabbro, & O'Neil, 2005). This term is generally used in research where screening measures are used to identify problem gamblers without confirmation through clinical interviews, and as such typically includes those with gambling disorder.

[2] The CD is defined as:

$$1 - \frac{|\widehat{\Psi}|}{|\widehat{\Sigma}_{yy}|}$$

here, $|\widehat{\Psi}|$ is the determinant of the covariance matrix among the errors and $|\widehat{\Sigma}_{yy}|$ is the determinant of the fitted covariance matrix among endogenous variables. The CD shows the joined effect of the predictor variables on all dependent variables (i.e., the higher the CD the more is the variance explained).

[3] Testing for invariance was examined through the traditional perspective (Byrne & Stewart, 2006) that examines the change in chi-square values ($\Delta\chi^2$) across nested models. If the $\Delta\chi^2$ values do not change significantly as the models grow more restrictive, it indicates that the more restrictive model fits the data as well as the less restrictive model.

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