Ciccarelli, M., Nigro, G., Griffiths, M.D., D'Olimpio, F. & Cosenza, M., (2019). The associations between maladaptive personality traits, craving, alcohol use, and adolescent problem gambling: An Italian survey study. *Journal of Gambing Studies,* Epub ahead of print

Abstract

Although gambling disorder (GD) criteria do not explicitly address craving, it has received increased attention because it has been found to be a significant predictor of gambling severity. Furthermore, recent findings have suggested that both alcohol consumption and maladaptive personality traits may be risk factors among adult GD. To date, no study has evaluated the relative contribution of these factors in adolescent gambling behavior. Consequently, the present study investigated the relationship between gambling severity, craving, maladaptive personality traits, and alcohol use among adolescents. The sample comprised 550 Italian high-school students (50.2% males), aged 14-19 years (mean age = 16.24 years; *SD* = 1.56). Participants were administered the South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA), Gambling Craving Scale (GACS), Personality Inventory for DSM-5-Brief Format (PID-5-BF), and Alcohol Use Disorders Identification Test (AUDIT). Results indicated that relative to both non-gamblers and non-problem gamblers, at-risk gamblers and problem gamblers scored higher on GACS, PID-5-BF and AUDIT. Regression analysis showed that Antagonism and Disinhibition PID-5-BF dimensions, Anticipation and Desire GACS subscales, and AUDIT total score were the best predictors of adolescent gambling involvement. These findings provide the first empirical evidence of associations between problematic gambling, craving, alcohol consumption, and maladaptive personality traits in adolescence.

Keywords: adolescent gambling; adolescent problem gambling; adolescent gambling disorder; gambling personality; gambling craving

Introduction

Recent reviews (Calado et al. 2017; Calado and Griffiths 2016) have demonstrated that past-year adolescent gambling across the world tends to be higher than among adults (e.g. Shaffer and Hall 2001), ranging from 0.2 to 5.6 %. More specifically, data from the Italian Population Survey on Alcohol and Drugs (IPSAD) – where the present study was carried out – showed that youth report higher prevalence of at-risk or problem gambling than adults (Bastiani et al. 2011). Beyond social and environmental factors, such as the availability and social acceptance of gambling activities (Calado et al. 2014; Volberg et al. 2010), the literature has highlighted the importance of personality and individual differences as predisposing conditions in the development of disordered gambling. The majority of more recent studies has adopted the conceptualization of personality as described by the five-factor model (Costa and McCrae 1992; McCrae and Costa 2003), according to which personality can be described as comprising five domains: neuroticism (emotional instability), extroversion (sociability and assertiveness), openness (openness to fantasy, experience, and imagination), agreeableness (kindness, trust) and conscientiousness (reliability and order) (Kaare et al. 2009).

Across different samples and assessment tools, studies have consistently shown that compared to non-disordered gamblers, disordered gamblers have higher scores on neuroticism and lower scores on conscientiousness (e.g. Bagby et al. 2007; Brunborg et al. 2016; Kaare et al. 2009; Myrseth et al. 2009; Ramos-Grille et al. 2015; Sundqvist and Wennberg 2015). Furthermore, neuroticism has been related to the proneness to experience negative emotions and to gamble in order to ameliorate mood (Blaszczynski and Nower 2002; Raylu and Oei 2002), whereas conscientiousness has been related to the difficulties in resisting urges or impulses (Cyders and Smith 2008). Similarly, MacLaren et al. (2015) observed that low positive emotions – a facet of extraversion domain – predicts disordered gambling.

The associations between agreeableness and gambling problems have shown less consistent results. Some studies have reported a positive association between low agreeableness and gambling problems (e.g. Brunborg et al. 2016; Buckle et al. 2013; MacLaren et al. 2011; Miller et al. 2013), while other studies have not (Bagby et al. 2007; Kaare et al. 2009; Myrseth et al. 2009). Disordered gamblers have also been shown to score lower on openness than non-disordered gamblers. This finding appears to highlight the inability of disordered gamblers to find functional ways (than gambling) to escape from day-to-day stressors and negative emotions (Buckle et al. 2013; Myrseth et al. 2009).

Section III of the DSM-5 (American Psychiatric Association 2013) proposed a hybrid model of personality disorders, which integrates the classic categorical approach with a more dimensional approach. The dimensional approach considers personality disorders as non-adaptive variants of personality traits, on a continuum from normality to pathology. This approach overcomes several problems of categorical diagnosis such as the extensive use of the

comorbidity criterion or the diagnosis of Personality Disorder Not Otherwise Specified (Widiger and Samuel 2005). In this hybrid model, the diagnosis of a Personality Disorder is formulated by taking into account two criteria. Criterion A regards the self and interpersonal functioning, whereas Criterion B regards the presence of one or more of five pathological personality traits: negative affectivity, detachment, antagonism, disinhibition, and psychoticism. A self-report assessment tool, the Personality Inventory for DSM-5 (PID-5; Krueger et al. 2012) was created to assess these pathological personality traits, which – in essence - capture the dysfunctional variants of the Five-Factor Model (FFM) dimensions (De Fruyt et al. 2013; Gore and Widiger 2013; Thomas et al. 2013; Wright et al. 2012).

A recent study (Carlotta et al. 2015) investigated adaptive and maladaptive personality dimensions in a sample of adult high-risk and low-risk gamblers, using both the PID-5 and Big Five Inventory (BFI; John et al. 1991). The authors found lower scores on both openness and conscientiousness scales of the BFI and higher scores on detachment and antagonism scales of PID-5 among high-risk gamblers compared to low-risk gamblers. However, when controlling for alcohol and drug use, only maladaptive personality traits discriminated problem gambling risk.

Overall, previous studies examining the personality correlates of disordered gambling have been based on adult samples. This is arguably surprising given that most research has suggested that maladaptive personality traits can be present during adolescence (Chanen et al. 2004) as well as documenting the temporal stability of such personality traits in adolescence and early adulthood (ages 12 to 20 years) (Roberts and DelVecchio 2000). Moreover, the screening of personality traits in adolescence has been found useful to individuate the antecedents of personality pathology in adulthood (see De Fruyt and De Clercq 2014 for a review).

The literature on adolescent gambling has also ignored the role of craving (i.e., the strong desire to engage in gambling, to both get excited and alleviate negative emotions) (e.g. Tiffany and Conklin 2000; Young and Wohl 2009). Although the criteria for gambling disorder do not explicitly address craving, it has been found to be a significant predictor of adult gambling severity and related-behaviors (e.g. Ashrafioun and Rosenberg 2012; Ciccarelli et al. 2016a, 2016b; Drummond et al. 2000).

Against this backdrop, the present study assessed the relationship between gambling severity, the five maladaptive personality traits (as assessed using the PID-5-BF), and craving in a sample of adolescent non-gamblers, non-problem gamblers, at-risk gamblers, and problem gamblers. Given the high comorbidity rates between alcohol use and gambling disorders (e.g. Griffiths, Wardle et al. 2010; Liu et al. 2009; Lorains et al. 2011; Tobias-Webb et al. 2018) and the impact of demographic characteristics (age, gender) (e.g. Afifi et al. 2010) on gambling, the possible confounding effect of these variables were controlled for in the analyses. Based on previous studies, it was hypothesized that higher level of gambling severity would be associated with higher scores on negative affectivity, antagonism, and disinhibition, high levels of craving, and higher alcohol consumption.

Methods

Participants

The sample comprised 550 adolescents (276 males) aged between 14 and 19 years (*M* =16.24 years; *SD* =

1.56) from the first- to the fifth-year of several public high schools in the cities of Naples and Caserta (56.5% lyceums

[secondary schools] and 43.5% technical and trade schools). More specifically, from the eight randomly selected

schools, only two declined to participate (refusal rate = 25%). Data collection began after the institutional review boards

approved the study protocol. No student refused to participate in the study. Participants were administered the Italian

versions of the South Oaks Gambling Screen Revised for Adolescents (SOGS-RA; Winters et al. 1993, 1995; translated

by Colasante et al. 2014), the Gambling Craving Scale (GACS; Young and Wohl 2009; translated by Ciccarelli et al.

2016a), the Personality Inventory for DSM-5-Brief Form (PID-5-BF; Krueger et al. 2012; APA 2013b; translated by

Fossati et al. 2013), and the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al. 1993; translated by

Piccinelli et al. 1997).

Measures

The *South Oaks Gambling Screen – Revised for Adolescents* is a commonly used self-report tool to assess the

severity of gambling involvement in adolescence and comprises 12 dichotomous (*yes/no*) scored items related to

gambling behavior over the last 12 months. It also includes several non-scored items related to the frequency of

participation in different gambling activities, the largest amount of money gambled in one day, and the gambling

motivation. The scores range from 0 to 12. A score of 0 indicates non-gambling, 1 indicates non-problem gambling, 2-3

indicates at-risk gambling, and scores of 4 or above indicate problem gambling.

The *Gambling Craving Scale* is a 9-item measure that assesses gambling-related craving (e.g. *"If it were

possible, I probably would gamble now"*). It includes three dimensions: *anticipation* (i.e., the expectation that gambling

would be fun); *desire* (i.e., an urgent desire to gamble); and *relief* (i.e., the expectation that gambling would alleviate

negative emotional states). Responses to questions such as *"If it were possible, I probably would gamble now"* or

"Gambling now would make things seem just perfect" are given on a 7-point Likert scale anchored at 1 (*strongly

disagree*) and 7 (*strongly agree*).

The *Personality Inventory for DSM-5-Brief Form* assesses five personality trait domains: *negative affectivity* is

the tendency to experience intense negative emotions and associated behaviors and interpersonal manifestations, such as

self-harm and dependence; *detachment* is the avoidance of socio-emotional experiences and retirement from affective

relationships; *antagonism* encompasses all behaviors that put the individual in opposition to others, such as egocentrism

and lack of empathy; *disinhibition* is the orientation towards immediate gratification, including impulsive behaviors; *psychoticism* includes culturally eccentric, strange, or unusual behaviors and thoughts. Originally, the PID-5 comprised 220 items, but recent studies have demonstrated the validity of its brief version including a sample of Italian adolescents (Fossati et al. 2017). The PID-5-BF comprises 25 items on a 4-point Likert scale from 0 (*very false or often false*) to 3 (*very true or often true*). For each trait domain, the score was obtained by dividing the raw domain score by the number of items in the domain. The score for each trait ranges from 0 to 15, with high scores reflecting a greater dysfunction in specific personality domain. The total score is computed by dividing the raw overall score by the total number of items (i.e., 25), and varies between 0 and 75, with high scores indicating greater overall personality dysfunction.

The *Alcohol Use Disorders Identification Test* is a 10-item self-report measure for assessing alcohol consumption. More specifically, it comprises three questions concerning the amount and frequency of drinking alcohol, three questions concerning alcohol dependence, and four questions concerning problems caused by drinking alcohol. Participants respond to each question on a 7-point scale from 0 (*never*) to 4 (*daily or almost daily*). A score of 8 or more indicates a strong likelihood of harmful alcohol use.

Procedure

The research was approved by the research team's university ethics committee. Before data collection, informed consent was obtained from participants, their parents (if they were under 18 years), and their schools. The informed consent stressed the anonymity of the participation and the right to refrain from participating and/or withdrawing from the study at any time. Each participant individually completed the self-report scales (i.e., SOGS-RA, GACS, PID-5-BF, and AUDIT) in a quiet room in the school. The scales were administered in counterbalanced order. Administration of the instruments took approximately 25 minutes to complete. After data collection, participants were debriefed and thanked for their participation, without any monetary reward.

Statistical analysis

Data were analyzed with the IBM Statistical Package for the Social Sciences, version 20.0. The alpha significance level was set at 0.05. Bivariate correlations were performed to examine the relationship between all variables. Gender and age differences among the SOGS-RA groups were tested by chi-square test and analysis of variance (ANOVA), respectively. A repeated measure analysis of covariance (ANCOVA) with SOGS-RA group (non-gamblers, non-problem gamblers, at-risk gamblers, and problem gamblers) as the independent variable, the PID-5-BF subscale (Negative affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism) scores as the dependent variable, and gender, age, and AUDIT score as covariates, was conducted with the purpose to examine personality

differences among levels of gambling severity. A repeated measure ANCOVA with SOGS-RA group (non-gamblers, non-problem gamblers, at-risk gamblers, and problem gamblers) as the independent variable, the GACS subscale (Desire, Anticipation, and Relief) scores as the dependent variable, and gender, age, and AUDIT score as covariates, was conducted with the purpose to examine differences on craving levels as function of gambling severity. A univariate ANCOVA on the AUDIT total score and SOGS-RA group (non-gamblers, non-problem gamblers, at-risk gamblers, and problem gamblers) as the independent variable, using gender and age as covariates, was run to assess the influence of problem gambling on alcohol consumption. Finally, to identify the predictors of adolescent problem gambling, a multiple regression analysis was performed on the SOGS-RA total score as the dependent measure, and using gender, age, and scores on the AUDIT, GACS, and PID-5-BF subscales as predictors.

Results

Correlational analysis showed that gender was negatively associated with SOGS-RA, all GACS subscales, the Antagonism subscale of the PID-5-BF, and AUDIT score, and positively associated with the Negative Affectivity and Psychoticism subscales of PID-5-BF. These results indicated that gambling severity, craving, antagonism, and alcohol use were associated with being male, whereas negative affectivity and psychoticism were associated with being female. Age was positively correlated with SOGS-RA (r = .238; $p < .001$), GACS Anticipation (r = .166; $p < .001$), GACS total score (r = .112; $p < .01$), and AUDIT (r = .379; $p < .001$), indicating that older adolescents have a greater involvement in both gambling activities and alcohol consumption, and report high gambling-related craving. SOGS-RA scores were strongly correlated with all subscales of GACS, with Detachment, Antagonism, and Disinhibition of PID-5-BF, and with AUDIT scores. The more severe the gambling involvement, the higher the level of gambling-related craving, the higher the dysfunctional personality traits, and the more severe the alcohol use (Table 1). Positive correlations between GACS total score and PID-5-BF Detachment, Antagonism, and Disinhibition domains were also observed.

INSERT TABLE 1 ABOUT HERE

According to the SOGS-RA scoring, there were 67 non-gamblers (NGs), 355 non-problem gamblers (NPGs), 90 at-risk gamblers (ARGs) and 38 problem gamblers (PGs). Significant differences in the gender ratio among groups were found ($\chi^2(3) = 43.43$, $p < .001$). There was a high proportion of male participants engaged in at-risk gambling (62.2%) and problem gambling (94.7%) compared to the other groups (non-gamblers: 38.8%; non-problem gamblers: 44.5%). The SOGS-RA groups also differed in age ($F_{3,546} = 16.35$; $p < .001$; $\eta^2_p = .08$). Bonferroni post-hoc tests demonstrated that non-gamblers were younger than all the other groups ($p < .001$) (Table 2).

INSERT TABLE 2 ABOUT HERE

The two-way ANCOVA (PID-5-BF subscales x SOGS-RA group) with gender, age, and AUDIT scores as covariates yielded significant main effects of group ($F_{3,543} = 4.12$; $p < .01$; $\eta^2_p = .02$), gender ($F_{1,543} = 16.12$; $p < .001$; $\eta^2_p = .03$), AUDIT ($F_{1,543} = 40.99$; $p < .001$; $\eta^2_p = .07$), and age ($F_{1,543} = 6.73$; $p < .01$; $\eta^2_p = .01$). The interaction of personality domains with gender ($F_{4,540} = 27.52$; $p < .001$; $\eta^2_p = .17$) and AUDIT ($F_{4,540} = 6.04$; $p < .001$; $\eta^2_p = .04$) were significant, whereas the interactions of personality domains with both group ($F_{12,1626} = 0.93$; $p = .51$) and age ($F_{4,450} = 0.58$; $p = .68$) were not. Follow-up tests indicated that problem gamblers scored higher than both non-gamblers and non-problem gamblers on detachment (all p-values $< .05$) and, along with at-risk gamblers, reported higher scores on antagonism than non-gamblers and non-problem gamblers (all p-values $< .01$). With regard disinhibition, at-risk gamblers had higher levels than both non-gamblers and non-problem gamblers (all p-values $< .001$). As compared to females, males reported greater antagonism, while females scored higher on negative affectivity and psychoticism compared to males (all p-values $\leq .001$). Moreover, severe alcohol consumption was positively correlated with detachment, antagonism, disinhibition, and psychoticism (all p-values $\leq .001$).

The two-way ANCOVA (GACS subscales x SOGS-RA group) with gender, age, and AUDIT scores as covariates showed main effects of group ($F_{3,543} = 36.07$; $p < .001$; $\eta^2_p = .17$), gender ($F_{1,543} = 5.99$; $p = .01$; $\eta^2_p = .01$), AUDIT scores ($F_{1,543} = 25.46$; $p < .001$; $\eta^2_p = .04$), and a tendentially significant effect of age ($F_{1,543} = 3.41$; $p = .06$; $\eta^2_p = .01$), as well as significant interactions of craving with both group ($F_{6,1086} = 6.78$; $p < .001$; $\eta^2_p = .04$) and AUDIT scores ($F_{2,542} = 9.99$; $p < .001$; $\eta^2_p = .04$), whereas interactions between craving and gender ($F_{2,542} = 1.41$; $p = .24$), and craving and age ($F_{2,542} = 0.14$; $p = .86$) were not significant. Follow-up tests demonstrated that, compared to non-gamblers and non-problem gamblers, at-risk and problem gamblers scored higher on the desire, anticipation and relief subscales, with males outscoring females on all the GACS subscales, and alcohol use being associated with both GACS anticipation and relief (all p-values $< .01$).

The univariate ANCOVA performed on AUDIT scores, using SOGS-RA groups as the independent factor and gender and age as covariates, revealed main significant effects of group ($F_{3,544} = 24.14$; $p < .001$; $\eta^2_p = .12$), gender ($F_{1,544} = 5.37$; $p = .02$; $\eta^2_p = .01$), and age ($F_{1,544} = 64.09$; $p < .001$; $\eta^2_p = .10$). Bonferroni post-hoc comparisons indicated that at-risk gambling and problem gambling groups had more severe alcohol consumption when compared to non-gamblers and non-problem gamblers, with older males drinking more than others (all p-values $< .001$).

INSERT TABLE 3 ABOUT HERE

A linear regression analysis performed on the SOGS-RA total score, with gender, age, and scores on the AUDIT, GACS, PID-5-BF subscales as predictors showed that, along with male gender and age, Antagonism and Disinhibition of PID-5-BF, Anticipation and Desire subscales of GACS, and AUDIT scores significantly predicted

gambling severity. The overall model explained about 40% of the total variance ($R^2_{adj} = .420$; $F_{7,549} = 57.91$, $p < .001$) (Table 3).

Discussion

The present study is the first ever to investigate the associations between craving, maladaptive personality traits, and adolescent gambling, while controlling for alcohol use. In line with previous findings from national and international surveys reporting problem gambling more likely to occur among males (Bastiani et al. 2011; Dodig 2013; Fröberg et al. 2015; Griffiths and Wood 2007; Hanss et al. 2014; Kristiansen and Jensen 2014; Olason et al. 2011; Raisamo et al. 2013; see also Hing et al. 2016), a greater proportion of male adolescents in both at-risk and problem gambling groups was found. This was most probably due to the higher rates of risk-taking and impulsivity (Cunningham-Williams et al. 2005) and/or to the willingness to engage regularly in more gambling forms found among males, as compared to females (e.g. Gainsbury et al. 2014; Svensson et al. 2011).

The positive association of age with gambling and alcohol consumption suggests that the possibility to access to legal gambling and alcohol use encourages the involvement in them, increasing the possibility to develop addictive disorders. Even though small age differences were found between groups, with non-gamblers being younger than other groups, overall, the present data are worrying as they demonstrate considerable gambling participation among Italian youth despite the country's legislation that prohibits gambling for minors (those under the age of 18 years).

The finding that adolescent at-risk and problem gamblers scored higher on antagonism is consistent with previous studies that identified an association between high antagonism (Carlotta et al. 2015) or low agreeableness (the reverse Antagonism construct) and gambling severity (Brunborg et al. 2016; Buckle et al. 2013; MacLaren et al. 2011; Miller et al. 2013). This confirms the asocial tendencies observed among disordered gamblers (Blaszczynski et al. 1997; Steel and Blaszczynski 1998), and the low levels of cooperation found among adolescent problem gamblers (Gerdern and Svensson 2003), as well as the high comorbidity between gambling and antisocial personality disorder (e.g. Blaszczynski and McConaghy 1994; Meyer and Fabian 1992; Slutske et al. 2001). Furthermore, the findings are congruent with accumulating evidence for the high prevalence of antisocial traits among men (e.g. Castro et al. 2012; Hamburger et al. 1996) because males were found to score higher than females on antagonism.

Detachment refers to high levels of introversion and avoidance of social situations, with a preference for time spent in solitude, such as engaging in excessive gambling. The present findings concerning the high levels of detachment among problem gamblers are in line with those of Chiu and Storm (2010) who reported low levels of extraversion (i.e., the construct negatively correlated with detachment) among pathological gamblers. Interestingly, in the attempt to examine personality differences among three proposed typologies of problem gamblers (i.e., *simple,*

hedonic, and *demoralized*), Vachon and Bagby (2009) found extraversion to be a discriminating factor between hedonic and demoralized gamblers, with extraversion high among the first type and low among the second type.

Further supporting the association between impulsivity and gambling severity are many studies reporting high levels of disinhibition among at-risk gamblers (e.g. Ciccarelli, Malinconico, et al. 2016; Cosenza et al. 2017; MacKillop et al. 2006; Michalczuk et al. 2011) and among gamblers who chase losses (Nigro et al., 2018). Disinhibition refers to the tendency to act impulsively and irresponsibly, as well as being oriented towards immediate gratification and being easily distracted. The present findings are also consistent with previous research showing disordered gamblers scoring significantly higher than non-problem gamblers on conscientiousness which is the construct negatively correlated with disinhibition (e.g. Brunborg et al. 2016; Kaare et al. 2009; Myrseth et al. 2009; Ramos-Grille et al. 2015; Sundqvist and Wennberg 2015).

The literature has widely demonstrated a strong relationship between negative affectivity (akin to the construct of neuroticism) and gambling involvement (e.g. Bagby et al. 2007; Brunborg et al. 2016; Kaare et al. 2009; MacLaren et al. 2011; Miller et al. 2013; Myrseth et al. 2009), suggesting that – probably because of a lack of emotional competence (Williams et al. 2012) – gambling may serve as a way to both avoid negative emotional states and to enhance mood (e.g. Dickerson et al. 1996; Raylu and Oei 2002; Wood and Griffiths 2007). Differently from what was expected, the findings of the present study did not support the assumption according to which negative affectivity is a strong predictor of problem gambling, at least in adolescent population. To explain these contrasting results, it is helpful to consider that this is the first study to have investigated the maladaptive personality traits involved in different levels of adolescent gambling severity. The majority of studies having demonstrated the role of negative affectivity in gambling have recruited adult participants, in some cases with a DSM diagnosis of pathological gambling (e.g. Bagby et al. 2007; Kaare et al. 2009; Miller et al. 2013; Myrseth et al. 2009).

However, in the present study, females were found to score higher than males on negative affectivity, as well as on psychoticism. These findings are in accord with studies that have identified a high incidence of anxiety and affective disorders among females (e.g. Leibenluft 1999; World Health Organization 2017). Psychoticism is the domain encompassing unusual, odd, and eccentric behaviors and cognitions. It also resembles the openness factor of FFM, even though the overlap between these two constructs has been the subject of disagreement (e.g. APA 2011; Krueger et al. 2011; van Kampen 2012). This personality trait is probably the most controversial and the least explored, and its correlations with gender in the present study represents a novel finding. Consequently, it needs further confirmation before any definitive conclusions can be drawn.

Alcohol consumption was a strong predictor of adolescent gambling severity in the present study, confirming previous findings (e.g. Ciccarelli, Griffiths, et al. 2016; see Rahman et al. 2014 and Rash et al. 2016 for reviews). In

addition, alcohol consumption showed associations with personality traits elevated in both at-risk gamblers and problem gamblers (i.e., detachment, antagonism, disinhibition), similar to a previous study where gamblers and alcohol users were found to share the same personality profile (Slutske et al. 2005). These results are compatible with those who believe there are common genetic risk factors between problem gambling and alcohol dependence, which may be responsible for their comorbidity (e.g. Slutske et al. 2000).

The present study found that all the differences concerning craving among the gambling groups were significant, indicating that craving increased with gambling severity (Young and Wohl 2009). More specifically, only two dimensions of craving predicted gambling involvement (i.e., desire and anticipation). These respectively refer to the urge to gamble and the expectation of fun deriving from gambling. Therefore, only the playful aspects of craving appeared to be involved in adolescent gambling in the present study, rather than emotional relief from negative affectivity that has been observed among adult gamblers who probably have more severe gambling involvement (Ciccarelli et al. 2016b; Young and Wohl 2009). The association between male gender and craving levels appears plausible in the light of the association between gambling severity with craving and the high prevalence of disordered gambling in the male population (e.g. Calado and Griffiths 2016; Cosenza et al. 2014; Cosenza et al. 2018, 2019; Cosenza and Nigro 2015; Hing et al. 2016; Nigro et al. 2017).

Limitations

Some limitations of the present study should be noted in relation to interpreting (and replicating) the present findings. The main limitation lies in the adoption of self-report measures of personality that are less accurate tools than interview-based measures (Bagby et al. 2008; Coolidge, Segal et al. 2000). Furthermore, due to the correlational nature of the study, it is not possible to draw causal conclusions from the variables examined in the present study. However, since personality traits have been found to be stable over the lifetime (Roberts and DelVecchio 2000; Specht et al. 2014), it is conceivable that personality factors enhance individuals' vulnerability to developing addictions. On the other hand, given that personality can also change across the lifespan due to both intrinsic maturation and social experiences (Specht et al. 2011), it is equally likely that disordered gambling can exacerbate these personality dimensions. Finally, although the size of problem gambling group was small, it should be noted that the national Italian data reported prevalence rate of problem gambling in the adolescent population between 2.2% and 2.6% (Bastiani et al. 2011; Molinaro et al. 2014).

Conclusions

The findings from the present study suggest that the personality profile of adolescent at-risk and problem gamblers combines high levels of detachment, antagonism, and disinhibition. Among dysfunctional personality traits, only antagonism and disinhibition, along with male gender, age, craving, and alcohol use, predicted gambling severity in adolescence. Even if the presence of dysfunctional personality traits does not necessarily imply mental disorder (Livesley and Jang 2000; Wakefield 2008), identifying the personality dimensions that may predispose individuals to develop gambling problems will be useful in developing effective interventions aimed at preventing the onset of gambling disorder.

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