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Gaming and gambling in adolescence: the role of personality, reflective functioning, time perspective and dissociation

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ABSTRACT

The 11th Revision of the International Classification of Diseases (ICD-11) formally recognized gaming disorder as an addictive health disorder like gambling disorder. The ICD-11 assumes that excessive online gaming can lead to functional/clinical impairments and psychological distress among a minority of individuals. The present study investigated similarities and commonalities between internet gaming disorder (IGD) and gambling disorder among adolescents ($N = 366$ students, 13–19 years). Participants completed the South Oaks Gambling Screen Revised for Adolescents (SOGS-RA), the Internet Gaming Disorder Scale-Short Form (IGDS9-SF), the Personality Inventory for DSM-5 Brief Form (PID-5-BF), the Reflective Functioning Questionnaire (RFQ-8), the Consideration of Future Consequences Scale (CFC-14), and the Adolescent Dissociative Experiences Scale (A-DES). Regression analyses showed that the significant predictors of (i) gambling severity were being male, high scores on the PID-5-BF Disinhibition and Antagonism domains, and low scores on RFQ-Certainty and CFC-Future subscales, and (ii) gaming severity were being male, high scores on the PID-5-BF Detachment scale and the A-DES, and low scores on the RFQ-Certainty. Risk factors shared by both disorders were male gender and impaired mentalization. Specific interventions on mentalization abilities may be useful in reducing and preventing problematic involvement in both gaming and gambling among adolescents.

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Gambling; internet gaming disorder; adolescence; mentalizing; time perspective; maladaptive personality traits

Introduction

Playing videogames is one of the most popular leisure activities worldwide that has significantly increased since the development of the internet and the growth of online gaming (Nuyens et al., 2016). The emergence of clinical cases in which spending time on gaming has resulted in an impaired individual functioning and the appearance of symptoms of addiction has gained research interest, prompting an increase of empirical investigations into problematic gaming behavior. Whereas the World Health Organization (WHO, 2019) recently recognized gaming disorder (GD) as a behavioral addiction, the American Psychiatric Association included

the Internet Gaming Disorder (IGD) in the Section III of the (fifth) Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013a), as a behavioral addiction warranting more research before being considered as a formal disorder, and adopting similar diagnostic criteria to those for substance use and gambling addictions. The prevalence rates of gaming disorder vary between 1.7% to over 10% of the population (Griffiths, Kuss, & King, 2012; Kuss, van Rooij, Shorter, Griffiths, & van de Mheen, 2013 [although a recent meta-analysis reported a worldwide prevalence rate of 1.9% among studies with high quality data; Stevens, Dorstyn, Delfabbro & King, 2020], as a function of culture, age group, and variety of screening tools (Kuss, Griffiths, Karila, & Billieux, 2014; Petry et al., 2014; Stevens et al., 2020).

In recent years, the gaming market has significantly changed, including purchasable and randomized rewards that make gaming similar to gambling from both a structural and psychological perspective, to the point where gamers now spend varying amounts of money to gain advantages in the game (Cleghorn & Griffiths, 2015). "Risk losing something of value in the hope of gaining something of greater financial value" (Cosenza, Griffiths, Nigro, & Ciccarelli, 2017, p. 384) is the quintessence of gambling, and, maybe, this is the reason for the frequent co-occurrence of gaming with gambling (Burleigh, Griffiths, Sumich, Stavropoulos, & Kuss, 2019). Gambling was included among 'Substance Related and Addictive Disorders' in the DSM-5 (APA, 2013a), and due to the continuous introduction of new forms of gambling and the growth of gambling opportunities, it represents a common activity among adolescents (Delfabbro, King, & Derevensky, 2016), with a prevalence rate of problem gambling in adolescence between 0.2 and 12.3% (Calado, Alexandre & Griffiths, 2017).

In the light of the adoption of the same diagnostic criteria for gaming disorder as that of some substance and gambling addictions, and the lack of knowledge relating to the individual determinants of IGD, the aim of the present study was to examine the interrelationship, the overlap, and the differences between adolescent gaming and gambling behavior, in terms of

their relative specific predictors. This could help further define the nosographic and clinical indicators of IGD.

Although previous research suggests that specific personality traits may predispose individuals to develop problematic gambling and gaming behavior (Ciccarelli, Nigro, Griffiths, D'Olimpio, & Cosenza, 2020; Cole & Hooley, 2013; Collins, Freeman, & Chamarro-Premuzic, 2012; Dash et al., 2019), the majority of these studies have recruited adult participants and have not assessed the maladaptive personality traits as suggested in the Section III of the DSM-5 (APA, 2013a, b) that proposed a hybrid model of personality disorders, according to which, personality disorders consist in dysfunctional personality traits that impair self and interpersonal functioning: negative affectivity, detachment, antagonism, disinhibition, and psychoticism. To date, only a few studies have examined the role of dysfunctional personality dimensions, as assessed using the Personality Inventory for DSM-5 Brief Form (PID-5-BF), in gambling and gaming, respectively. Ciccarelli et al. (2020) found antagonism and disinhibition to be the best predictors of adolescent gambling involvement (for similar results, see Passanisi, D'Urso, & Pace, 2019), whereas Laier et al. (2018) reported that all the maladaptive personality traits of the PID-5 were related to IGD symptoms. However, only Ciccarelli et al. (2020) and Passanisi et al. (2019) recruited adolescent samples.

Time perspective (Ciccarelli, Malinconico, Griffiths, Nigro, & Cosenza, 2016; Zimbardo & Boyd, 1999) refers to an individual's orientation toward past, present and future, and is one of the most typical features of addictive behaviors (e.g., Barnett et al., 2013; Sansone et al., 2013). In the field of gambling, several studies have documented the inability by individuals with disordered gambling to plan for the future and consider distant outcomes of their current behavior, placing priority on immediate goals, and ignoring the future consequences that their behavior could have (e.g., Cosenza, Matarazzo, Baldassarre, & Nigro, 2014; Hodgins & Engel, 2002; Nigro, Cosenza, Ciccarelli, & Joireman, 2016), even among adolescent gamblers

(Cosenza et al., 2017; Cosenza & Nigro, 2015; Nigro, Cosenza, & Ciccarelli, 2017). However, in the gaming field, only one study has shown that a negative time orientation predicted problematic gaming involvement, whereas a positive orientation toward the future prevented the occurrence of IGD symptoms (Lukavská, 2018). To date, no study has examined the contribution of time perspective in adolescent gaming.

Mentalizing comprises individuals understanding themselves and others in terms of mental states such as beliefs, emotions, and goals (Fonagy, Bateman, & Luyten, 2012). Failures in mentalization are commonly referred to as *hypomentalizing* and *hypermentalizing*. The first reflects the inability by individuals to consider complex models of their own and others' minds, whereas the latter comprises complex models of mind devoid of empirical evidence (Fonagy & Bateman, 2016). Mentalizing impairments help explain the decision-making deficits observed among individuals with disordered gambling (Brevers et al., 2013) and the persistence in gambling despite losses (Nigro, Matarazzo, Ciccarelli, D'Olimpio, & Cosenza, 2019). They have also been found to mediate the relationship between dysfunctional impulsivity and gambling involvement among adolescent gamblers (Cosenza et al., 2019). However, despite the increasing interest in the role of mentalization in different psychopathological conditions, there is a distinct lack of research investigating the relationship between mentalizing and IGD.

Dissociation comprises a disengagement from reality due to a temporal disruption in the integration of mental activities (APA, 2013a). Empirical studies having addressed the role of dissociation in gaming behavior have consistently reported a positive relationship between excessive gaming and various dissociative manifestations (see Guglielmucci et al., 2019 for a review). However, these studies have mainly recruited adult gamers, with some research not using validated psychometric instruments to assess dissociation, such as surveys and ad-hoc questionnaires (e.g., Barnes & Pressey, 2014; Ortiz de Gortari & Griffiths, 2014, 2016; Snodgrass, Lacy, Dengah, Fagan, & Most, 2011). Similarly, a recent review of the gambling

literature (Schluter & Hodgins, 2019) highlighted a lack of a unified conceptualization of dissociation, with a specific focus on "in-game dissociation", the altered state of awareness occurring during gambling (e.g., Blaszczynski, Cowley, Anthony, & Hinsley, 2016; Oakes et al., 2012; Rèmond & Romo, 2018). Only a handful of studies have examined the role of "general dissociation" among adult gamblers, demonstrating its role in the development and maintenance of gambling problems (Gori et al., 2016; Imperatori et al., 2017; Rèmond & Romo, 2018). The present study is the first to examine the role of general dissociation in both adolescent gambling and gaming, utilizing a clinical measure of dissociation assessing disruptions in memory, perception, and depersonalization/derealization across a variety of daily experiences (Armstrong et al., 1997).

Based on the aforementioned gaps in the literature, the main aim of the present study was to examine the interrelation, overlap, and differences between adolescent gambling and gaming behavior in terms of gender, age, cognitive, metacognitive, and personality correlates, as well as investigating the specific predictors of these two disorders. It was hypothesized that: (i) these two potentially addictive behaviors would be characterized by different personality dimensions: antagonism and disinhibition in problem gambling, and detachment in problem gaming; (ii) myopia for the future would have a role in problem gambling but not in problem gaming; (iii) there would be mentalizing deficits as common risk factors for both problem gaming and problem gambling; and (iv) dissociation would be associated with problem gaming but not problem gambling.

Methods

Participants, procedure, and ethics

The study sample comprised 366 adolescents[1] (52.2% boys) aged between 13 and 19 years (M_{age} = 16.20 years; SD_{age} = 1.33). They attended several high schools in Southern Italy (lyceums) that agreed to participate. After being informed about the nature of the study and the protection of anonymity and confidentiality of the data, participants (or their parents if minors) signed informed consent forms prior to data collection. Participants were provided with 'paper-and-pencil' questionnaires, and they received written instructions on how to complete the survey. Administration of the survey took approximately 30-35 minutes to complete. Ethics approval was obtained from the research team's university Psychology Department ethics committee.

Measures

The 12-item South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA; Winters, Stinchfield, & Fulkerson, 1993; Italian version: Chiesi, Donati, Galli, & Primi, 2013) is a self-report scale that assesses adolescent gambling severity over the past 12 months. The scale's 12 dichotomous (*yes/no*) items relate to gambling behavior (such as loss of control and chasing losses), and several non-scored items relate to the frequency of participation in different gambling activities, gambling motivation, and the highest amount of money gambled in one day. The scores range from 0 to 12, with higher scores indicating greater problematic gambling involvement. In the present study, the SOGS-RA had an acceptable internal consistency reliability coefficient ($\alpha = 0.71$).

[1] The a-priori power analysis performed with the program G* Power (Erdfelder et al., 1996) was performed for the present study. For the ANOVA executed to detect gender differences on the examined variables, the following input parameters were incorporated: effect size = 0.5, α err prob = 0.05, power = 0.95, and we obtained the following output parameters: critical t = 1.65, sample size = 176, actual power = 0.95. For the regression, having inserted these input parameters: effect size $f^2 = 0.15$, α err prob = 0.05, power = 0.95, and number of predictors =13, we obtained the following output parameters: critical F = 1.78, sample size = 189, actual power = 0.95. The number of participants recruited was larger than that needed and all of these were used in the final analysis.

The nine-item Internet Gaming Disorder Scale-Short-Form (IGDS9-SF; Pontes & Griffiths, 2015; Italian version: Monacis, Palo, Griffiths, & Sinatra, 2016) is a self-report scale that assesses the severity of both online and offline gaming involvement over the past 12 months. The nine items reflect the nine diagnostic criteria for IGD according to the DSM-5 (APA, 2013a), such as the perceived inability to stop gaming, gaming to escape from a negative mood, and the loss of interest in other entertainment activities. Participants are required to rate the items on a five-point Likert scale from 1 (*never*) to 5 (*very often*). The scores range from 9 to 45, with high scores indicating problematic gaming involvement. In the present study, the IGDS9-SF had a good internal consistency reliability coefficient ($\alpha = 0.82$).

The 25-item Personality Inventory for DSM-5-Brief Form (PID-5-BF; Krueger, Derringer, Markon, Watson, & Skodol, 2012; APA, 2013b; Italian version: Fossati, Krueger, Markon, Borroni, & Maffei, 2013) is a self-report scale that assesses five personality trait domains: *Negative Affectivity, Detachment, Antagonism*, *Disinhibition,* and *Psychoticism.* Each item is rated on a four-point scale from 0 (*very false or often false*) to 3 (*very true or often true*). Each trait domain score is computed by dividing the raw domain score by the number of items in the domain. The scores on each domain range from 0 and 15, with high scores reflecting a greater dysfunction in the specific personality domain. The total score is obtained by dividing the raw overall score by the total number of items (i.e., 25), and ranges from 0 to 75, with high scores indicating greater overall personality dysfunction. In the present study, Cronbach's alpha for the full scale ($\alpha = 0.74$) and for each scale were acceptable: Negative Affectivity ($\alpha = 0.75$), Detachment ($\alpha = 0.74$), Antagonism ($\alpha = 0.71$), Disinhibition ($\alpha = 0.74$), and Psychoticism ($\alpha = 0.72$).

The 14-item Consideration of Future Consequences scale (CFC-14; Strathman, Gleicher, Boninger, & Edwards, 1994; Italian version by Nigro et al., 2016) is a self-report scale assessing time perspective. The 14 items comprise two subscales: *Immediate* and *Future*. Items are scored

on a seven-point scale from 1 (*extremely uncharacteristic*) to 7 (*extremely characteristic*). The total score ranges from 14 to 98, with higher scores being indicative of a greater future orientation. In the present study, Cronbach's alpha for the full scale (α = 0.74) and for each scale were acceptable: Immediate (α = 0.76), Future (α = 0.74).

The eight-item Reflective Functioning Questionnaire (RFQ-8; Fonagy et al., 2016; Italian version: Morandotti et al., 2018) is a self-report scale assessing two different processes of reflective functioning: *Certainty about mental states* and *Uncertainty about mental states*. Items are rated on how much individuals agree or disagree with each statement on a seven-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). A low agreement with the certainty scale reflects excessive and inaccurate mentalizing (*hypermentalizing*), while high agreement reflects genuine mentalizing. A high agreement with the uncertainty scale indicates lack of knowledge about mental states (*hypomentalizing*), while low agreement indicates genuine mentalizing. In the present study, Cronbach's alpha for each scale were acceptable: Certainty (α = 0.70) and Uncertainty (α = 0.72).

The 30-item Adolescent-Dissociative Experiences Scale (A-DES; Armstrong et al., 1997; Italian version: Schimmenti, 2016) is a self-report scale that assesses the frequency of dissociative experiences in adolescence. Items are rated on a 11-point scale from 0 (*never*) to 10 (*always*). The A-DES comprises four subscales reflecting four dissociative dimensions (absorption and imaginative involvement, amnesia, depersonalization/derealization, and passive influence), but the Italian validation of the scale showed a better fit for the single-factor structure (Schimmenti, 2016). The total score is the mean of all item scores and ranges from 0 to 10. Higher scores reflect a higher frequency of dissociative experiences. In the present study, the A-DES had an excellent internal consistency reliability coefficient (α = 0.93).

Data analysis

Data were analyzed with the IBM Statistical Package for the Social Sciences, version 20.0. The significance level was set at $p<.05$. All variables were initially screened for missing data, distribution abnormalities, and outliers (Tabachnick & Fidell, 2019). Given that the distributions of both SOGS-RA and IGDS9-SF were positively skewed, square-root transformations were performed on these variables so that assumptions of normality, linearity, and homoscedasticity were adequately met. Missing data (< 3%) were replaced with means. Bivariate correlations were calculated to examine the relationships among the variables. To identify potential predictors of problematic gambling behavior, a linear regression analysis was performed with SOGS-RA score as the dependent variable, and gender, age, PID-5-BF, RFQ-8, CFC-14 subscales and A-DES total score as independent variables. Similarly, a linear regression analysis was performed with IGDS9-SF score as the dependent variable, and gender, age, PID-5-BF, RFQ-8, CFC-14 subscales and A-DES total score as independent variables to identify the predictors of problematic gaming behavior. In the regression analyses, all the variables of interest taken into consideration in the present study were used as predictors in order to evaluate their contributions in both gaming and gambling problems. To control for the presence of multicollinearity, the variance inflation factors (VIFs) were calculated before interpreting the regression coefficients, which were below the recommended cut-off of 10 (max. VIF = 1.341; Ryan, 1997).

INSERT TABLE 1 ABOUT HERE

Results

To test for gender differences, univariate ANOVAs were carried out using Bonferroni correction for multiple comparisons. Effects of gender were observed on SOGS-RA ($F_{1,364}$ = 44.76; $p < .001$), IGDS9-SF ($F_{1,364}$ = 71.42; $p < .001$), PID-5-BF Negative Affectivity ($F_{1,364}$ = 58.13; $p < .001$), Antagonism ($F_{1,364}$ = 19.31; $p < .001$), Psychoticism ($F_{1,364}$ = 8.34; $p < .01$) dimensions, RFQ-8 Certainty ($F_{1,364}$ = 15.58; $p < .001$), and Uncertainty subscales ($F_{1,364}$ =

20.48; $p < .001$). Young women scored higher on Negative Affectivity, Psychoticism, and Uncertainty, whereas young men scored higher on SOGS-RA, IGDS9-SF, Antagonism, and Certainty. The descriptive statistics of the variables of interest by gender are summarized in Table 1.

Correlational analysis showed that gender was negatively correlated with both SOGS-RA and IGDS scores, indicating that male gender was associated with higher scores on both gaming and gambling scales. Scores on the SOGS-RA were positively associated with the Antagonism, Disinhibition, and Psychoticism subscales of PID-5-BF, Immediate subscale of CFC-14, and A-DES total scores, and negatively associated with the Certainty subscale of RFQ-8 and Future subscale of CFC-14. Scores on the IGDS9-SF were positively associated with the Detachment, Antagonism, Disinhibition, and Psychoticism subscales of PID-5-BF, Uncertainty subscale of RFQ-8, Immediate subscale of CFC-14, and A-DES total scores[2], and negatively associated with the Certainty subscale of RFQ-8 (see Table 2).

INSERT TABLE 2 ABOUT HERE

The regression analysis run on SOGS-RA total score showed that, along with male gender and age, high scores on Disinhibition and Antagonism subscales of PID-5-BF, and low scores on Immediate subscale of CFC-14 and Certainty subscale of RFQ-8 significantly contributed to problem gambling severity, with the final regression model explaining 23% of the variance of the criterion ($R^2_{adj} = .234$; $F_{6,365} = 19.59$, $p<.001$) (see Table 3).

The regression analysis run on the IGDS9-SF total score showed that male gender, high scores on A-DES total score and Detachment subscale of PID-5-BF, and low scores on Certainty subscale of RFQ-8 significantly contributed to problem gaming severity, with the

[2] Given that the A-DES contains an item related to gaming but no items related to gambling, the correlation analysis between A-DES, SOGS-RA and IGDS9-BF was conducted by eliminating this item (Item 1). The correlation coefficients obtained were: 0.334 between A-DES and IGDS9-BF and 0.197 between A-DES and SOGS-RA.

final regression model explaining 33% of the variance of the criterion (R^2_{adj} = .329; $F_{4,365}$ = 45.84, p < .001) (see Table 4).

INSERT TABLES 3 AND 4 ABOUT HERE

Discussion

The aim of the present study was to examine the interrelationship, the overlap, and the differences between problem gaming and problem gambling behavior in adolescence, in order to help further define the nosographic and clinical indicators of IGD. The positive association between gaming and gambling supports the frequent co-occurrence between these two potentially addictive behaviors (e.g., Burleigh et al., 2019; Parker, Taylor, Eastabrook, Schell, & Wood, 2008), possibly due to the structural characteristics of these two activities which are becoming increasingly similar (Cleghorn & Griffiths, 2015). Moreover, all of the hypotheses were supported.

The results of the two regression analyses demonstrated distinctive associations in both problem gambling and problem gaming. Age positively predicted problem gambling but not problem gaming. It could be that for individuals who have reached the age of 18 years in Italy, the access to legal and more varied forms of gambling increases the likelihood in developing addictive disorders (see Ciccarelli et al., 2020 for similar results). This is not true for gaming. More specifically, compared to gambling, gaming does not have set age limits for participation (although most games now have age ratings), and some studies have documented a negative correlation between gaming and age, with younger individuals being more involved than older individuals (e.g., Mentzoni et al., 2011; Wittek et al., 2015).

The present study also found that different personality dimensions were associated with gaming and gambling problems. Disinhibition and antagonism predicted problem gambling, whereas detachment predicted problem gaming. The results related to gambling substantially confirm those by Ciccarelli et al. (2020) who, using the PID-5-BF for the first time in a sample

of adolescents with different degrees of gambling participation, found these two personality traits predicted gambling severity. Given that disinhibition relates the tendency to be impulsive and irresponsible when making decisions, as well as being oriented towards immediate gratification, the results of the present study are consistent with the broad literature concerning the high levels of impulsivity found among individuals with problem gambling (e.g., Ciccarelli et al., 2016; Cosenza et al., 2017; Nigro, Ciccarelli, & Cosenza, 2018). The present findings are also in line with previous research investigating personality dimensions with measures other than the PID-5 (such as the Big Five Inventory [BFI; John, Donahue, & Kentle, 1991]), which reported that individuals experiencing disordered gambling score low on conscientiousness, which is a negative correlate of disinhibition (e.g., Brunborg, Hanss, Mentzoni, Molde, & Pallesen, 2016; Ramos-Grille, Gomà-i-Freixanet, Aragay, Valero, & Vallès, 2015; Sundqvist & Wennberg, 2015).

The observed association between adolescent gambling and antagonism extended the results of Carlotta et al. (2015) that, investigating the relationship between gambling and both adaptive and maladaptive personality traits among adult Italian gamblers, reported high levels of antagonism among participants at high risk of developing problem gambling. More specifically, the authors found that individuals experiencing problem gambling scored higher on the facets related to the lack of guilt or concern for the others (callousness), proneness to be dishonest (deceitfulness), and tendency to manipulate others to their advantage (manipulativeness). This confirms other findings in literature regarding the association between gambling and asocial tendencies (Blaszczynski, Steel, & McConaghy, 1997; Steel & Blaszczynski, 1998), and the frequent comorbidity with antisocial personality disorder (e.g. Blaszczynski & McConaghy, 1994; Slutske et al., 2001).

The finding that detachment was a predictor of gaming severity extended Laier et al.'s (2018) findings on adults gamers to adolescent gamers. For the first time, they found, in

investigating the maladaptive personality traits in accordance to DSM-5 in gaming, a relationship between IGD symptoms and detachment. Furthermore, they found that this relationship was mediated by avoidance expectancies. This result indicates that the expectancies associated with gaming help to avoid negative feelings that might contribute to the development of problematic gaming among adolescents reporting high detachment, and who engage in gaming as a dysfunctional coping strategy. A similar observation has emerged from Škarupová and Blinka's study (2016) in which the authors suggested that both dysfunctional detachment and destructive overdependence may predispose addictive gaming.

Despite the association observed between gambling participation and dissociation, dissociation emerged as a specific predictor of gaming involvement in the present study. The present finding represents a novelty in the literature on adolescent gaming, extending previous studies that have focused on variables akin to the construct of dissociation. Among these, Chang et al. (2018) examined the motivations associated with gaming and found that escapism, conceived as the desire to escape from reality, plays a key role in determining the transition from gaming use to problematic gaming, while Vadlin et al. (2016) reported psychotic-like experiences among 13% of individuals experiencing problem gaming. The association between gaming and dissociation is probably due to the possibility, offered by online activities, to express unintegrated mental states that do not find other modalities of expression in daily life (Schimmenti & Caretti, 2010). The online activity, in turn, strengthens the dissociative states, in a vicious circle that fosters the psychopathology (Schimmenti, & Caretti, 2017; Schimmenti, 2017; Schimmenti et al., 2017).

The finding related to the role of time perspective in predicting problem gambling confirms previous studies among both adults and adolescents, which found that individuals experiencing problematic or pathological involvement in gambling exhibit a foreshortened time horizon, with an orientation to the present and an inability to consider a long period of time into the future

(MacLaren, Fugelsang, Harrigan, & Dixon, 2012; Nigro et al., 2017; Nigro, D'Olimpio, Ciccarelli, & Cosenza, 2019). More specifically, a study analyzing the developmental trajectory of time perspective in a large sample aged from 16 to 75 years demonstrated that adolescents and adults do not differ in immediate time orientation, which remains substantially stable over time, but in future time orientation that increases with age (Nigro et al., 2016). Consequently, it could be that the myopic perspective among adolescents represents a vulnerability factor for their involvement in gambling, which in turn is strengthened.

Being male was associated with both problem behaviors. Regarding gaming, international studies have consistently documented that male adolescents spend more time gaming than their female counterparts (Lemmens, Valkenurg, & Gentile, 2015; Rehbein, Kliem, Baier, Mößle, & Petry, 2015; Rehbein, Staudt, Hanslmaier, & Kliem, 2016). In relation to gender differences, several hypotheses (among others) have been formulated: (i) young men are more interested than young women in activities involving competition (Klimmt, Schmid, & Orthmann, 2009); (ii) young men are more confident than young women in their use of computers and their gaming performance (Hamlen, 2010; Terlecki et al., 2011); and (iii) the purely male characteristics of the characters involved in the game would make them more suitable for male users (Ivory, 2006). In gambling, it has been similarly asserted that male adolescents are more impulsive and risk-prone, as well as more willing to engage in several gambling forms (Cunningham-Williams et al., 2005; Gainsbury et al., 2014; Svensson, Romild, Nordenmark, & Månsdotter, 2011). Being a young woman appears to be a protective factor in the development of both problematic gambling and problematic gaming, even if some studies have documented the existence of a telescoping phenomenon, whereby women begin gambling later in life but develop problematic gambling in shorter time (Nigro et al., 2017; Potenza, 2013).

In addition to gender, problem gaming and problem gambling had another common risk factor – hypermentalizing. Hypermentalizing reflects complex models of mind devoid of

empirical evidence, in as much as it comprises the belief to always know the reasons underlying their own and others' behavior. Recent studies have found that this excessive self-confidence can lead to poor decision-making performance in both gambling and non-gambling tasks (Brevers et al., 2013, 2014), as well as having a direct effect in facilitating the propensity to chase gambling losses (Nigro, Matarazzo, et al., 2019). Given that the only two studies having so far focused on mentalization among adolescent gamblers have observed an association with gambling severity with both hypomentalizing and hypermentalizing (Ciccarelli, Nigro, D'Olimpio, et al., 2021; Cosenza et al., 2019), it can be asserted that the lack of a genuine mentalization, both in the direction of a deficient and hypertrophic mentalization, constitutes a risk factor for the development of behavioral addictions, such as gaming and gambling. In fact, for the first time in literature, the present study demonstrated the importance of mentalizing in gaming severity.

Limitations

Although the findings of the present study are promising, some aspects limit its generalizability, including the (i) use of self-report measures that are potentially affected by social desirability (Arnold & Feldman, 1981); (ii) RFQ-8 that distinguishes hypomentalizing from hypermentalizing, but without specifying whether these deficits regard their own, other people's mental states, or both; (iii) use of the PID-5 brief form that did not allow the investigation of the specific facets of each maladaptive personality domain; (iv) use of IGDS9-SF does not distinguish online from offline games, which could be important for the potential to play endlessly (Griffiths, 2010); and (v) use of screening tools such as SOGS-RA may inflate problem gambling rates even though it is one of the most commonly used measures of assessing adolescent problem gambling.

Conclusions

The present findings have important theoretical and clinical implications. First, the 'identity profiles' and indicators of individuals experiencing problem gambling and problem gaming appear to be different (at least among Italian adolescents), in as much as they are characterized by specific cognitive and personality risk factors that exclusively contribute to problem gambling and problem gaming. While there are similarities, problem gambling and problem gaming are different behaviors with different associated risk factors. Based on the findings of the present study, impulsivity, hostility, and myopia for the future contribute to adolescent problem gambling, whereas detachment and dissociation contribute to adolescent problem gaming. Second, while there are clear differences, problem gaming and problem gambling share some risk factors such as being a young man and hypermentalizing, factors that may help explain the frequent co-occurrence between the two potentially addictive behaviors. The present results also have significant implications for the treatment and prevention, suggesting that a specific intervention on mentalization abilities may be useful in reducing and preventing the severity of involvement in both problem gaming and problem gambling among adolescents and that more targeted prevention programs are needed among male Italian adolescents.

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Table 1

Means and standard deviations by gender

	Boys (*N* = 191)		Girls (*N* = 175)		*p*-value	η^2_p
	Mean	***SD***	**Mean**	***SD***		
SOGS-RA	1.51	1.85	0.46	0.99	<.001	.11
IGDS9-SF	15.11	5.20	11.24	3.24	<.001	.16
PID-5-BF Negative affectivity	5.53	2.89	7.88	3.00	<.001	.14
PID-5-BF Detachment	3.69	2.78	3.95	2.47	ns	-
PID-5-BF Antagonism	3.54	2.72	2.37	2.29	<.001	.05
PID-5-BF Disinhibition	4.77	2.91	4.85	2.80	ns	-
PID-5-BF Psychoticism	4.28	2.89	5.18	3.03	<.01	.02
RFQ-8 Certainty	1.08	0.75	0.79	0.66	<.001	.04
RFQ-8 Uncertainty	0.64	0.50	0.89	0.59	<.001	.05
CFC-14 Immediate	22.25	7.20	21.75	7.90	ns	-
CFC-14 Future	29.71	7.85	29.64	7.32	ns	-
A-DES	2.80	1.39	2.93	1.36	ns	-

Descriptive statistics are reported for the untransformed variables. ns=non-significant

Table 3

Results of hierarchical linear regression analysis on adolescent problem gambling (SOGS-RA) (N=366)

Note. B: unstandardized coefficient; β: standardized regression coefficient. PID-5-BF = Personality Inventory for DSM-5-Brief Form; CFC-14 = 14-item Consideration of Future Consequences; RFQ-8 = 8-item Reflective Functioning Questionnaire.

Predictors	B	*SE*	β	*t*	*p*-value	VIF
Model 1						
(R^2_{adj} = 0.11; *p*<.001)						
Gender	-1.050	.157	-.331	-6.690	<.001	1.000
Model 2						
(R^2_{adj} = 0.13; *p*<.001)						
Gender	-1.117	.157	-.352	-7.122	<.001	1.021
Age	.177	.059	.148	2.997	<.01	1.021
Model 3						
(R^2_{adj} = 0.18; *p*<.001)						
Gender	-1.117	.152	-.352	-7.335	<.001	1.021
Age	.148	.058	.124	2.564	.011	1.032
PID-5-BF Disinhibition	.128	.027	.231	4.834	<.001	1.011
Model 4						
(R^2_{adj} = 0.20; *p*<.001)						
Gender	-1.000	.155	-.315	-6.442	<.001	1.085
Age	.136	.057	.113	2.371	<.05	1.037
PID-5-BF Disinhibition	.106	.027	.191	3.901	<.001	1.087
PID-5-BF Antagonism	.095	.031	.156	3.103	<.01	1.142
Model 5						
(R^2_{adj} = 0.21; *p*<.001)						
Gender	-.1.002	.153	-.316	-6.530	<.001	1.085
Age	.159	.057	.133	2.790	<.01	1.057
PID-5-BF Disinhibition	.092	.027	.166	3.382	.001	1.118
PID-5-BF Antagonism	.102	.031	.166	3.335	.001	1.147
CFC-14 Future	-.030	.010	-.143	-3.015	<.01	1.046
Model 6						
(R^2_{adj} = 0.23; *p*<.001)						
Gender	-1.117	.156	-.352	-7.183	<.001	1.145
Age	.155	.056	.130	2.752	<.01	1.058
PID-5-BF Disinhibition	.057	.029	.102	1.960	.051	1.301
PID-5-BF Antagonism	.092	.030	.151	3.057	<.01	1.158
CFC-14 Future	-.036	.010	-.171	-3.593	<.001	1.082
RFQ-8 Certainty	-.371	.114	-.169	-3.250	.001	1.286

Table 4

Results of hierarchical linear regression analysis on adolescent problem gaming (IGDS-9-SF)

Predictors	B	*SE*	β	*t*	*p*-value	VIF
Model 1 (R^2_{adj} = 0.16; *p*<.001)						
Gender	-3.871	.458	-.405	-8.451	<.001	1.000
Model 2 (R^2_{adj} = 0.29; *p*<.001)						
Gender	-4.035	.422	-.422	-9.554	<.001	1.002
A-DES	.042	.005	.359	8.135	<.001	1.002
Model 3 (R^2_{adj} = 0.32; *p*<.001)						
Gender	-4.094	.412	-.428	-9.932	<.001	1.003
A-DES	.032	.005	.276	5.854	<.001	1.197
PID-5-BF Detachment	.376	.085	.207	4.400	<.001	1.197
Model 4 (R^2_{adj} = 0.33; *p*<.001)						
Gender	-4.267	.419	-.446	-10.194	<.001	1.044
A-DES	.028	.006	.242	4.874	<.001	1.341
PID-5-BF Detachment	.355	.086	.196	4.139	<.001	1.215
RFQ-8 Certainty	-.663	.318	.100	-2.088	<.05	1.252

Note. B: unstandardized coefficient; β: standardized regression coefficient.

A-DES = Adolescent-Dissociative Experiences Scale; PID-5-BF = Personality Inventory for DSM-5-Brief Form; RFQ-8 = 8-item Reflective Functioning Questionnaire.