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## **Abstract**

**Aims:** The primary aim of the present study was to understand the impact of online gambling on gambling problems in a large-scale nationally representative sample of Italian youth, and to identify and then further examine a subgroup of online gamblers who reported higher rates of gambling problems. **Design:** Data from the ESPAD®Italia2013 (European School Survey Project on Alcohol and Other Drugs) Study were used for analyses of adolescent Internet gambling. **Setting:** Self-administered questionnaires were completed by a representative sample of high school students, aged 15–19 years. **Participants:** A total of 14,778 adolescent students. **Measurements:** Respondents' problem gambling severity; gambling behavior (participation in eight different gambling activities, the number of gambling occasions and the number of online gambling occasions, monthly gambling expenditure); Socio-demographics (e.g., family structure and financial status); and control variables were measured individually (i.e., use of the Internet for leisure activities and playing video games). **Findings:** Rates of problem gambling were five times higher among online gamblers than non-online gamblers. In addition, factors that increased the risk of becoming a problem online gambler included living with non-birth parents, having a higher perception of financial family status, being more involved with gambling, and the medium preferences of remote gamblers (e.g., Internet cafes, digital television, and video game console). **Conclusions:** The online gambling environment may pose significantly greater risk to vulnerable players. Family characteristics and contextual elements concerning youth Internet gambling (e.g., remote mediums) may play a key role in explaining problem online gambling among adolescents.

**Keywords:** Online gambling; Internet gambling; Problem gambling; Adolescent gambling; ESPAD data

## **1. Introduction**

The introduction of new technologies has changed the nature of many forms of gambling providing new remote modes of gambling. As specific forms of gambling may impact on development differently, it is important to examine the relationships in adolescence between specific forms and mediums of gambling (e.g., Internet gambling) and problem gambling severity. Previous research into Internet gambling has shown that a combination of individual, situational, and/or structural characteristics can be important in the acquisition, development and maintenance of Internet gambling (see Kuss & Griffiths [2012] for a review).

Although there has been a significant increase of research into online gambling (e.g., Dowling, Lorains, & Jackson, 2015; Gainsbury, Russell, Blaszczynski, & Hing, 2015; King, Delfabbro, 2016; King, Delfabbro, Kaptsis, & Zwaans, 2014), the vast majority of studies have limited results due to methodological shortcomings. For example, a vast majority of studies have utilized either self-report methods (e.g., surveys, focus groups, case study interviews, etc.) with self-selected participants (e.g., Griffiths, Parke, Wood & Rigbye, 2010; McCormack, Shorter & Griffiths, 2013, 2014) and/or behavioral tracking data using non-representative samples from online gambling clientele at specific gaming operator sites (e.g., Auer & Griffiths, 2014; Broda et al, 2008; Dragicevic et al, 2011; LaBrie et al, 2008; Xuan & Shaffer, 2009). In addition, a large majority of studies do not comprise samples that were representative of the general population (as most utilize self-selected samples). Thus, the principal aim of the present study was to investigate the determinants of problem gambling among a nationally representative sample of adolescents. In particular, the study examined which forms and mediums of gambling (e.g., Internet gambling) are most likely to be associated with problem gambling.

### **1.1 Online gambling during adolescence**

Based on the results of the studies reviewed, Kuss and Griffiths (2012) reported that gambling on the Internet was associated with problem gambling more than land-based gambling. One reason for this may be the structural characteristics of the Internet inherent to this technology, namely availability, ease of access, anonymity (especially in underage individuals), and convenience (McCormack & Griffiths, 2013).

Although there is now much research into adolescent gambling more generally (e.g., Molinaro et al., 2014), adolescent Internet gambling is much less researched. A review of

youth Internet gambling studies (Griffiths, Derevensky, & Parke, 2012) on eight studies with sample sizes of over 1,000 adolescents (including two British studies with over 8,000 participants) reported past-year Internet gambling prevalence rates of 2% (USA), 4-8% (Canada), 1-8% (Great Britain), and 20–24 percent (Iceland). Among these studies that had also assessed problem gambling, the problem gambling rates among adolescent online gamblers ranged from 7.5% to 37% and was significantly higher than the rates of problem gambling among offline-only gamblers (1.5% to 3%). However, most of these studies utilized non-representative convenience samples.

## **1.2 Individual, family and contextual factors influencing gambling during adolescence**

Derevensky and Gilbeau (2015) recently examined the empirical evidence concerning the many correlates of adolescent gambling over the past 25 years. This body of evidence suggests that male adolescents are more likely to be problem gamblers than females, and that initial gambling experiences often begin in their own homes with family members. Beyond the strong association between Internet gambling and gambling problems, investigating specific factors that may promote participation in remote gambling (e.g., family and medium preferences of remote gamblers) may help in the development of early interventions (e.g., interventions to reduce gambling-related harms). Consequently, it is important to adopt a broader perspective in the consideration of problem (and pathological) gambling, focusing on the role of social relationships (e.g., family) and contextual factors including situational and structural characteristics (Griffiths & Delfabbro, 2001; Molinaro et al., 2014; Reith, 2012).

In relation to potential risk factors, it has been suggested that family structure may mediate the expression of temperamental risk in substance use behavior (Hoffmann, 2002; Scalese et al., 2014). More specifically, single-parent families and ‘reconstituted families’ (i.e., blended families) have been associated with an increased risk of substance use disorders (Scalese et al., 2014). With regard to gambling problems, research findings concerning the relationship between family socio-demographic characteristics (e.g., family structure, family socioeconomic status) and adolescent problem gambling have been inconsistent. For instance, while some studies have found that family structure is not related to problem gambling (e.g., Hayer, 2012; Molinaro et al., 2014), other empirical studies have reported that adolescents from single-parent families are at greater risk of being classified as problem gamblers (McComb & Sabiston, 2010).

The issue of problematic adolescent gambling also needs to be studied in lights of its association with excessive use of other entertainment technologies, such as computer and video games, and the Internet (Parker, Summerfeldt, Taylor, Kloosterman, & Keefer, 2013). Research studies have demonstrated that adolescent problem gamblers are more likely to engage in problematic video gaming and Internet abuse (e.g., Wood, Gupta, Derevensky & Griffiths, 2004; Hayer & Griffiths, 2014). In addition, participation in online gambling is significantly associated with greater rates of problem gambling among adolescents (Griffiths et al., 2012; Potenza et al., 2011). A recent review of the online gambling literature by Hing and colleagues (2014) reported that medium preferences of remote gamblers are associated with problem gambling (e.g., personal computer). In addition, the increased use of gaming consoles with an Internet connection as well as interest in online gambling and gaming has led to video gaming operators partnering with online gambling providers to bet on the outcome of games arguably determined by skill (Griffiths, King & Delfabbro, 2014). Thus, specific investigation of the family structure and contextual elements surrounding Internet gambling among youth (e.g., remote mediums such as mobile phone and digital television) on problem gambling in youth warrant consideration.

### **1.3 The present study**

As the preceding literature demonstrates, most empirical studies into online gambling have not used representative samples, and relatively little research has been carried out into adolescent gambling online. Therefore, the following study examines data collected from a large-scale nationally representative sample of Italian youth. The specific objective of the present study was to further the understanding of the impact of online gambling in facilitating gambling problems. The primary study objective was to evaluate the prevalence and characteristics (mode of access) of Internet gambling among Italian adolescents. A second objective was to identify and then examine more closely a subgroup of online gamblers who have reported higher rates of gambling problems. Therefore, the current study examines the potential differences between problem and at-risk gamblers, taking into consideration use of online in addition to non-online gamblers on socio-demographic characteristics, gambling participation and gambling problems. Understanding specific factors that are associated with problem online gamblers are likely to help identify the areas where researchers and policymakers should concentrate their efforts. The overarching objective of this study was to further the understanding of the impact of Internet gambling on adolescent problem gambling

in an attempt to aid the theoretical understanding of disordered gambling and enable the creation of more effective prevention, harm minimization, and treatment strategies.

#### **1.4 Research questions and hypotheses**

Following the review of the literature and based on exploratory expectations this study was designed to ascertain the epidemiology of online adolescent gambling in Italy. Related research questions that were investigated included whether: (i) online adolescent gamblers would present with more gambling problems than non-online gamblers, (ii) specific medium of access would be associated with online adolescent problem gambling, (iii) there would be potential differences between problem and at-risk adolescent gamblers, taking into consideration their online usage in addition to socio-demographic characteristics (i.e., gender, age, family structure, financial family status, playing of video games, and internet usage for leisure activities) and gambling participation (i.e., gambling expenditure and number of gambling activities), and (iv) online gambling would be a more important parameter in predicting at risk and problem gambling than playing video games and other online leisure activities. The related hypotheses were:

- Hypothesis 1: Online adolescent gamblers are more likely to be problem gamblers than non-online adolescent gamblers;
- Hypothesis 2: More problem online adolescent gamblers engage in gambling using particular medium of remote gambling (e.g., personal computer and gaming consoles) compared to at-risk online adolescent gamblers;
- Hypothesis 3: Online problem adolescent gamblers are more likely to live with people they were unrelated to (e.g., step-parents) compared to at-risk online adolescent gamblers;
- Hypothesis 4: Adolescent problem gambling is positively associated with online adolescent gambling.

## **2. Methods**

### **2.1 Participants and procedure**

The present study used data from ESPAD@Italia2013 (European School Survey Project on Alcohol and Other Drugs), a national school survey conducted every year to monitor risk-behaviors among Italian young population. Data are collected on individual characteristics, including exposure to risk factors, alongside information about drug use and other potentially addictive behaviors. Utilizing the ESPAD methodology (Hibell et al., 2012), self-administered questionnaires were completed by a representative sample of high school adolescent students (aged 15–19 years). The authorization by the School Director was required to allow students to complete the Italian ESPAD questionnaire. The survey was included in each school's annual Teaching Programme (Decree of the President of the Italian Republic n.275/1999, Art. 8), edited, agreed and approved by Collegial Bodies composed of teachers, parents and students (Legislative Decree n.297/1994). The total sample comprised 31,547 adolescent students. Of the 31,547 adolescents participating in the survey, a total of 14,778 students (46.8%) completed the South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA; Winters, Stinchfield, & Fulkerson, 1993; Italian version: Colasante et al., 2014) and were included in the subsequent analyses. Given that gambling was more prevalent among males, the sample comprised 63% male respondents aged between 15 and 19 years ( $M = 17.26$  years,  $SD = 1.41$ ).

## 2.2 Measures

Modules and optional questions were added to the 2013 ESPAD standardized questionnaire in order to investigate additional specific areas of interest (i.e., gambling).

**Gambling behavior.** Participation in eight different gambling activities was assessed, including instant scratch tickets, lottery tickets, football pools, new slot machines and video poker, sport betting, other events betting, poker, and card games. Participants indicated how often they engaged in each of these activities over the past 12 months (seven options ranging from “0 times” to “all days”). The eight questions had adequate internal reliability ( $\alpha = .84$ ; 95% CI=.83-.84). In addition, questions were also included regarding the number of gambling occasions (“During the last 12 months, on how many occasions [if any] have you participated in gambling activities?” – seven options ranging from “0 times” to “40 or + times”) and the number of online gambling occasions (“On how many occasions [if any] have you participated in online gambling activities? – seven options ranging from “0 times” to “40

or + times”). Participants were also asked their typical monthly gambling expenditure (five options ranging from “0 Euros” to “91 or + Euros”).

**Problem gambling severity.** Problem gambling was assessed using the South Oaks Gambling Screen-Revised for Adolescents [SOGS-RA; (Winters et al., 1993; Italian version: Colasante et al., 2014)]. Participants were presented with twelve ‘yes-no’ items assessing negative feelings and behaviors associated with gambling, and are scored 1 or 0, respectively. The sum of these items is the total SOGS-RA score, varying from 0 to 12, and referred to as the ‘narrow’ criteria (Winters, Stinchfield, & Kim, 1995). In reporting past-year prevalence rates, Winters et al.’s (1993) original scoring system was used. A SOGS-RA score of 0-1 is labelled ‘no problem,’ 2-3 merits an ‘at-risk’ label, and 4 or more indicates ‘problem’ gambling. The twelve items had adequate internal reliability ( $\alpha = .78$ ; 95% CI=.78-.79).

**Socio-demographics.** The participants reported their age and gender. Family structure was obtained by recoding the responses to the question: ‘Which of the following people live in the same household with you?’ to indicate living with: two parents; one parent; and others (e.g., with step-parents or neither natural parent). Finally, financial status was assessed using the answer to a 7-point scale to the question “What is the economic status of your family compared to others?” from “*very much above*” to “*very much below*”. Responses were recoded and participants were divided into three financial status groups: high, medium, and low (Scalese et al., 2014).

**Control variables.** Use the Internet for leisure activities (e.g., online chatting, listening to music online, playing online games) and playing video games were introduced as control variables.

## 2.3 Analysis

In the present study, a non-gambler was defined as anyone who had not engaged in gambling at least once in the past 12 months. An online gambler was defined as anyone who had participated in online gambling at least once in the past 12 months. Non-online gamblers were defined as anyone who had gambled at least once in the past 12 months, but did not report engaging in online gambling. These definitions are consistent with previous studies (e.g., Gainsbury, Russell, Hing, Wood, & Blaszczynski, 2013; Griffiths, Wardle, Orford, Sproston, & Erens, 2009; Wardle, Moody, Griffiths, Orford, Volberg, 2011).

Pearson chi-square analyses were carried out to test for statistically significant differences between proportions of variables of interest. Post-hoc tests for the chi-square analyses were conducted using a Bonferroni-adjusted z test. Two-way ANOVAs were used for analyzing continuous dependent variables. Models examined associations between the three gambling groups and socio-demographic characteristics, by mode of gambling (online vs. non-online). A multivariate multinomial logistic regression model was conducted in order to determine which factors (socio-demographic and gambling characteristics) were associated with problem gambling severity. Reference category was “non problem gamblers” and results were reported as odds ratios (OR) and 95% confidence interval (CI). Due to the large sample size, an alpha of 0.001 was used, and effect sizes are reported for all chi-square and ANOVA analyses. For chi-square, the  $\Phi$  (phi) coefficient was used, while for ANOVA tests, the partial eta squared ( $\eta_p^2$ ) are reported.

### 3. Results

#### 3.1 Prevalence and characteristics of Internet gambling among Italian adolescents

Of the 14,778 participants who completed the SOGS-RA, 82.9% were classified as non-problem gamblers, 10.6% were classified as at-risk gamblers, and 6.5% were classified as problem gamblers. Of these participants, 2,257 (15.3%) were classified as non-gamblers in the past 12 months, 10,222 (69.2%) were classified as non-online gamblers in the past 12 months, and 2,299 (15.6%) were classified as online gamblers in the past 12 months (Table 1). The overall problem gambling prevalence rate among Italian non-online gamblers was 4.0%. In comparison, the rate among online gamblers was five times higher at 21.9%. Less than 10% of non-online gamblers were classified as at-risk gamblers, whereas more than 20% of online gamblers were classified as at-risk gamblers.

**Modes of participation in gambling activities among online gamblers.** Higher rates of problem gambling severity were associated with greater use of smartphones, tablets, Internet cafes, television, and video game consoles (see Table 1). More specifically, for online gamblers, a significantly higher proportion of problem gamblers engaged in gambling using the Internet cafes, television, and video game consoles compared to at-risk gamblers.

[INSERT TABLE 1 ABOUT HERE]

### 3.2 Socio-demographic characteristics

Socio-demographic characteristics of adolescent online gamblers and non-online gamblers stratified by problem gambling severity are tabulated (Table 2). For non-online gamblers, problem gamblers were more likely to be male and less likely to be female compared with at-risk gamblers. In relation to family structure, for online gamblers, problem gamblers were less likely to live with two parents and more likely to live with others compared with at-risk gamblers. In relation to financial family status, for online gamblers, problem gamblers were more likely to perceive their financial family status as high and less likely to perceive their financial family status as medium compared with at-risk gamblers.

[INSERT TABLE 2 ABOUT HERE]

### 3.3 Gambling participation

**Gambling expenditure:** For both adolescent non-online gamblers and online gamblers, problem gamblers were more likely to spend greater amounts of money (€11 to over €91) on gambling (59% of online gamblers, 35% of non-online gamblers) compared with at-risk gamblers (40% of online gamblers, 20% of non-online gamblers) [ $X^2(2, n=2066) = 272.68, p < .001, \Phi = .36$  for online gamblers;  $X^2(2, n=9180) = 777.82, p < .001, \Phi = .30$  for non-online gamblers].

**Number of different forms of gambling:** On average, at-risk non-online adolescent gamblers engaged in 3.01 of the eight different forms of gambling surveyed ( $SD = 1.80$ ), compared with 4.51 for at-risk online gamblers ( $SD = 2.09$ ), 3.56 for problem non-online gamblers ( $SD = 2.11$ ), and 5.58 for problem online gamblers ( $SD = 2.26$ ). Averaged over problem gambling status, adolescent online gamblers ( $M = 4.28, SD = 2.27$ ) engaged in significantly more forms of gambling compared with non-online gamblers ( $M = 2.23, SD = 1.54$ ),  $F(1, 10966) = 1015.85, p < .001, \eta_p^2 = .09$ . In addition, the interaction was significant, such that the difference between adolescent non-online gamblers and online gamblers was significantly higher for problem gamblers,  $F(2, 10966) = 7.54, p < .001, \eta_p^2 = .001$ .

### 3.4 Predictors of Problem Gambling Severity

Table 3 shows the results of multinomial logistic regressions. Males were significantly more likely than females to be at-risk and problem adolescent gamblers. Participants who perceived their financial family status as low were significantly more likely than adolescents

who perceived their financial family status as medium/high to be at-risk gamblers. In addition, adolescents who lived with others were significantly more likely than adolescents who lived with one-parent/two parents to be problem gamblers. Furthermore, the effect of being at-risk and problem gamblers appeared to increase with greater gambling expenditure and number of gambling activities. More specifically, high expenditure on gambling and being engaged in a greater number of gambling activities were associated positively with at-risk and problem gamblers. Finally, being an online gambler was positively associated to adolescents' problem gambling severity, while use the Internet for leisure activities (e.g., chatting, listening to music, playing games) and playing video games were not significantly associated with at-risk and problem gambling.

[INSERT TABLE 3 ABOUT HERE]

#### **4. Discussion**

##### **4.1 Prevalence and characteristics of Internet gambling among Italian adolescents**

The present study is the first national problem gambling prevalence survey conducted in Italy to specifically investigate the prevalence of online gambling in a youth population. The results indicated that, adolescent participation in online gambling is significantly associated with greater problem severity and, more specifically, rates of adolescent problem gambling were five times higher among online gamblers than non-online gamblers. This confirms previous findings with adolescents (Griffiths et al., 2012; Potenza et al., 2011) and adults (Kuss & Griffiths, 2012; Gainsbury, Russell, Blaszczynski, & Hing, 2015; Wood & Williams, 2011). Although causation cannot be determined from these findings, these results suggest that the online gambling environment may pose significantly greater risk to vulnerable players, with fewer safeguards to prevent them gambling excessively and developing problems (McCormack & Griffiths, 2013; Gainsbury & Wood, 2011).

To the authors' knowledge, the present study is the first to examine the associations between mode of access and problem gambling among online gamblers from a large-scale nationally representative sample of youth. The results indicate that a significant higher proportion of problem online adolescent gamblers engaged in gambling using Internet cafes, television, and video game consoles compared to at-risk gamblers. Possible explanations of these relationships may be that: Internet cafes allow youth to access the Internet outside of

the home where it is not overseen by parents and guardians, and television and video game consoles allow youth to gamble at home, and adolescents have easy access from a familiar environment. A possible explanation for these associations may be that the more frequently a parent gambles in the presence of a child, the more likely it is that the child will adopt such gambling behaviors.

One British adolescent gambling survey found that a 16% of adolescents who gambled online played along with their parents (Wood & Griffiths, 2007). According to some scholars (e.g., Griffiths & Wood, 2000; Griffiths & Parke, 2002), the parental transmission of gambling may be assisted by the social trend called “cocooning” (i.e., the tendency for families to spend available leisure time inside the family home using electronic entertainment). The emergence of gambling within new technologies in the family home enables parents not only to gamble in the presence of their children but also turns gambling into a potential family activity. Unfortunately, the present data do not allow the researchers to ascribe parental influence for online gambling at home with the family. Thus, future studies are needed to investigate this possible effect of parental transmission of gambling to online gambling among their teenage children. A second explanation may be that easy access from a family environment serves as a pragmatic way of evading age controls and parental supervision while conveying a false sense of security, and reducing natural apprehension and guardedness while facilitating immersion in a virtual environment and dissociation from reality (Floros, Siomos, Fisoun, & Geroukalis, 2013).

#### **4.2 Differences between problem and at-risk gamblers by mode of gambling (online vs. non-online)**

The present study also examined the potential differences between problem and at-risk adolescent gamblers, taking into consideration use of online activities in addition to socio-demographic characteristics and gambling participation. Analysis of demographic variables suggests that adolescent problem online gamblers represent a distinctly different cohort than at-risk online gamblers. More specifically, significant differences were reported with respect to family structure and family financial status. Adolescent problem online gamblers were more likely to live with people they were unrelated to (e.g., with step-parents or neither natural parent) when compared with at-risk online gamblers. These results echo and expand previous studies that have analyzed the negative consequences of disrupted

families (e.g., with step-parents or neither natural parent) in relationships to other risk behaviors in adolescence (Scalese et al., 2014; Skeer, McCormick, Normand, Buka, & Gilman, 2009).

Family structure may influence parenting styles (e.g., parental monitoring and the adolescent-parent relationship) and also buffer the expression of the temperamental trait related to substance use behavior (Chan & Koo, 2011; Patock-Peckham, King, Morgan-Lopez, Ulloa, Moses, 2011). Thus, it is possible that youth not living with their birth parents (e.g., grand-parents, step-parents) would provide insufficient resources for adequate adolescent socialization and control (e.g., amount of money spent on gambling or use of credit cards). In addition, adolescents who perceived their financial family status as high were more likely to be problem online gamblers. It may be possible that living in family with more economic resources may provide more access to online devices, which in turn can provide youth with more chances to engage in gambling activities. Adolescent problem online gamblers participate in a greater variety of gambling activities and they appear to spend more money than at-risk online gamblers. This is also consistent with previous research (e.g., Griffiths et al., 2009; Wood & Williams, 2011). This finding suggests that highly involved gamblers use the Internet to facilitate their gambling, because it is a convenient and easily accessible way to gamble (McCormack & Griffiths, 2013; Gainsbury, 2015).

Regarding the differences among non-online adolescent gamblers, problem non-online gamblers were more likely to be male and less likely to be female compared with at-risk non-online gamblers. This is consistent with previous reports that male adolescents are more likely to be problematic gamblers than female adolescents (e.g., Derevensky & Gilbeau, 2015). In the present study, the offline gambling is used as comparison.

#### **4.3 Possible Predictors of Problem Gambling Severity**

In accordance to the primary aim of the study, the findings show that being an online gambler was positively associated to adolescents' rates of at-risk and problem gambling, even when traditional video game playing and using the Internet for other leisure activities (e.g., online chatting, listening to online music, playing online games) are taken into account. Furthermore, the association between online adolescent gambling and problem gambling was highly significant. Adolescents that reported being online gamblers were twice as likely to experience gambling problems compared to non-online gamblers. An explanation for this

positive association after controlling for playing video games and other online leisure activities may be that Internet gambling appears to be conceptually distinct from other excessive online or electronic activities such as online chatting and online gaming with respect to prevalence rates, etiologies, characteristics of individuals participating in at-risk problem gambling, and risks for harms.

One of the major differences between online gambling and other online activities is that online gambling typically requires much more money to participate than other online activities and many young people are likely to have low disposable incomes. Therefore, even a relatively low frequency of online gambling may lead to financial problems causing negative detriments elsewhere in their lives (even if the young person comes from a household that is financially affluent). Another possible explanation may be that problem and at-risk gambling may be associated with Internet and video/computer game abuse (e.g., Young, 2004) than video game playing and using the Internet for other leisure activities. With regard to family socio-demographic characteristics (e.g., family structure, family socioeconomic status), research findings are neither consistent nor straightforward (e.g., Hayer & Griffiths, 2014). However, the present study found that adolescents who perceived their financial family status as low were significantly more likely than adolescents who perceived their financial family status as medium/high to be at-risk gamblers. In addition, adolescents who lived with unrelated others were significantly more likely than adolescents who lived with one or two parents to be problem gamblers. These results extend gambling research by demonstrating a clear association between family socio-demographic characteristics and at-risk and problem gambling in a national representative sample of adolescents. Finally, it is not surprising that greater involvement in gambling activities and expenditure were related to at-risk and problem gambling, as this is consistent with previous findings and may explain the link between internet gambling and gambling problems (Gainsbury, 2013; Philander & MacKay, 2014).

#### **4.4 Strengths and limitations**

This present study presented some limitations. First, findings were based on self-report data. Secondly, although the definitions of online and non-online gamblers were consistent with previous studies (Gainsbury et al., 2013; Griffiths et al., 2009; Wardle et al., 2011), classifying anyone who had participated in Internet gambling at least once in the past 12

months as an online gambler does not differentiate between gamblers based on frequency of Internet gambling. Future studies should quantify the extent of involvement in online gambling to enable evaluation of regular Internet gambling. Additionally, in a secondary analysis of the online gambling data from the 2010 BGPS (Wardle et al., 2011), for the first time, four new groups of gamblers were created for comparison: offline gambling only, online gambling only, online and offline gambling but on different activities, online and offline gambling but on the same activities. The comparisons between these more nuanced groups of gamblers warrant additional study. Third, although this study has considered the role of socio-demographic characteristics, gambling participation and gambling problems, future studies may benefit from including other factors, such as impulsivity traits (e.g., Canale, Vieno, Griffiths, Rubaltelli, & Santinello, 2015; Liu et al., 2013) and reason for gambling (e.g., Canale, Santinello, & Griffiths, 2015) to better elucidate the differences between online and non-online gamblers.

Notwithstanding these limitations, the strengths of the study include the use of a large sample representative of the Italian high school population. Moreover, this study clearly demonstrated that: rates of problem gambling were five times higher among online gamblers than non-online gamblers; and living with non-birth parents, having a higher perception of financial family status, being more involved gamblers, and the medium preferences of remote gamblers (e.g., Internet cafes, digital television, and video game console) appear factors that increase the risk of becoming a problem online gambler.

Internet gambling represents a relatively recent new mode of gambling that needs to be better understood, especially in relation with its consequences for adolescent health. The higher rate of gambling problems reported by online gamblers is of concern given that participation in this mode of gambling appears to be increasing (Wardle & Griffiths, 2011). Specific interventions, such as limiting access to gambling-related Internet sites and monitoring of youth activities (e.g., Lee, Stuart, Ialongo, & Martins, 2014) warrant consideration. In addition, problem online gamblers may not recognize the negative consequences of their gambling, which may also go undetected by others, given the privacy and anonymity of online gambling. Therefore, further efforts are needed to increase public awareness to the potential risks of Internet gambling. Recently, Internet-based interventions (e.g., Canale, Vieno, Santinello, Chieco, & Andriolo, 2015; Danielsson, Eriksson, & Allebeck, 2014; Disperati et al., 2015) have been launched specifically for adolescents and young adults in an attempt to reduce high-risk behaviors (e.g., smoking, heavy drinking and

problem gambling) and increase program utilization. Given the efficacy of similar programs, gambling online services may be effective in growing youth awareness of their potentially problematic gambling behavior and assist adolescents and young adults in retaining control and minimizing and reducing gambling-related problems (e.g., Griffiths & Cooper, 2003; Monaghan & Wood, 2010).

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