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Gambling behaviors in adolescent male and female regular and non-regular gamblers: a study of Central Italian adolescents

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Dear Editor

Thank very much for the comments of the reviewers. We have highlighted in yellow the changes and our responses to the issues raised by reviewer 1 are below.

We hope that our paper has been improved and can be considered for the publication.

Thank you again!

COMMENTS TO THE AUTHOR:

Reviewer #1: This manuscript reports on the cross-sectional study examining the prevalence of a variety of gambling behaviors and endorsement of items on a problem gambling screening instrument. Strengths of the manuscript include the large sample (N = 1,255), reporting and methods for handling missing data, and a well written Introduction. The manuscript has several addressable limitations that hamper enthusiasm for the manuscript. The following comments are offered as constructive feedback to the authors:

1. The authors discuss underage gambling in the Introduction and Discussion, yet the results do not break down gambling behavior by under-age versus age of majority. For example, it would be particularly helpful from a public health perspective to know how many under-age adolescents are playing lottery.

→ **thank you for your relevant suggestion. We have inserted in our analyses (results and discussion) also the distinction between minors and adolescents of age.**

2. The authors report the item by item endorsement of the SOGS-RA but do not report the prevalence of problem gambling in the sample. Please provide this information.

→ **Ok, thank you. We have reported the prevalence of problem gambling in the sample.**

3. Minor issue: please revise references so that journal titles are capitalized and italicized as necessary.

→ **Ok, thank you for your comment. We have revised all the references.**

Reviewer #2: This is a clearly written and well organized study. Each section was contained concise descriptions of the content. It was easily understood by this reviewer. This study, "Gambling behaviors in adolescent male and female regular and non-regular gamblers: a study of Italian adolescents", seeks to establish an overview of the prevalence of gambling behaviors including similarities and differences between genders, frequencies and games played. A useful background was developed in the introduction. The authors use a cohort of students enrolled in schools in the Tuscany region of Italy with a sample of 1255 adolescents, 742 males and 513 females aged 13-19. The measurement surveys are clearly explained. Assessment employed the Italian version of the South Oaks Gambling Screen, Revised for Adolescents (SOGS-RA). A series of chi-squared tests were performed to explore group differences and appear appropriate for this study. Results are presented clearly with discussion of complexities in the results between regular and non-regular gamblers and between genders as these differences were identified. The results identify key elements in understanding gambling patterns of young people in Tuscany. It highlights the risks to

those identifies as regular high frequency gamblers for experiencing and/or developing problems in the future. The results are clearly described.

The discussion is thorough, highlighting strengths of sample size and inclusion of a significant number of female subjects. It was noted that this study was limited the non-longitudinal design, the regional population studied (Tuscany), and that the survey was self reported. These are clearly described. The discussion of conclusion drawn from the study are clearly explained as are the possible implications for further study.

This is a clearly written study with strong utility in examining the gambling patterns of adolescents in Central Italy. The clinical and policy implications of the results are well described. Should this study be selected for publication, I recommend that the title reflect that this is a study from Tuscany or Central Italian youth as the population of Italy is geographically very diverse and the results of this sample may not generalize to the entire nation.

→ Thank you for your appreciation and suggestions. We have modified the title of the paper inserting the specification of the origin of the sample from central Italy and better clarified the poor external validity in the possibility to generalized our results to entire Italian young population.

Gambling behaviors in adolescent male and female regular and non-regular gamblers: a study of **Central Italian adolescents**

Franca Tani, Lucia Ponti, & Simon Ghinassi

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Compliance with Ethical Standards

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Conflict of interest. The authors declare that they have no conflict of interest.

Ethical Approval. All procedures performed in this study were in accordance with the ethical treatment of human participants of the Italian Psychological Association (the Ethical Committee of the University of Florence approved the study - n. 81120/2018), and with the 1064 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent. All participants (or parents in the case of minor students) gave written informed consent.

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2 **Gambling behaviors in adolescent male and female regular and non-regular gamblers: a study of**
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4 **Central Italian adolescents**
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6
7
8 **Abstract**
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10 Gambling is a widespread and popular phenomenon among adolescents. However, little is known
11 specifically about adolescent gambling behaviors in Italy. The aim of the present study was to explore the
12 prevalence and frequency of gambling behaviors, the types of bets most frequently chosen, the amount of
13 money spent on gambling, and the more frequent problem gambling behaviors, taking into account the type of
14 gambler (regular and non-regular), gender, and age. For this propose, 1255 adolescents (59.1% males) aged
15 13 to 19 years ($M = 16.06$; $SD = 1.47$), were recruited for the study. Results of a series of chi-squared tests
16 show that 70.8% of adolescents had gambled at least once in the previous year, with more than 68% of minors
17 declaring that they had gambled. Among those who claimed to have gambled, 24% were regular gamblers
18 who spent more money, had more gambling-related problems, and chose games more at risk for developing
19 gambling addiction, compared to non-regular gamblers. Regarding gender, results show that males gambled
20 more, more frequently, spent more, and presented more gambling-related problems than females. About age,
21 adolescents of age gambled more on some games that involved going to places to bet than minors but no
22 differences between minors and of-age adolescents emerged on the amount of money spent and in being a
23 regular gambler or not. However, gender and age differences emerged only in the non-regular group, whereas
24 in the regular-gambling group, males and females and minor and of-age adolescents did not differ on any
25 aspect analyzed.
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49 **Keywords:** Gambling behaviors, regular gamblers, non-regular gamblers, adolescents, gender differences
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1
2 **Introduction**
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4 Recent literature has widely documented that gambling constitutes a form of addictive behavior that is
5 spreading among adolescents (Andrie et al. 2019). Although gambling is often considered an activity typical
6 of adults, and despite legislation that generally prohibits minors from participating in any form of gambling,
7 there is a plethora of studies that suggest that the popularity and diffusion of gambling among adolescents has
8 been increasing in recent years (Calado et al. 2017; Delfabbro et al. 2016; Hayer and Griffiths 2014). The
9 global increase of gambling is probably due to the fact that, in the last decade, it has been one of the fastest-
10 growing and wide-spreading businesses in the world, with technological developments that have created new
11 innovative forms of gambling. Never before has there been such a variety of different types of gambling
12 activities that are easily accessible and readily available (Derevensky and Gilbeau 2019). In this regard, it has
13 recently been shown that gambling is part of the life experience of most young people and one of the
14 preferred choices to spend free time (Calado and Griffiths 2016; Hayer and Griffiths 2014; Wiebe and
15 Falkowski-Ham 2003). Moreover, there are alarming data indicating that rates of problem gambling among
16 young people are at least four times higher than in adults (Burge et al. 2006; Petit et al. 2015).
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30 Gambling in adolescence is also associated with relevant negative outcomes. A large number of studies
31 underline that adolescents who gamble are more prone to engage in other forms of behavior addiction, such as
32 smoke tobacco, drink alcohol, and use substances (Barnes et al. 2011; Colasante et al. 2014; Hardoon et al.
33 2004; Walther et al. 2012). Moreover, they are at a higher risk of developing more severe gambling problems
34 during adulthood (Granero et al. 2014), due to the fact that an early onset of gambling is linked with more
35 severe gambling problems later in life (Rahman et al. 2012; Winters et al. 2002).
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43 Despite these negative outcomes linked to gambling, an increasing percentage of adolescents do
44 gamble. For example, results of a study by Derevensky and Gupta (2000) showed that more than 71% of
45 adolescents had gambled in the previous year, and more than 14% of them gambled at least once a week,
46 qualifying them as regular gamblers. Moreover, authors have highlighted a greater prevalence of males than
47 females in the regular gambler group (84% vs 64%). A meta-analytic study highlighted that 77–83% of
48 adolescents in the world were involved in some form of gambling (Blinn-Pike et al. 2010).
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55 In the specific Italian context, however, the percentage of adolescent gamblers is higher than in other
56 countries. In 2013, 91% of adolescents gambled at least once during the year and, among them, 46% were
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2 classifiable as regular gamblers; 55% were males vs 29% females (Donati et al. 2013). This percentage was
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4 found to be slightly lower in recent years, settling at around 85%; however, the percentage of Italian
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6 adolescent regular gamblers remains very high, at about 30% (Donati et al. 2019). These percentages are
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8 alarming, considering that gambling frequency is a strong predictor of problem gambling (Chiu and Storm
9
10 2010; Derevensky et al. 2010; Raisamo and Lintonen 2012) and is related with greater gambling-related
11
12 negative outcomes (Castrén et al. 2015; Winters et al. 1993), both in adolescents and adults.
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14 As is clear from the above percentages, gambling is more common in adolescent males than females
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16 (Weidberg et al. 2018), and all studies agree that gambling appears to be an activity in which boys spend more
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18 time, with more frequency (Andrie et al. 2019; Canale et al. 2017; Colasante et al. 2014; Derevensky and
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20 Gilbeau 2019; Svensson and Sundqvist 2019; Weidberg et al. 2018). Gender differences also emerge
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22 regarding the type of gambling adolescents choose. Although data on this detail is quite heterogeneous, males
23
24 overall tend to prefer games that include perceived or actual elements of skill, such as horse races, bets on
25
26 sports teams, and card games for money. Females tend to prefer bets based on chance, such as bingo and
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28 scratch cards (Baggio et al. 2018; Donati et al. 2013; Kristiansen and Jensen 2014; Weidberg et al. 2018).
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31 Despite the growing interest for gambling in adolescence, most research on this topic has been
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33 conducted in North America, Australia and Europe (Calado et al. 2017), while in the specific Italian context,
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35 studies that explore adolescent gambling behaviors are lacking. Therefore, the present study aimed to fill this
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37 gap by examining this phenomenon in a large sample of Italian adolescents. In particular, we aimed to
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39 analyze: prevalence of gambling, frequency of different gambling behaviors, games most played, amount of
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41 money spent, and more frequent problem gambling behaviors, taking into consideration the frequency of
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43 gambling (regular and non-regular gamblers), gender, and age (minors and adolescents of legal age for
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45 gambling).
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48 **Materials and methods**

49 *Procedure*

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51 The research project was conducted in agreement with the guidelines for the ethical treatment of human
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53 participants of the Italian Psychological Association. The Ethical Committee of the University of Florence
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55 approved the study (n. 81120/2018). The principals of the schools where students were recruited as subjects
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2 were then contacted so that they could review the project and give written authorization. Written formal
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4 consent was obtained from the students, or their parents in the case of minor students, prior to data collection.
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6 All students were informed about the purpose of the study, that data were collected anonymously, that no
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8 monetary reward was to be expected, and that they could withdraw from the study at any time without
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10 consequences. All students invited to participate agreed to do so. Data collection was carried out in class
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12 during school hours.
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16 ***Participants***

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19 A total of 1255 adolescents (742 males and 513 females), aged 13 to 19 years ($M = 16.06$; $SD = 1.47$), were
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21 recruited for the present study. Of them, 1035 (82.5%) were underage. Participants were high school students
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23 enrolled at eight public high schools in Tuscany, a region in the center of Italy. More than 86% came from
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25 central Italy, from families of middle/high socio-educational background where more than 62% of fathers and
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27 71% of mothers had a high school diploma or university degree. Moreover, more than 88% of fathers and
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29 92% of mothers had a job.
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33 ***Measures***

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35 In order to assess gambling behavior, the Italian version of South Oaks Gambling Screen-Revised for
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37 Adolescents (SOGS-RA; Chiesi et al. 2013; Winters et al. 1993) was used. The SOGS-RA is a self-report
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39 questionnaire composed of two different sections. In the first section, participants were asked to report the
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41 frequency of gambling (never, less than monthly, monthly, weekly, daily) in a list of 11 gambling activities
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43 (cards for money, coin tosses for money, bets on games of personal skill, bets on sports teams, bets on horse
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45 or dog races, bingo, dice games for money, slot machines, scratch cards such as Gratta & Vinci/win for Life,
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47 lotteries, on-line games), and the amount of money spent on gambling (€1 or less, more than €1 to €10, more
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49 than €10 to €49, €50 to €99, €100 to €199, more than €200) in the previous year. This section enables
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51 classification between non-gamblers and gamblers and, among the latter, to distinguish non-regular gamblers
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53 (those who gamble once a month or less) and regular gamblers (those who gamble weekly or more often). The
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55 second is composed of 12 items and assesses gambling-related problems (e.g. of items: "In the past 12
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2 months, have you ever gambled more than you had planned to?" (item 4); "In the last 12 months, have you
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4 ever hidden from family or friends any betting slips, IOUs, lottery tickets, money that you've won, or other
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6 signs of gambling?" (item 8). This section allows the assessment of gambling problems, identifying non-
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8 problem gamblers (SOGS-RA score ranged from 0 to 1), at-risk gamblers (SOGS-RA score ranged from 2 to
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10 3), and problem gamblers (SOGS-RA score of 4 or greater). In the present sample, the Cronbach's alpha was
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12 83.

16 *Data analysis*

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18 Missing data ranged between .1% and .6% and were missing completely at random (Little's MCAR
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20 test was not significant, $\chi^2 = 120.474$, $df = 103$, $p = .112$). Given the low percentage of missing values, the
21
22 expectation maximization (EM) algorithm was employed to substitute missing items.

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24 A series of chi-squared tests was performed in order to explore differences between regular and non-
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26 regular groups, males and females, and minors and adolescents of legal age for gambling.

30 **Results**

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32 According to the criterion of the SOGS-RA classification, 82.5% of adolescents were non-problematic
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34 gamblers with 861 minors (83.2%) and 175 of age (79.5%), 11.4% were at-risk gamblers with 116 minors
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36 (11.2%) and 27 of age (12.3%), and 6.1% were problematic gamblers with 58 minors (5.6%) and 18 of age
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38 (8.2%). Chi square tests showed significant gender differences in the distribution of the three gambling
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40 categories ($\chi^2(2) = 65.75$, $p = .000$), with males reporting lower levels of non-problematic gambling and
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42 higher levels of at-risk and problematic gambling. On the contrary, no significant differences emerged in
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44 reference to the distribution of the three gambling categories with respect to being a minor or not ($\chi^2(2) =$
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46 2.46, $p = .292$).

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48 Overall, results showed that 29.2% of participants ($n = 367$; 133 males and 234 females; 330 minors and 37 of
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50 age) had not gambled in the previous 12 months. On the contrary, 70.8% ($n = 888$; 609 males and 279
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52 females; 705 minors and 183 of age) declared that they had gambled at least once in the previous year.

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54 Although most of the minors declared that they had gambled during the previous year (68.1%), there was a
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56 significant prevalence of adolescents of legal age that declared having gambled in the previous year than
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2 minors ($\chi^2(1) = 19.90, p = .000$). Moreover, results highlighted significant gender differences, with a
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4 prevalence of male gamblers ($\chi^2(1) = 112.39, p = .000$). Within the gamblers group, most were non-regular
5
6 gamblers (76%, $n = 675$), because they had gambled once a month or less during the previous year, and 24%
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8 ($n = 213$) were regular gamblers. In particular, 19.5% ($n = 173$) gambled weekly and 4.5% ($n = 40$) daily
9
10 during the previous year. Females were mainly non-regular gamblers, while males were mainly regular
11
12 gamblers ($\chi^2(2) = 53.13, p = .000$). Among females, 255 (91.4%) were non-regular gamblers and 24 (8.6%)
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14 regular gamblers; among males, 420 (69%) were non-regular gamblers and 189 (31%) were regular gamblers.

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16 On the contrary, no significant difference with respect to regular and non-regular gamblers emerged between
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18 minors and of-age adolescents ($\chi^2(1) = 2.35, p = .125$). In fact, 528 minors (74.29%) and 147 of age (80.3%)
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20 were non-regular gamblers, and 177 minors (25.1%) and 36 of age (19.7%) were regular gamblers.

21
22 The frequencies of gambling activity by gender and age group (minors and of legal age) are reported in table
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24 1 and table 2, respectively.

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29 INSERT TABLE 1 ABOUT HERE

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31 INSERT TABLE 2 ABOUT HERE

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35 Most of those who declared that they had gambled said that they had not spent significant amounts of money
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37 in the previous year, while some declared a greater expenditure. In fact, 40.4% of participants spent €1 or less
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39 ($n = 359$), 29.7% from €1 to €10 ($n = 264$), 14.7% from €10 to €49 ($n = 131$), 8.9% from €50 to €99 ($n = 79$),
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41 4.5% from €100 to €199 ($n = 40$), and 1.8% more than €200 ($n = 15$) in the previous 12 months. A significant
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43 difference between regular and non-regular gamblers emerged regarding the amount of money spent gambling
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45 with, as expected, regular gamblers spending more than non-regular gamblers ($\chi^2(5) = 364.03, p = .000$). Chi-
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47 squared tests showed significant gender differences, with males spending more than females ($\chi^2(5) = 44.86, p$
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49 $= .000$). Among non-regular gamblers, the same gender differences were maintained, with males tending to
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51 spend more money than females ($\chi^2(5) = 11.55, p = .042$). However, among regular gamblers, no gender
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53 differences emerged about money spent on gambling activities ($\chi^2(5) = 4.42, p = .491$). On the contrary, no
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55 significant differences emerged with respect to age group regarding the amount of money spent gambling
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2 $(\chi^2(5) = 6.96, p = .224)$. In addition, no significant differences emerged between minors and of-age
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4 adolescents regarding the amount of money spent with respect to non-regular $(\chi^2(5) = 7.26, p = .202)$ and
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6 regular $(\chi^2(5) = 6.49, p = .261)$ gamblers.
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9 The most common forms of gambling were scratch cards, such as Gratta & Vinci or win for Life (62.8%, n =
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11 559), betting on sports events (42.6%, n = 378), and playing cards for money (29.2%, n = 259). In table 3, the
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13 frequencies of the most common gambling activities, separately by gender, age group (minor and of age), and
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15 regular and non-regular gamblers, are reported.
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19 INSERT TABLE 3 ABOUT HERE
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23 Results highlighted significant gender differences, with males, compared to females, gambling more
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25 frequently on the following activities: bets on games of personal skill $(\chi^2(1) = 39.08, p = .000)$; bets on sports
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27 teams $(\chi^2(1) = 110.60, p = .000)$; on-line games $(\chi^2(1) = 23.50, p = .000)$. On the contrary, females reported a
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29 preference for bingo $(\chi^2(1) = 6.60, p = .010)$, scratch cards such as Gratta & Vinci/win for Life $(\chi^2(1) = 12.24,$
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31 $p = .000)$, and lotteries $(\chi^2(1) = 9.80, p = .002)$. No significant gender differences emerged regarding other
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33 gambling activities.
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35 As expected, chi-squared tests showed significant differences between regular and non-regular gamblers for
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37 most gambling activities, with regular gamblers reporting a higher prevalence for: cards for money $(\chi^2(1) =$
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39 $35.78, p = .000)$, coin tosses for money $(\chi^2(1) = 28.14, p = .000)$, bets on games of personal skill $(\chi^2(1) =$
40
41 $81.03, p = .000)$, bets on sports teams $(\chi^2(1) = 187.97, p = .000)$, bets on horse or dog races $(\chi^2(1) = 87.95, p$
42
43 $= .000)$, dice games for money $(\chi^2(1) = 20.46, p = .000)$, slot machines $(\chi^2(1) = 79.33, p = .000)$, and on-line
44
45 games $(\chi^2(1) = 96.07, p = .000)$. However, no significant differences between regular and non-regular
46
47 gamblers emerged for: bingo $(\chi^2(1) = .08, p = .776)$, scratch cards such as Gratta & Vinci/win for Life $(\chi^2(1)$
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49 $= .03, p = .860)$, and lotteries $(\chi^2(1) = 3.19, p = .074)$.
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52 Regarding gender differences among non-regular gamblers, analyses showed the same gender differences
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54 found for the entire group. Males gamble more frequently on games of personal skill $(\chi^2(1) = 21.27, p =$
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56 $.000)$; sports teams $(\chi^2(1) = 63.42, p = .000)$; and on-line games $(\chi^2(1) = 11.50, p = .001)$, than females. On
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2 the contrary, females gamble more frequently at bingo ($\chi^2(1) = 7.93, p = .005$), scratch cards such as Gratta &
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4 Vinci/win for Life ($\chi^2(1) = 10.90, p = .001$), and lotteries ($\chi^2(1) = 12.62, p = .000$). Males and females of the
5
6 regular gambler group showed no significant gender differences, with $p > .05$ for all gambling activities.
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9 Regarding differences between minors and of-age adolescents, results highlighted that adolescents of age
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11 gamble more frequently at bingo ($\chi^2(1) = 13.15, p = .000$), scratch cards such as Gratta & Vinci/win for Life
12
13 ($\chi^2(1) = 4.84, p = .028$), and lotteries ($\chi^2(1) = 6.08, p = .014$) than minors. On the other hand, minor
14
15 adolescents gamble more frequently at games of personal skill ($\chi^2(1) = 5.34, p = .021$), and sports teams
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17 ($\chi^2(1) = 6.94, p = .008$). No significant differences related to age emerged regarding other gambling activities.
18
19 Chi square tests showed significant differences between minors and of-age adolescents among non-regular
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21 gamblers on games of personal skill ($\chi^2(1) = 4.62, p = .032$), with minors gambling more frequently than
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23 adolescents of age, and bingo ($\chi^2(1) = 10.71, p = .001$), with minors, on the contrary, gambling less frequently
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25 than of-age adolescents. Significant differences also emerged between minors and of-age adolescents among
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27 regular gamblers. In particular, adolescents of age gambled more frequently at cards for money ($\chi^2(1) = 4.24,$
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29 $p = .040$), slot machines ($\chi^2(1) = 4.71, p = .030$), scratch cards such as Gratta & Vinci/win for Life ($\chi^2(1) =$
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31 $8.06, p = .005$), lotteries ($\chi^2(1) = 8.25, p = .004$), and on-line games ($\chi^2(1) = 14.04, p = .000$) than minors. No
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33 significant differences between minors and of-age adolescents emerged among regular gamblers on the other
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35 gambling activities.
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38 In reference to problematic behaviors related to gambling reported by participants that have declared to have
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40 gambled in the previous 12 months, the most common were: feeling bad about the amount bet or what
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42 happens when you bet money (item 6), returning another day to try to regain the lost money (item 1), wanting
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44 to stop gambling, but thinking it's not possible (item7), and betting more money than setting out to do (item
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46 4). Table 4 reports item frequencies separately for gender, age, and gambling frequencies (regular and non-
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48 regular gamblers).
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2 As reported in table 4, males engage significantly more frequently in most problem gambling behaviors
3 than females. Item 1: Went back another day to try to win back lost money ($\chi^2(1) = 12.45, p = .000$);
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5 item 2: Told others you were winning when you weren't ($\chi^2(1) = 10.39, p = .001$); item 3: Arguments
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7 about money with family/friends about gambling ($\chi^2(1) = 5.45, p = .020$); item 4: Gambled more than
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9 planned to ($\chi^2(1) = 6.51, p = .011$); item 5: Criticized or told you had a gambling problem ($\chi^2(1) = 8.32,$
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11 $p = .004$); item 6: Felt bad about the amount bet or what happens when you bet ($\chi^2(1) = 17.41, p = .000$);
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13 item 7: Like to stop betting but didn't think you could ($\chi^2(1) = 5.85, p = .016$); item 8: Hidden signs of
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15 gambling from friends/family ($\chi^2(1) = 11.46, p = .001$); item 9: Arguments about money with
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17 family/friends about gambling ($\chi^2(1) = 11.45, p = .001$); item 11: Skipped or absent from school/work
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19 due to betting ($\chi^2(1) = 8.83, p = .003$). On the contrary, no gender differences were found in the
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21 frequency of subsequent problematic gambling behaviors: item 10: Borrowed money and not paid it
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23 back ($\chi^2(1) = .17, p = .683$); item 12: Borrowed money or stolen something in order to bet or to cover
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25 gambling debts ($\chi^2(1) = 2.17, p = .141$).
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29 As expected, problematic gambling behaviors were higher in regular gamblers than non-regular
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31 gamblers (chi-squares were significant at the $p = .000$ for all problematic gambling behaviors).
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34 Regarding gender differences in non-regular gamblers, males engaged significantly more frequently than
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36 females in subsequent problematic gambling behaviors. Item 5: Criticized or told you had a gambling
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38 problem ($\chi^2(1) = 4.22, p = .040$); item 6: Felt bad about the amount bet or what happens when you bet
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40 ($\chi^2(1) = 5.47, p = .019$); item 8: Hidden signs of gambling from friends/family ($\chi^2(1) = 7.34, p = .007$);
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42 and item 9: Arguments about money with family/friends about gambling ($\chi^2(1) = 5.02, p = .025$).
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45 However, male and female regular gamblers showed no significant gender differences with $p > .05$ for all
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47 problematic gambling behaviors.

48 Finally, regarding age differences in problem gambling behaviors, results showed that of-age adolescents
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50 engaged significantly more frequently in Item 1: Went back another day to try to win back lost money ($\chi^2(1)$
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52 $= 3.97, p = .046$) than minors. On the contrary, minors and adolescents of age did not differ regarding the
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54 other problem gambling behaviors ($p > .005$). Among non-regular gamblers, adolescents of age showed the
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56 following problematic gambling behaviors significantly more frequently than minors: Item 1: Went back
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2 another day to try to win back lost money ($\chi^2(1) = 6.76, p = .009$), and item 10: Borrowed money and did not
3
4 paid it back ($\chi^2(1) = 4.75, p = .029$). As for gender, minors and of-age adolescent regular gamblers showed no
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6 significant differences for all problematic gambling behaviors ($p > .05$).
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10 Discussion

11 The main aim of this study was to explore in detail the gambling behaviors of adolescents in central Italy, also
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13 analyzing regular vs non-regular gamblers, and gender and age (minors vs adolescents of legal age)
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15 differences.
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18 In line with previous literature, gambling is a very common activity among adolescents; more than 70% of the
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20 participants declared to have gambled at least once during the previous year. Although this percentage is
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22 lower than that reported by other Italian studies (Donati et al. 2013; Donati et al. 2019), it remains a concern,
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24 considering that gambling is prohibited for minors, and only 17.5% of our sample were of age. Our results
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26 highlight a worrisome picture, with most minors (68.1%) declaring that they had gambled during the previous
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28 year and, among them, 25% had gambled regularly. Moreover, 11.4% of participants can be considered at-
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30 risk gamblers, and 6.1% as problematic gamblers, without significant differences between minors and of-age
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32 adolescents. This result is in line with Bastiani and colleagues data, which reported a high prevalence of
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34 gambling activities among minors (Bastiani et al. 2010).
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37 Moreover, many adolescents declared to have spent a significant amount of money on the activity, with more
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39 than 32% spending 100 euros or more in the past year. The most common gambling activities were scratch
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41 cards, such as Gratta & Vinci and Win for Life, betting on sports events, and playing cards for money, a result
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43 in line with previous Italian studies (Chiesi et al. 2013; Donati et al. 2013; Donati et al. 2019). Finally, the
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45 most frequent problem behaviors related to gambling were: feel bad about the amount bet, go back another
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47 day to try to win back lost money, would like to stop betting but doesn't think it possible, and gambling more
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49 than planned. The greater prevalence of these gambling problem behaviors is similar to results found in
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51 previous studies (Chiesi et al. 2013; Govoni et al. 2001) and suggests a personal difficulty of adolescents to
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53 control gambling behaviors.
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55 It must be recognized that 76% of those who claimed to gamble can be considered non-regular gamblers due
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57 to their low frequency of gambling. As expected, this group is composed by adolescents with a low risk
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2 profile: they gambled once a month or less over the past year, spent less money on gambling activities, and
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4 tended to play at more socially-acceptable games, such as bingo, scratch cards, and lotteries.
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6 On the contrary, 24% of adolescents who claimed to gamble in the previous year can be considered regular
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8 gamblers. They gambled weekly or daily during the previous 12 months, spent more money than non-
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10 regulars, and had a significantly greater prevalence for cards, coin tosses, and dice games for money, bets on
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12 games of personal skill, sports teams, and horse or dog races, slot machines, and on-line games. Most of these
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14 games are more commonly associated with gambling problems (Welte et al. 2009) and can be considered the
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16 most predisposing types for the development of a gambling addiction (Tani and Ilari 2016). Finally, compared
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18 to non-regular gamblers, regular gamblers report a greater prevalence of all problem gambling behaviors.
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20 In reference to gender differences, in line with previous studies (for example, Andrie et al. 2019; Derevensky
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22 and Gilbeau 2019; Weidberg et al. 2018), our results confirmed the greater prevalence of males involved in
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24 gambling activities. In fact, males gambled more, were more frequent gamblers, and spent more than females.
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26 Significant gender differences also emerged regarding gambling activities: males tended to gamble more at
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28 games that involved skills (bets on games of personal skill and on sports teams) and on-line games. On the
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30 contrary, females tend to bet on more socially accepted games, such as bingo, scratch cards and lotteries.
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32 Moreover, males report a greater prevalence of problem gambling behaviors. In particular, males manifest
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34 problems that arise as a result of gambling, such as arguments with friends and family, having problems at
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36 school, and borrowing money to bet without returning it, and those that indicate a lack of control and
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38 struggling with gambling behavior, like wagering more than planned and feeling bad about the amount bet, or
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40 about what happens when money is lost. These results confirm the fact that gambling constitutes a particular
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42 risk factor for adolescent males.
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44 Regarding gender differences between the regular and non-regular groups, results highlighted an interesting
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46 interpretation. In fact, while the same gender differences emerged regarding the non-regular group, results
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48 from the regular group showed that males and females do not differ in any aspect investigated. In other words,
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50 male and female regular gamblers prefer the same games, spend the same amount of money, and report the
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52 same problem gambling behaviors. Therefore, although adolescent males are more at risk of being involved in
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54 gambling activities and more likely to engage in problem gambling behavior, when adolescent females
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56 regularly engage in gambling activities, they tend to present the same at-risk profile that males do. To support
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2 this, Ellenbogen and colleagues (2007) found a diminution of gender differences among adolescents with
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4 probable pathological gambling.
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6 Finally, in reference to age differences, our results confirm a greater prevalence in of-age adolescents
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8 involved in gambling activities, although among regular gamblers there were not significant differences
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10 between the prevalence of minors and of-age adolescents, and they also did not differ in the amount of money
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12 spent on gambling activities.
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14 Significant age differences emerged regarding gambling activities: adolescents of age tended to gamble more
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16 at some games that involved going to places to bet, such as bingo, scratch cards (Gratta & Vinci/win for Life),
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18 and lotteries. On the contrary, minors tend to gamble more frequently at games of personal skill, and on sports
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20 teams, bets that can be made without going to designated places. However, it should be emphasized that for
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22 other types of bets, which in any case involve going to designated places where minors cannot by law enter,
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24 no significant differences emerged in the probability of gambling between minors and adolescents of age. As
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26 noted with respect to gender differences in regular gamblers, with respect to age, minors and adolescents of
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28 age regular gamblers did not differ in the choice of bets and in manifestation of problematic gambling
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30 behaviors.
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32 Although the present study has several strengths, such as sample size and inclusion of a significant number of
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34 female adolescents, it also presents some limitations. First, the design is not longitudinal, and therefore does
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36 not allow us to explore the evolution of gambling behaviors during the adolescent period. Second, the sample
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38 comes only from central Italy, thus leaving other parts of the country out of our analysis. This limits the
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40 possibility of generalizing these results to the entire young Italian population. Moreover, we used only self-
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42 report data, which does not necessarily allow us to know the true gambling behavior of the adolescents, due to
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44 possible bias-related to social stigma.
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46 However, our results provide a detailed image of the gambling behavior of Italian adolescents, which can
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48 have important social and clinical implications. In fact, from a social point of view, our data show that
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50 although gambling in Italy is forbidden to minors, a high percentage do gamble. This result highlights the
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52 need for greater controls via legislation, regarding both compliance with the laws by providers and the
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54 accessibility of gambling for adolescents. Moreover, more information on gambling for the general population
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56 would be desirable. In fact, regarding some bets that are more socially acceptable, such as scratch cards, in
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2 Italy it is common for adults to buy tickets for minors, not recognizing such activities as gambling (Tani and
3 Ilari 2016).

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6 From a clinical point of view, it might be it hasty and dangerous to consider gambling a male problem. On the
7
8 contrary, particular attention should be paid to the frequency of gambling in female adolescents; although
9 they are less involved in gambling activities, once they start, they have the same risk profile as males.

10
11 Moreover, our results provide a detailed overview of gambling preferences and characteristics of adolescents
12 who gamble regularly. In this regard, data showed that the most common problem gambling behavior is the
13 inability to control gambling, for example, wanting to go back to win lost money, playing more than planned,
14 wishing to quit but thinking it impossible, and feeling bad about the money spent. This could be relevant
15 information for clinicians who work with adolescent gamblers, to create tailored interventions.
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Table 1. Frequency of gambling activity by gender

Gambling activity	Never			Less than monthly			Monthly			Weekly			Daily		
	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females
Cards for money	628 (70.7)	429 (70.4)	199 (71.3)	205 (23.1)	131 (21.5)	74 (26.5)	27 (3)	22 (3.6)	5 (1.8)	21 (2.4)	20 (3.3)	1 (.4)	7 (.8)	7 (1.1)	0 (0)
Coin tosses for money	847 (95.4)	576 (94.6)	271 (97.1)	29 (3.3)	22 (3.6)	7 (2.5)	5 (.6)	4 (.7)	1 (.4)	3 (.3)	3 (.5)	0 (0)	4 (.5)	4 (.7)	0 (0)
Bets on games of personal skill	675 (76)	426 (70)	249 (89.2)	152 (17.1)	126 (20.7)	26 (9.3)	34 (3.8)	31 (5.1)	3 (1.1)	19 (2.1)	18 (3)	1 (.4)	8 (.9)	8 (1.3)	0 (0)
Bets on sports teams	506 (57)	275 (45.2)	231 (82.8)	172 (19.4)	143 (23.5)	29 (10.4)	72 (8.1)	66 (10.8)	6 (2.2)	118 (13.3)	107 (17.6)	11 (3.9)	20 (2.3)	18 (3)	2 (.7)
Bets on horse or dog races	839 (94.5)	570 (93.6)	269 (86.4)	26 (2.9)	17 (2.8)	9 (3.2)	7 (.8)	6 (1)	1 (.4)	10 (1.1)	10 (1.6)	0 (0)	6 (.7)	6 (1)	0 (0)
Bingo	690 (77.7)	488 (80.1)	202 (72.4)	161 (18.1)	92 (15.1)	69 (24.7)	29 (3.3)	22 (3.6)	7 (2.5)	7 (.8)	6 (1)	1 (.4)	1 (.1)	1 (.2)	0 (0)
Dice games for money	857 (96.5)	585 (96.1)	272 (97.5)	23 (2.6)	16 (2.6)	7 (2.5)	1 (.1)	1 (.2)	0 (0)	3 (.3)	3 (.5)	0 (0)	4 (.5)	4 (.7)	9 (0)
Slot Machines	722 (81.3)	487 (80)	235 (84.2)	124 (14)	83 (13.6)	41 (14.7)	25 (2.8)	22 (3.6)	3 (1.1)	12 (1.4)	12 (2)	0 (0)	5 (.6)	5 (.8)	0 (0)
Gratta & Vinci/win for Life	329 (37)	249 (40.9)	80 (28.7)	440 (49.5)	274 (45)	166 (59.5)	86 (9.7)	60 (9.9)	26 (9.3)	29 (3.3)	22 (3.6)	7 (2.5)	4 (.5)	4 (.7)	0 (0)
Lotteries	682 (76.8)	486 (79.8)	196 (70.3)	171 (19.3)	99 (16.3)	72 (25.8)	26 (2.9)	17 (2.8)	9 (3.2)	7 (.8)	5 (.8)	2 (.7)	2 (.2)	2 (.3)	0 (0)
On-line games	789 (88.9)	520 (85.4)	269 (96.4)	52 (5.9)	47 (7.7)	5 (1.8)	26 (2.9)	25 (4.1)	1 (.4)	8 (.9)	7 (1.1)	1 (.4)	13 (1.5)	10 (1.6)	3 (1.1)

Table 2. Frequency of gambling activity by age

Gambling activity	Never			Less than monthly			Monthly			Weekly			Daily		
	Total	Minor	Of age	Total	Minor	Of age	Total	Minor	Of age	Total	Minor	Of age	Total	Minor	Of age
Cards for money	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Coin tosses for money	628 (70.7)	507 (71.9)	121 (66.1)	205 (23.1)	157 (22.3)	48 (26.2)	27 (3)	18 (2.6)	9 (4.9)	21 (2.4)	18 (2.6)	3 (1.6)	7 (.8)	5 (.7)	2 (1.1)
Bets on games of personal skill	847 (95.4)	670 (95)	177 (96.7)	29 (3.3)	23 (3.3)	6 (3.3)	5 (.6)	5 (.7)	0 (0)	3 (.3)	3 (.4)	0 (0)	4 (.5)	4 (.6)	0 (0)
Bets on sports teams	675 (76)	524 (74.3)	151 (82.5)	152 (17.1)	130 (18.4)	22 (12)	34 (3.8)	28 (4)	6 (3.3)	19 (2.1)	15 (2.1)	4 (2.2)	8 (.9)	8 (1.1)	0 (0)
Bets on horse or dog races	506 (57)	386 (54.8)	120 (65.6)	172 (19.4)	139 (19.7)	33 (18)	72 (8.1)	61 (8.7)	11 (6)	118 (13.3)	106 (15)	12 (6.6)	20 (2.3)	13 (1.8)	7 (3.8)
Bingo	839 (94.5)	664 (94.2)	175 (95.6)	26 (2.9)	21 (3)	5 (2.7)	7 (.8)	6 (.9)	1 (.5)	10 (1.1)	8 (1.1)	2 (1.1)	6 (.7)	6 (.9)	0 (0)
Dice games for money	690 (77.7)	566 (80.3)	124 (67.8)	161 (18.1)	113 (16)	48 (26.2)	29 (3.3)	20 (2.8)	9 (4.9)	7 (.8)	5 (.7)	2 (1.1)	1 (.1)	1 (.1)	0 (0)
Slot Machines	857 (96.5)	680 (96.5)	177 (96.7)	23 (2.6)	18 (2.6)	5 (2.7)	1 (.1)	1 (.1)	0 (0)	3 (.3)	2 (.3)	1 (.5)	4 (.5)	4 (.6)	0 (0)
Gratta & Vinci/win for Life	722 (81.3)	580 (82.3)	142 (77.6)	124 (14)	92 (13)	32 (17.5)	25 (2.8)	18 (2.6)	7 (3.8)	12 (1.4)	10 (1.4)	2 (1.1)	5 (.6)	5 (.7)	0 (0)
Lotteries	329 (37)	274 (38.9)	55 (30.1)	440 (49.5)	343 (48.7)	97 (53)	86 (9.7)	67 (9.5)	19 (10.4)	29 (3.3)	18 (2.6)	11 (6)	4 (.5)	3 (.4)	1 (.5)
On-line games	682 (76.8)	554 (78.6)	128 (69.9)	171 (19.3)	129 (18.3)	42 (23)	26 (2.9)	17 (2.4)	9 (4.9)	7 (.8)	3 (.4)	4 (2.2)	2 (.2)	2 (.3)	0 (0)
	789 (88.9)	632 (89.6)	157 (85.8)	52 (5.9)	41 (5.8)	11 (6)	26 (2.9)	13 (1.8)	13 (7.1)	8 (.9)	8 (1.1)	0 (0)	13 (1.5)	11 (1.6)	2 (1.1)

Table 3. Frequency of most common gambling activity by gender, age group, and regular and non-regular gamblers

Gambling activity	Total	M	F	Minor		Of age		Regular gamblers						Non regular gamblers			
				n	(%)	n	(%)	n	(%)	Total	M	F	Minor	Of age	Total	M	F
Cards for money	260 (29.3)	180 (29.6)	80 (28.7)	198 (28.1)	62 (33.9)	97 (45.5)	86 (45.5)	11 (45.8)	75 (42.4)	22 (61.1)	163 (24.1)	94 (22.4)	69 (27.1)	123 (23.3)	40 (27.2)		
Coin tosses for money	41 (4.6)	33 (5.4)	8 (2.9)	35 (5)	6 (3.3)	24 (11.3)	22 (11.6)	2 (8.3)	22 (12.4)	2 (5.6)	17 (2.5)	11 (2.6)	6 (2.4)	13 (2.5)	4 (2.7)		
Bets on games of personal skill	213 (24)	183 (30)	30 (10.8)	181 (25.7)	32 (17.5)	100 (46.9)	91 (48.1)	9 (37.5)	84 (47.5)	16 (44.4)	113 (16.7)	92 (21.9)	21 (8.2)	97 (18.4)	16 (10.9)		
Bets on sports teams	382 (43)	334 (54.8)	48 (17.2)	319 (45.2)	63 (34.4)	178 (83.6)	161 (85.2)	17 (70.8)	150 (84.7)	28 (77.8)	204 (30.2)	173 (41.2)	31 (12.2)	169 (32)	35 (23.8)		
Bets on horse or dog races	49 (5.5)	39 (6.4)	10 (3.6)	41 (5.8)	8 (4.4)	39 (18.3)	34 (18)	5 (20.8)	33 (18.6)	6 (16.8)	10 (1.5)	5 (1.2)	5 (2)	8 (1.5)	2 (1.4)		
Bingo	198 (22.3)	121 (19.9)	77 (27.6)	139 (19.7)	59 (32.2)	49 (23)	43 (22.8)	6 (25)	37 (20.9)	12 (33.3)	149 (22.1)	78 (18.6)	71 (27.8)	102 (19.3)	47 (32)		
Dice games for money	31 (3.5)	24 (3.9)	7 (2.5)	25 (3.5)	6 (3.3)	18 (8.5)	17 (9)	1 (4.2)	16 (9)	2 (5.6)	13 (1.9)	7 (1.7)	6 (2.4)	9 (1.7)	4 (2.7)		
Slot Machines	166 (18.7)	122 (20)	44 (15.8)	125 (17.7)	41 (22.4)	84 (39.4)	76 (40.2)	8 (33.3)	64 (36.2)	20 (55.6)	82 (12.1)	46 (11)	36 (14.1)	61 (11.6)	21 (14.3)		
Gratta & Vinci/win for Life	559 (63)	360 (59.1)	199 (71.3)	431 (61.1)	128 (69.9)	133 (62.4)	115 (60.8)	18 (75)	103 (58.2)	30 (83.3)	426 (63.1)	245 (58.3)	181 (71)	328 (62.1)	98 (66.7)		
Lotteries	206 (23.2)	123 (20.2)	83 (29.7)	151 (21.4)	55 (30.1)	59 (27.7)	50 (26.5)	9 (37.5)	42 (23.7)	17 (47.2)	147 (21.8)	73 (17.4)	74 (29)	109 (20.6)	38 (25.9)		
On-line games	99 (11.1)	89 (14.6)	10 (3.6)	73 (10.4)	26 (14.2)	63 (29.6)	57 (30.2)	6 (25)	43 (24.3)	20 (55.6)	36 (5.3)	32 (7.6)	4 (1.6)	30 (5.7)	6 (4.1)		

Table 4. Frequencies of the items of SOGS-RA related to problematic gambling behaviors

	Gender			Age		Regular gamblers					Non regular gamblers				
	Total %	M %	F %	Minor %	Of age %	Total %	M %	F %	Minor %	Of age %	Total %	M %	F %	Minor %	Of age %
1. In the past 12 months, how often have you gone back another day to try to win back the money you lost? (most of the time/every time)	13.1	15.8	7.2	11.9	17.5	36.2	35.4	41.7	33.9	47.2	5.8	6.9	3.9	4.5	10.2
2. In the past 12 months when you were betting, have you ever told others you were winning money when you really weren't winning?	5.4	7.1	1.8	5	7.1	16.9	17.5	12.5	15.3	25	1.8	2.4	.8	1.5	2.7
3. Has your betting money, in the past 12 months, ever caused any problems for you such as arguments with family and friends, or problems at school or work?	6	7.2	3.2	5.8	6.6	18.3	17.5	25	17.5	22.2	2.1	2.6	1.2	1.9	2.7
4. In the past 12 months, have you ever gambled more than you had planned to?	11.1	13	7.2	11.2	10.9	29.6	31.7	12.5	29.4	30.6	5.3	4.5	6.7	5.1	6.1
5. In the last 12 months, has anyone criticized your betting or told you that you had a gambling problem, regardless of whether you thought it was true or not?	7.8	9.5	3.9	8.1	6.6	18.3	18	20.8	17.5	22.2	4.4	5.7	2.4	4.9	2.7
6. In the past 12 months, have you ever felt bad about the amount you bet, or about what happens when you bet money?	22.6	26.6	14	22.7	22.4	53.5	51.9	66.7	51.4	63.9	12.9	15.2	9	13.1	12.2
7. Have you ever felt, in the past 12 months, that you would like to stop betting money but didn't think you could?	12.2	14	8.2	11.6	14.2	28.2	27.5	33.3	26.6	36.1	7.1	7.9	5.9	6.6	8.8
8. In the last 12 months, have you ever hidden from family or friends any betting slips, IOUs, lottery tickets, money that you've won, or other signs of gambling?	7.2	9.2	2.9	7.7	5.5	18.3	18	20.8	18.6	16.7	3.7	5.2	1.2	4	2.7
9. In the past 12 months, have you had money arguments with family	6.2	8	2.2	6.2	6	17.8	18	16.7	16.9	22.2	2.5	3.6	.8	2.7	2

or friends that centered on gambling?

10. In the past 12 months, have you borrowed money to bet and not paid it back?	3.6	3.8	3.2	3.1	5.5	10.3	10.1	12.5	9.6	13.9	1.5	1	2.4	.9	3.4
11. In the past 12 months, have you ever skipped or been absent from school or work due to betting activities?	3.9	5.3	1.1	4.3	2.7	13.6	13.8	12.5	13.6	13.9	.9	1.4	-	1.1	0
12. Have you borrowed money or stolen something in order to bet or to cover gambling debts in the last 12 months?	3.5	4.1	2.2	3.4	3.8	11.3	11.1	12.5	10.7	13.9	1	1	1.2	.9	1.4