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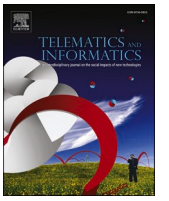

Differences in the maximum proportion of spent income devoted to online gambling among adolescents due to conflictual relationships

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ABSTRACT

This paper analyzes a new topic in gambling among adolescents: the association between the amount of available income that is spent weekly and online gambling, and further examines the possible role of conflictual relationships as a moderator of this association. To that end, interval regression analyses are used with a nationally representative sample of Spanish adolescents (n = 38,010; M_{age} = 15.69; 51.4 % females). The results indicate that spent income, bullying victimization and poor-quality or conflictual relationships with the mother are positively associated with online gambling. Moreover, the last two predictors moderate the association between spent income and online gambling. The results also indicate that parents and schools have some room to maneuver. Thus, informative campaigns at school integrating parents could reduce online gambling directly and indirectly via the improvement of adolescents' conflictual relationships. Moreover, special attention should be paid to boys, among whom most online gambling takes place.

1. Introduction

The huge development of the Internet since the mid-1990s has yielded substantial changes in people's daily lives (Ling, 2004). Despite the massive innovations the Internet affords in terms of new and rewarding experiences (McNicol and Thorsteinsson, 2017; Pang and Zhang, 2024; Tirado-Morueta et al., 2020) or improving health and well-being by searching and sharing health-related information (Pang and Liu, 2023), there are negative consequences for people's health, wellbeing, and, consequently, for the development of adolescents. Adolescents are the group with the highest Internet use and the group most vulnerable to Internet addiction (Malak et al., 2017; Tang et al., 2014). The misuse of new technologies is associated with anxiety, depression, fear of missing out, and poor quality sleep (Abbouyi et al., 2024; Pang and Quan, 2024; Woods and Scott, 2016). Another consequence is poorer or fewer social

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relationships (Koyuncu et al., 2014) and loneliness (Marttila et al., 2021). New technologies also increase the likelihood of suffering bullying through these channels, as it can be carried out at any time and place (Camerini et al., 2020). Finally, new technologies have facilitated the possibility of gambling via the Internet (Calado and Griffiths, 2016; Sztainert et al., 2018).

An excellent overview of the definition, measures and problems associated with online gambling can be found in Langham et al. (2016). In their Table 1 and Table 2, these authors report a taxonomy of harms for both the gambler and other related people. The following is a brief outline of these harms: a) Financial (reduction or loss of capacity to consume luxury goods but also necessary items like food, medication, healthcare, etc.); b) Conflictual (dishonest relationships, less care to family and children, etc.); c) Emotional and health problems (stress, anxiety, bad feelings about oneself, less care paid to eating and healthy habits, etc.); d) Reduced performance at school and work with possible negative consequences (greater likelihood of being unemployed or worse labor contracts both in the present and in the future); f) Greater vulnerability and likelihood of being involved in criminal activities. Moreover, some authors have concluded that harms related to gambling also occur among moderate and low risk gamblers (McMahon et al., 2019).

The European Gaming & Betting Association reported that in 2020, online gambling revenues increased by 7 % to €26.3bn (European Gaming Betting Association, 2020). This report also forecasts a steady increase in the following years with a prediction of €37.3bn in 2025. According to the *Directorate-General for Gambling Regulation*, the number of active online gamblers was 1,481,727 in Spain in 2020 with an annual increment equal to 8.36 % (Dirección General de Ordenación del Juego, 2021). Most online gamblers are male (82.33 %). The average expense per active gambler was 533 euros; this average expense is 574 for males and 343 for females. These figures show that online gambling is an increasing phenomenon in Spain. In part, this could be due to the fact that gambling is a legal activity and its social acceptability has increased as a consequence of the proliferation of advertisement on mainstream media, particularly during the broadcast of soccer and basketball games (Jauregui et al., 2018).

The increasing awareness about online gambling and betting has been incorporated in international organizations like the World Health Organization. Thus, it states in its International Classification Diseases-11 (ICD-11): "*Hazardous gambling and betting refers to a pattern of gambling and betting that appreciably increases the risk of harmful physical or mental health consequences to the individual or to others around this individual*". This statement clearly reflects that online betting can have serious physical and mental health consequences both for the gambler and for their close environment. Previously, the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) of the American Psychiatric Association (American Psychiatric Association, 2013) – which provides the most well-accepted diagnostic criteria for mental disorders – included gambling disorder in the category of behavioral addictions (Stehmann, 2020).

The current study seeks to contribute to the online gambling literature by examining a new topic, namely, the quantitative association between online gambling and spent income, this is to say, the amount of income that is spent weekly by the adolescent, and whether this association is moderated by having conflictual relationships with peers and parents. To that end, a holistic theoretical framework is used to propose several research hypotheses. This theoretical framework combines elements from the theory of demand, the theory of rational addiction (Becker et al., 1991; Becker and Murphy, 1988), and the theory about parenting styles (Baumrind, 1978; Spera, 2005; Steinberg et al., 2006).

The purpose of the paper is threefold. First, it focuses not only on finding significant predictors, but also on providing quantitative interpretations of their associations with the behavior. Thus, most studies estimate non-linear regression models, like logistic regression models, focusing only on the statistical significance of coefficients or odds ratios without analyzing the magnitude of the association between predictors and the dependent variable in an understandable way. This means that readers cannot infer how big this association is, as it depends not only on the estimated coefficient, but also on the level of the other predictors (Wooldridge, 2002). In this context, some predictors could be statistically significant but could have a very low association in quantitative terms. Second, the paper focuses on the role of conflictual relationships and its moderation effects on the proportion of income spent weekly on online gambling, an aspect not considered previously in the literature, to the best of the authors' knowledge. Understanding the role of the proportion of income spent weekly on online gambling is fundamental in order to identify high risk groups and develop policies targeted specially to these groups. Third, the paper analyzes these and other aspects of online gambling using data from Spain, an under-researched cultural context.

2. Background and hypotheses

Given the increasing trends in online gambling reported in the previous section, the fact that gambling can have serious consequences for gamblers, their families and community, and that the current harms can affect the life course of gamblers and also be intergenerational (Langham et al., 2016), it is essential to improve the knowledge base about online gambling behavior, especially at the beginning or in the early stages of the behavior. With this goal in mind, the present study analyzes the predictors of the quantity of online gambling among adolescents and, consequently, identifies those who are at increased risk for gambling.

Economists, both at the micro and macro levels, recognize the importance of income as a key factor in consumer decisions when buying goods and services (Pindyck and Rubinfeld, 2018). In this respect, online gambling can be considered as another commodity by some consumers. According to the theory of rational addiction, rational consumers purchase addictive goods and services as a result of a life-long utility maximization process (Becker et al., 1991; Becker and Murphy, 1988). Some consumers have high rates of temporal preference and, as a consequence, value the present much more than the future. As a result, the present utility of consuming a good or service is higher than the discounted disutility of future harms and, consequently, consuming the addictive good or service is a "rational" choice. However, some people could remain misinformed about the future consequences or about the addictive nature of the goods and/or services. Consequently, they could initiate use because they underestimate the negative consequences, and subsequently may regret their decisions if the underrated negative consequences actually take place.

The literature on adolescent smoking provides some evidence for this mechanism. For example, 25 % of Spanish smokers aged 14 and 18 years old reported that one of the two most important reasons to smoke include that they don't know why they smoke, but they can't stop doing it (Borderías et al., 2015). Similarly, another study reported that even those who succeed in quitting smoking typically relapse three to four times before achieving success (Prochaska et al., 1992). These studies suggest that addiction can be stronger than the willpower of users, and consequently the role of addiction is underestimated, in particular during the initial phases of consumption.

Addictions also can arise as the consequence of stressful life events, as they can increase the marginal utility of commodities that can be consumed in order to find relief or escape from problems (Becker et al., 1991; Suranovic et al., 1999). This form of consumption could generate "unhappy addicts." Among adolescents, one of the most stressful life events is conflictual relationships with peers, in the form of suffering bullying from these peers. In this respect, being bullied can increase the probability of seeking relief through gambling online. Moreover, bullying victimization could increase student loneliness (Marttila et al., 2021), which has been found to be a predictor of addictive use of the Internet (Sarıalioğlu et al., 2021). Taking the arguments above into account, the following hypotheses are postulated:

H1: Spent income is positively associated with gambling online.

H2: Bullying victimization is positively associated with gambling online.

Regarding the family environment, the quality of parental relationships has been introduced in the analysis. The relationship between parenting style and several outcomes related to child well-being has been extensively analyzed over several decades. Authoritative parenting styles and good relationships with parents are positively associated with higher academic performance (Glasgow et al., 2016; Steinberg et al., 2006) and better self-esteem and life satisfaction (Milevsky et al., 2007). In contrast, poor or conflictual parental relationships are associated with delinquency (Fletcher et al., 2004; Lamborn et al., 1991; Smith and Stern, 1997), tobacco and alcohol consumption (Piko and Balázs, 2012), and substance abuse (Fletcher et al., 2004; Matejevic et al., 2014). More recently, and in connection with Internet outcomes, poor relationships between parents and children are negatively associated with Internet addiction (Soh et al., 2018; Wang et al., 2018; Yang et al., 2016), cyberbullying behaviors (Makri-Botsari and Karagianni, 2014), and gambling online (Escario and Wilkinson, 2020). Of note, Internet-related parenting styles that were initially perceived as authoritative were later interpreted as laissez-faire (Özgür, 2016). While this could be due to the fact that children are maturing and need less guidance and direction, in other cases it could be perceived by children as a loss of interest by their parents, leaving more unsupervised room and time to engage with the Internet. Given the above results, the following hypothesis is analyzed:

H3: Conflictual parent–child relationships are positively associated with online gambling.

Bullying victimization and having conflictual relationships could increase adolescent's anxiety and insecurity. It has been argued that the beginning and resumption of harmful addictions, such as smoking, gambling and cocaine use, among others, "are often traceable to the anxiety, tension, and insecurity produced by adolescence" (Becker and Murphy, 1988). In this sense, and according to the Theory of Rational Addiction (Becker et al., 1991; Becker and Murphy, 1988), stressful life events, such as bullying and conflictual relationships with parents, raise the marginal utility of gambling but, and importantly, this also implies that adolescents will become more present-oriented individuals and, therefore, will pay less attention to future consequences of their consumption. Accordingly, more present-oriented adolescents are more prone to spend a higher proportion of their income on addictive products today. Thus, it is possible that bullying and/or conflictual relationships with parents, not only directly correlate with online gambling, but they also moderate the proportion of income that adolescents devote to online gambling. Thus, the following hypotheses are postulated:

H2b: The association between spent income and online gambling increases with bullying victimization.

H3b: The association between spent income and online gambling is higher among those who have conflictual relationships with parents.

In order to avoid bias in the regression estimates, the usual control variables are included, such as gender, age, immigrant status, parents' education, and so on. The model analyzed including the postulated hypotheses and the rest of predictors is depicted in Fig. 1.

3. Data, variables and methods

To undertake the analyses, the 2018/19 Survey on Drug Use in Secondary Education in Spain ["Encuesta sobre Uso de Drogas en Enseñanzas Secundarias en España (ESTUDES) 2018/19"] was used. A total of 38,010 high school students aged between 14 and 18 years were interviewed in 2019 during the period from February 4 to April 5. This survey is a nationally representative random sample. A two-stage cluster sampling was carried out, in which, in the first instance, educational centers (first stage units) were randomly selected, and then classrooms (second stage units) were also randomly selected.[1]

The dependent variable, *Online Gambling*, was computed as the response to the following question: "*In the last 12 months, what was the largest sum of money you have spent betting on the Internet in only one day?*". Possible answers are: Nothing; Less than €6; Between €6 and €30; Between €31 and €60; Between €61 and €300; and, finally, More than €300.

Key predictors are *Income*, *Bullying Victimization,* and measures of the quality of parental relationships. The first predictor measures the money spent weekly by the young person and is obtained in response to the following question: "*Currently, how much money do you spend weekly on going out with friends, going to the movies, going out for a drink…?*". The second variable is a dichotomous variable indicating whether or not the adolescent has been bullied (1 = yes; 0 = no) and was obtained in response to the following question: "*In the last 12 months, have you suffered bullying via the Internet or by other means?*".

In order to measure the quality of parental relationships, the following variables are used. *Conflictual Mother Relationship* (1 = the

[1] Further details, although in Spanish, can be found in the following URL: https://pnsd.sanidad.gob.es/profesionales/sistemasInformacion/sistemaInformacion/pdf/ESTUDES_2018-19_Informe.pdf.

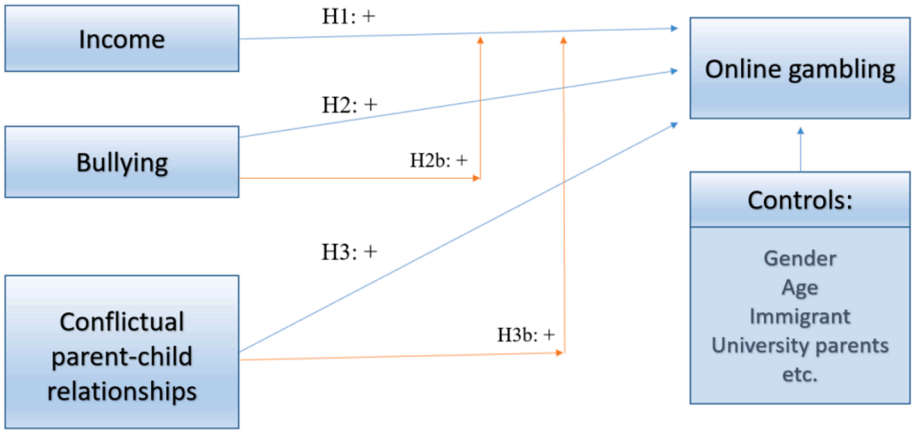

Fig. 1. Research model.

adolescent has a bad or very bad relationship with his/her mother; 0 = otherwise); *Normal Mother Relationship* (1 = the adolescent has a normal relationship with his/her mother; 0 = otherwise); *Good Mother Relationship* (1 = the adolescent has a good or very good relationship with his/her mother; 0 = otherwise); *Conflictual Father Relationship* (1 = the adolescent has a bad or very bad relationship with his/her father; 0 = otherwise); *Normal Father Relationship* (1 = the adolescent has a normal relationship with his/her father; 0 = otherwise); *Good Father Relationship* (1 = the adolescent has a good or very good relationship with his/her father; 0 = otherwise). Both *Normal Mother Relationship* and *Normal Father Relationship* act as the reference categories in regression analyses.

Control variables include: *Male* (1 = male; 0 = female); *Age 14 years* (the reference category, 1 = the student is 14 years old; 0 = otherwise); *Age 15 years* (1 = the student is 15 years old; 0 = otherwise); *Age 16 years* (1 = the student is 16 years old; 0 = otherwise); *Age 17 years* (1 = the student is 17 years old; 0 = otherwise); *Age 18 years* (1 = the student is 18 years old; 0 = otherwise); *Immigrant* (1 = yes; 0 = otherwise); *University Mother* (1 = the mother has a university degree; 0 = otherwise); *University Father* (1 = the father has a university degree; 0 = otherwise); and, finally, *Information on ICTs* (1 = the adolescent has received information in class about the problems associated with the misuse of new technologies; 0 = otherwise).

Given the nature of the dependent variable, it is censored at several intervals instead of being observed as a continuous variable; an interval regression approach is used in order to analyze the postulated hypotheses. Consequently, it is assumed that the observed dependent variable Y is an interval categorization of a non-observable latent dependent variable, Y^*. The relationship between both variables is the following:

$$Y = 0 \ \ if \ \ Y_i^* \leqslant 0.$$

$$Y = 1 \ \ if \ \ 0 < Y_i^* < 6.$$

$$Y = 2 \ \ if \ \ 6 \leqslant Y_i^* \leqslant 30.$$

$$Y = 3 \ \ if \ \ 30 < Y_i^* \leqslant 60.$$

$$Y = 4 \ \ if \ \ 60 < Y_i^* \leqslant 300.$$

$$Y = 5 \ \ if \ \ 300 < Y_i^*.$$

The non-observable latent dependent variable is assumed to be a function of the explanatory variables plus an error term:

$$Y_i^* = X_i\beta + \varepsilon_i.$$

where Y_i^* is the non-observable latent dependent variable for respondent i, X_i is a vector with the predictor values for respondent i, β is a vector of coefficients with the same dimension as X_i, and finally, ϵ_i is an error term for respondent i which is independent, identically and normally distributed, this is to say, $\epsilon_i \sim N(0, \sigma)$. One interesting property of an interval regression model is that the β coefficients can be directly interpreted in terms of the association of the predictors with the non-observable latent variable. Consequently, the coefficient associated with the income variable represents the income proportion devoted to online gambling of an additional euro or the marginal propensity to online gambling. In general, the marginal propensity will differ from the average propensity or income proportion devoted to the commodity considered. However, it will be shown that, in this study, the marginal propensity is a fairly good approximation of the average propensity or income proportion devoted to online gambling. All statistical analyses are carried out with the R Software (version 4.0.5).

4. Results

Results from descriptive analyses of the measures appear in Fig. 2, for the dependent variable, and in Table 1 for the dependent and explanatory variables. Regarding the 34,900 students that answered the question about the highest amount bet on one day while on the Internet, the majority (93.5 %) reported that they have not bet any money, 3.1 % reported less than €6, 1.8 % between €6 and €30, 0.7 % between 31 and €60, 0.5 % between €61 and €300, and finally, 0.4 % more than €300. Therefore, about 6.5 % of adolescents bet money online in the last year. This pattern was distinct when differentiated by sex. Thus, 1.3 % of girls bet money while the percentage of boys was almost ten times higher, 12.4 %.

Concerning the key predictors, as shown in Table 1, the amount of income spent weekly by students ranges from 0 to €200 with a mean equal to €12.63. Almost a tenth, 9 %, reported they have been bullied. Fewer than 5 % reported conflictual relationships with their mother and the father, 2.2 % and 4.3 % of students, respectively. In addition, 42.1 % of mothers and 36.4 % of fathers have a university degree, and 75.3 % of respondents reported they have received information at school about problems associated with the misuse of new technologies.

Results from the interval regressions are presented in Table 2. Results from Model 1 without moderation effects provide support for both hypotheses 1 and 2. Both spent income and experiencing bullying are positively associated with online gambling.

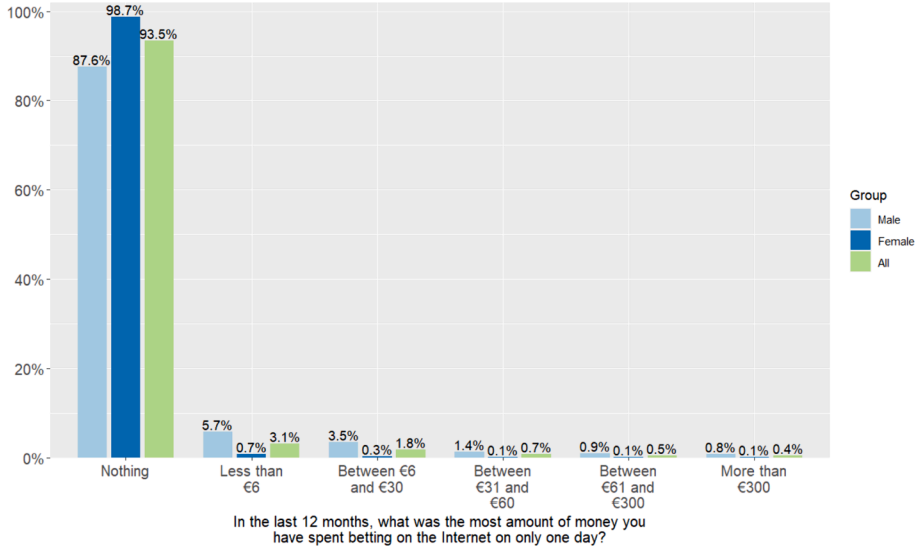

Fig. 2. Histogram of the dependent variable.

Table 1
Descriptive analysis of the variables.

Dependent and continuous variables	*N*	*Mean*	*SD*	*Min*	*Max*
Online Gambling	34,900	0.129	0.579	0	5
Income	37,136	12.630	14.380	0	200
Categorical variables	*N*	*Percentage*	*Frequency*	*Min*	*Max*
Bullying Victimization	37,366	8.97	3,350	0	1
Conflictual Mother Relationship	36,869	2.18	805	0	1
Regular Mother Relationship	36,869	12.56	4,629	0	1
Good Mother Relationship	36,869	85.26	31,435	0	1
Conflictual Father Relationship	35,737	4.28	1,529	0	1
Regular Father Relationship	35,737	18.13	6,479	0	1
Good Father Relationship	35,737	77.59	27,729	0	1
Male	38,010	48.64	18,489	0	1
Age 14 years	38,010	20.01	7,607	0	1
Age 15 years	38,010	25.16	9,562	0	1
Age 16 years	38,010	25.99	9,877	0	1
Age 17 years	38,010	23.29	8,854	0	1
Age 18 years	38,010	5.55	2,110	0	1
Immigrant	37,902	9.32	3,533	0	1
University Mother	33,682	42.12	14,187	0	1
University Father	31,625	36.36	11,500	0	1
Information on ICTs	38,010	75.30	28,622	0	1

Table 2
Interval regression estimates.

	Model 1			**Model 2**			**Model 3**		
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
Intercept	−1.454	−2.410 – -0.497	**0.003**	−1.119	−2.077 – -0.161	**0.022**	−0.950	−1.908 – 0.007	0.052
Income (H1)	0.196	0.180 – 0.212	**<0.001**	0.174	0.157 – 0.190	**<0.001**	0.161	0.145 – 0.178	**<0.001**
Bullying Victimization (H2)	1.980	1.212 – 2.748	**<0.001**	−0.958	−1.966 – 0.050	0.063	−0.786	−1.792 – 0.221	0.126
Conflictual Mother Relationship (H3)	5.437	3.774 – 7.099	**<0.001**	5.375	3.714 – 7.035	**<0.001**	−0.345	−2.424 – 1.734	0.745
Good Mother Relationship	0.147	−0.558 – 0.852	0.683	0.105	−0.599 – 0.809	0.769	0.107	−0.596 – 0.810	0.766
Conflictual Father Relationship (H3)	0.977	−0.284 – 2.238	0.129	0.977	−0.282 – 2.236	0.128	1.062	−0.195 – 2.319	0.098
Good Father Relationship	−0.102	−0.709 – 0.506	0.743	−0.092	−0.699 – 0.515	0.766	−0.086	−0.692 – 0.519	0.780
Male	3.237	2.814 – 3.661	**<0.001**	3.219	2.796 – 3.642	**<0.001**	3.200	2.777 – 3.622	**<0.001**
Age 15 years	0.020	−0.610 – 0.650	0.951	0.018	−0.612 – 0.647	0.956	0.031	−0.597 – 0.660	0.922
Age 16 years	0.008	−0.617 – 0.633	0.981	−0.001	−0.625 – 0.623	0.997	0.003	−0.620 – 0.627	0.991
Age 17 years	−0.153	−0.797 – 0.491	0.642	−0.146	−0.789 – 0.498	0.657	−0.169	−0.811 – 0.473	0.606
Age 18 years	−1.049	−2.090 – -0.007	**0.048**	−0.970	−2.010 – 0.070	0.068	−0.934	−1.972 – 0.105	0.078
Immigrant	1.463	0.676 – 2.249	**<0.001**	1.441	0.656 – 2.226	**<0.001**	1.416	0.632 – 2.200	**<0.001**
University Mother	−0.025	−0.515 – 0.466	0.921	−0.045	−0.535 – 0.445	0.858	−0.037	−0.526 – 0.452	0.882
University Father	−0.186	−0.690 – 0.317	0.468	−0.189	−0.692 – 0.315	0.463	−0.205	−0.707 – 0.298	0.425
Information on ICTs	−0.797	−1.313 – -0.281	**0.002**	−0.814	−1.329 – -0.298	**0.002**	−0.834	−1.348 – -0.319	**0.001**
Log(scale)	2.858	2.850 – 2.867	**<0.001**	2.857	2.848 – 2.865	**<0.001**	2.855	2.847 – 2.864	**<0.001**
Income:Bullying Victimization (H2b)				0.250	0.194 – 0.305	**<0.001**	0.236	0.180 – 0.291	**<0.001**
Income:Conflictual Mother Relationship (H3b)							0.397	0.310 – 0.484	**<0.001**
Log(σ)		2.858			2.857			2.855	
Observations	26,774			26,774			26,774		
R^2 Nagelkerke	0.035			0.038			0.040		

Regarding relationships with parents, the results partially support hypothesis 3. In this respect, the only significant variable is the one that indicates whether or not the adolescent has a conflictual relationship with his/her mother. The coefficient is quite high, indicating that these adolescents devote on average around €5.4 more to gambling online than the rest. Finally, the estimates for Model 2 and Model 3 support the existence of positive moderating effects of both variables considered. This is to say, being a victim of bullying and having a conflictual relationship with the mother, which support H2b and H3b, respectively.

Regarding the remaining control variables, it is important to note that online gambling is higher among males and among immigrants. However, no significant differences were observed by age and parental education measured by attainment of a university degree or not. Of interest is the estimated result indicating that online gambling is lower among those adolescents who have received information at school about the dangers of new technologies, as this has implications for interventions and policy.

5. Discussion

The descriptive analysis revealed that around 6.5 % of Spanish adolescents have gambled online in the last twelve months. This percentage is consistent with previous research that has found similar results for Spanish adolescents using earlier waves of the survey, 6.0 % (Escario and Wilkinson, 2020) and 6.9 % (Casaló et al., 2022). The prevalence percentages among adolescents found in this and similar studies could underestimate the real figure; it is plausible that students who were truant on the day the survey was administered and those who have dropped out of school could have higher prevalence rates of online gambling.

The theory of rational addiction posits that addiction to substances and engaging in health compromising behaviors can be seen as rational (Becker et al., 1991; Becker and Murphy, 1988; Escario and Molina, 2001; Pierani and Tiezzi, 2009; Suranovic et al., 1999), in the sense that individuals make decisions to maximize their lifetime utility. However, youth in particular are prone to underestimate the negative consequences of behaviors, such as online gambling and/or their addictive power and, consequently, they might make poor decisions.

Several studies support the fact that people underestimate the power of addictive substances and experiences. For example, even at the early stages of smoking, 25 % of high school adolescents endorsed that they cannot quit smoking as one of the two principal reasons to smoke (Borderías et al., 2015). Moreover, it is not clear that consumers act rationally, as the empirical work of Kahneman and Tversky (Kahneman, 2011; Kahneman et al., 1982; Kahneman and Tversky, 2000) challenges the assumption of human rationality, describing the heuristics and shortcuts people use when making decisions. Finally, even if consumers make 'rational decisions,' there are unintended external consequences of their online gambling on their families and communities (Langham et al., 2016). These arguments support the need for more research about the predictors of online gambling and for interventions designed to reduce the magnitude of online gambling.

With the aim of delving into the quantitative association between spent income and online gambling (H1), Fig. 3 presents the predicted values for gambling for different levels of income spent. The first graphic, corresponding to the first regression model, shows that the predictions coincide almost perfectly with a straight line passing through the origin of coordinates, and that the confidence interval is quite small. When expense and income follow a straight line passing through the origin, the marginal propensity and the average propensity are equal. Given that the predictions follow this pattern very well, the marginal propensity can be interpreted as an average propensity or the proportion of income devoted to online gambling. Thus, adolescents could spend on average about 19.6 % of their spent income on online gambling, with those who experience cyberbullying spending about 2 euros more than the rest. Both results are consistent with previous literature that found similar results for Spain in which positive associations between frequency of online gambling, measured as the number of times per week, and both income and cyberbullying were observed (Escario and Wilkinson, 2020).

The association between online gambling and income could reflect bidirectional causation. On the one hand, more income increases purchasing power and, consequently, children can purchase more commodities, including online gambling. On the other hand, engaging in potential addictive behaviors such as online gambling requires disposable income. This may drive adolescents to seek additional funds, potentially leading them to, for example, seek part-time employment. Thus, parental monitoring of children's income and expenses could help in reducing online gambling. Therefore, regardless of the causal mechanism, parents can exert some influence by restricting children's income, as providing adolescents with less income could decrease the likelihood of devoting some part to online gambling.

With respect to the second hypothesis, assuming that nobody wants to be bullied, the bidirectional causation is less probable. Consequently, the results underscore the possibility that some bullied victims find relief or evade problems through gambling online. Thus, in addition to the already pernicious consequences that experiencing bullying can yield (Camerini et al., 2020; Holbrook et al., 2020; Kowalski et al., 2019; Willard, 2007), some adolescents may engage in other pernicious behaviors like gambling online. Suffering bullying increases loneliness, reduces self-esteem and causes stress (Baker and Tanrikulu, 2010; Chan and Wong, 2015; Chen et al., 2017; Hoff and Mitchell, 2009), factors that are positively related to problematic Internet use and/or gambling on the Internet (Grubbs et al., 2019; Sarıalioğlu et al., 2021; Vigna-Taglianti et al., 2017). Given these complex connections between bullying victimization, emotions and other problematic behaviors like online gambling, school-based campaigns may be an effective point of intervention to reduce bullying in any of its forms.

The results confirming hypothesis 3 are consistent with other studies that have found that having caring parents is protective against online gambling frequency (Escario and Wilkinson, 2020). These results are also consistent with studies that find that the mother's parental style is more influential than the father's parental style (Milevsky et al., 2007). These authors found that whereas the advantage of having an authoritative mother is evident for all the outcomes assessed in their study, the advantage of having an authoritative father was only evident for one of the three outcomes assessed.

Some prior studies have not distinguished between father- and mother–child relationships (Escario and Wilkinson, 2020). A similar approach could be done in this study by creating a new variable that measures conflictual relationship with parents without distinguishing between them. The new variable obtained merging the two variables has a positive and significant association with online gambling (estimates not reported but available upon request). This result is independent of measuring the new variable as one that indicates with how many parents the adolescent has a conflictual relationship, taking values 0, 1 and 2; or measuring it as a dichotomous variable indicating whether or not the adolescent has at least a conflictual relationship with one of their parents. The results above indicate the benefits of measuring parenting styles and/or relationships with parents separately for each parent, given that a significant finding based on the joint measure could be due to one of the parents only, as is the case in this study.

The estimates of Model 2 that include a moderation effect between bullying victimization and income provide evidence in favor of

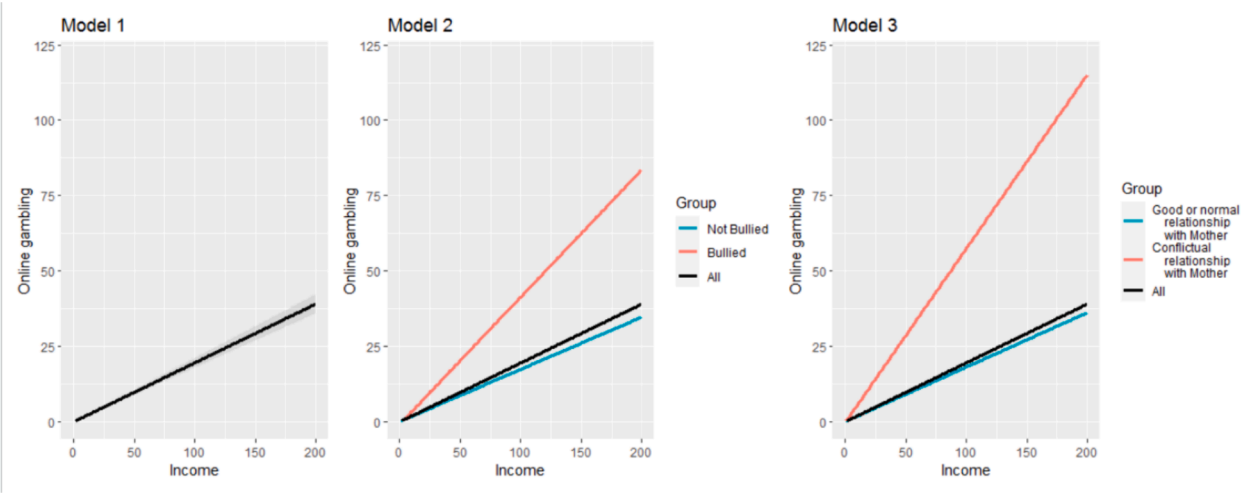

Fig. 3. Predicted online gambling by income.

hypothesis 2b. Bullying victimization moderates the association between online gambling with spent income. The second graphic in Fig. 2 also shows the predicted values of the dependent variable for all respondents (model 1) and distinguishes between whether or not they have suffered bullying (model 2). Once again, the estimated coefficient for the income variable or marginal propensity could be interpreted as the proportion of spent income proportion devoted to online gambling. According to estimates appearing in column 2, the proportion of spent income devoted to online gambling is higher for adolescents who have suffered bullying (42 % [0.25 + 0.17]) than for the rest (17 %).

Similarly, a moderation effect between spent income and online gambling was observed with conflictual maternal relationships in Model 3. According to this estimated model, the percentage of spending on online gambling by those who have a conflictual relationship with their mother is considerably higher (56 % [0.40 + 0.16]) than among the rest (16 %). This divergence in the proportion of income devoted to online gambling provides evidence in favor of hypothesis 3b.

5.1. Policy recommendations

According to the descriptive results, about 6.5 % of the sample reported online gambling in the last year despite the fact that online gambling is prohibited for those under 18 years of age and most respondents in this study are minors. Given that many young people underestimate the addictive nature of these behaviors (Borderías et al., 2015; Prochaska et al., 1992), the prevalence rate is concerning and underscores the need to reduce online gambling and thereby reduce associated future negative consequences. The results of this study have implications for policy.

Firstly, the above results underscore the need to devote more efforts to ensure that adolescents under 18 years of age do not engage in online gambling. In this respect, banning advertisements during the broadcasting of football or basketball games, since these are widely watched by adolescents and children who begin to practice these sports, might be beneficial. Some researchers have argued that advertising increases the social acceptability of online gambling and have warned about the aggressive nature of advertising and the trivialization of its behavioral consequences (Jauregui et al., 2018; McMahon et al., 2019; Moodie and Reith, 2009). In this respect, research has pointed out that the gambling industry does not embrace the new social responsibility codes (Moodie and Reith, 2009).

Secondly, although online gambling is a complex phenomenon in which several factors and environments interact, the estimated results in this study indicate that parents have some room to maneuver. Thus, it is clear that spent income is a key factor explaining the amount gambled online. Moreover, the proportion of income devoted to gambling online is clearly influenced by experiencing conflictual relationships with parents. This suggests that parents could reduce online gambling by reducing and/or controlling their children's money and how the money is spent. Similarly, it is important that parents should be aware that having bad or very bad relationships with their children is associated with higher online gambling (Escario and Wilkinson, 2020), among other problems (Bench, 2019; Glasgow et al., 2016; Lee and Shin, 2017; Pengpid and Peltzer, 2019; Piko and Balázs, 2012).

Thirdly, the results also indicate that parents and schools could reduce online gambling via fighting against bullying, given that suffering this conflictual relationship with peers increases the proportion of income devoted to online gambling. Additionally, promoting counter information in schools could offer protective effects. In this respect, school campaigns should be integrated in a more general community effort, including parents, among other targets. Some authors have argued that informative school campaigns could include parents with hardly any additional costs, to make them key collaborators in order to reinforce the messages (Barlés Arizón et al., 2014). In this sense, it is important for parents and schools to come together and create an environment that is adverse to bullying, as it has been found that it increases with perceived peer approval of bullying (Doane et al., 2014) and suffering it increases the likelihood of becoming a perpetrator (Patchin and Hinduja, 2011), yielding more bullying in the future. The benefits of these campaigns will be crucial as they will reduce both bullying and online gambling, and, consequently, the negative consequences associated with both.

Fourthly, the results indicate that online gambling increases among those children who have a conflictual relationship with their mothers. This group shows a very high proportion of income devoted to online gambling. This suggests that parents should pay special attention to these children in order to improve their relationship and reduce online gambling. In this respect, it appears relevant to try to find a balance between warm and monitoring parenting styles in parents' relationships with their children (Bench, 2019; Lamborn et al., 1991; Steg and Vlek, 2009). Finally, most online gambling occurs among boys. Consequently, boys should be considered as a priority target population.

All of the above suggests that although online gambling could be due to social motives or considered a recreational activity in the early stages (Quinlan et al., 2014), some adolescents underestimate the negative consequences of online gambling, including its addictive nature, and will experience negative socio-emotional consequences (Suranovic et al., 1999). Fortunately, results indicate that both school and parents could influence children's online gambling via information campaigns targeted to reduce bullying and to inform about the consequences of misusing new technologies. Moreover, teaching parents to engage in healthy, warm parenting styles, while also monitoring the child's behavior, may reduce online gambling.

5.2. Limitations

This study analyzes online gambling among adolescents using cross-sectional survey data; consequently, it suffers from the limitations inherent to this type of data. Most importantly, the results inform about associations and, unlike panel data, they cannot yield causal inferences. Moreover, the variables analyzed are based on self-reported measures and some measurement error may be present due to memory errors and social desirability bias. Finally, the analyses and results are obtained using data from Spain; consequently, generalizations cannot be automatically extended to other countries and future research in other scenarios would be interesting.

Despite these drawbacks, the strength of this paper lies in its analysis of an interesting topic using a huge data set and appropriate regression techniques.

6. Conclusions

This paper analyzes the prevalence and predictors of online gambling among Spanish adolescents aged 14 to 18 years old. This study contributes to the literature on online gambling by jointly examining the roles of several predictors, analyzing moderation effects among them, and providing quantitative predictions for the dependent variable. The results indicate that this behavior begins at ages below the minimum legal permissible age and mainly affects boys. This fact is quite serious, as it is argued that adolescents probably underestimate the negative consequences and addictive potential not only of substance consumption but also of activities such as online gambling. Interval regression analyses revealed that online gambling among adolescents is positively associated with spent income, bullying victimization, and having a conflictual relationship with the mother. Moreover, the association with spent income is quantitatively higher when adolescents suffer bullying victimization and have conflictual relationships with the mother. The results underscore the potential benefits of school-based interventions that are designed to limit online gambling and directly address the role of parents and peers. These interventions could reduce online gambling directly and indirectly via reductions in bullying victimization and via an improved control of spent income.

7. Research data and code

The R code used to obtain descriptive analyses, the estimates and the figures that appear in the article is provided. The authors do not have permission to share data but data can be requested at no cost from the Spanish Government's Delegation for the National Plan on Drugs at: http://www.pnsd.mscbs.gob.es/profesionales/frmBuzonContacto.do.

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José-Julián Escario: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Formal analysis, Conceptualization. **Joel Enrique Espejel Blanco:** Writing – review & editing, Writing – original draft. **J. Ignacio Giménez-Nadal:** Writing – review & editing, Writing – original draft. **Anna V. Wilkinson:** Writing – review & editing, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data but data can be requested at no cost from the Spanish Government's Delegation PND at: http://www.pnsd.mscbs.gob.es/profesionales/frmBuzonContacto.do.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tele.2024.102162.

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