Potential risk of gambling products and online gambling among European adolescents

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1. Introduction

Gambling addiction is a widespread research topic, suggesting that pathological gambling has characteristics that are similar to those of substance abuse (Blanco et al., 2001), and that a relevant part of increasing social costs associated to gambling are more likely to be paid by the less-well off, and potentially most vulnerable members of the society (Resce et al., 2019). Nowadays, a greater focus is devoted to adolescent gambling behavior, which is caused by the greater availability and accessibility of gambling activities, at the same time generating personal, social and economic costs for the new generations (Hardoon and Derevensky, 2002). Furthermore, it is well-recognized how certain categories of people are more at-risk of becoming problematic gamblers: among them, who experienced difficulties at school, drug users, children of gamblers and, in general, males (Winters et al., 1993), whose participation seem to be favoured by the current gaming culture (Lopez-Fernandez et al., 2019). On the other side, more recent findings about problematic adolescent gamblers suggest how having high support both by families (e.g. parental monitoring) and institutions (in terms of benefits, financial support and inequality reduction) reduces the risks of problematic behaviors (Colasante et al., 2022).

This situation appears to be exacerbated by the venue of online gambling, which makes even more accessible these kind of games for adolescents. The undoubted proficiency of young people in using social media and online tools increases their chances of being exposed to online gambling, especially casino and poker (Griffiths and Parke, 2010; Molinaro et al., 2020). Accordingly, Chóliz (2016) highlights how the characteristics of online gaming make them way more addictive, and their usage (jointly with the number of young pathological gamblers) is increased with their growth and promotion.

The paper is organized as follows: in the second section data are presented, from the 2019 ESPAD cross-sectional survey on European adolescents. Jointly, the estimation strategy based on a probit model with sample selection (Van de Ven and Van Praag, 1981) will be briefly described. In the third section results of the main model will be shown and discussed. Moreover, predicted probabilities will be plotted for subsamples based on four different types of games (lotteries, cards, betting and slot-machines) in order to explore how different games influence the probability of problematic gambling, conditioned on online gaming. Finally, some conclusions are drawn from the obtained results.

The analysis will show how factors important in increasing the chance of playing, are not necessarily important for generating a problematic gambler, who seems to be triggered by a lacking of family support, high money availability, and a social context with many slot and betting gamblers. Indeed, slot-machines emerge as the main game able to induce problematic behaviors also in other games, while young people are less sensible to lotteries, among others. Online gaming always increases the chances of becoming a problematic gambler.

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2. Data and Methods

Data were drawn from the ESPAD cross-sectional survey that collected comparable data on risk-behaviours among students in several European and neighbouring countries, every four years since 1995. The sample (n= 85,420) comes from 33 countries that participated in the 2019 data collection. The data collection was conducted through the self-administration of questionnaires to students in the classroom setting. The study methodology used nationally representative samples of randomly selected classes/schools in which the cohort of students turning 16 years in the survey year completed the standardized ESPAD questionnaire.

The dependent variable of gambling was based on the question asking students about both the frequency of their gambling activity in general and the types of games played (slot machines, cards or dice, lotteries or betting on sports/animals) in the last 12 months. Gamblers were identified as those who had gambled for money on at least one of the four games of chance (slot machines, cards or dice, lottery, betting on sports or animal races) in the last 12 months.

The dependent variable of problem gambling was based on the Consumption Screen for Problem Gambling (CSPG) (Rockloff, 2012). The CSPG consists of three questions measuring: (1) gambling frequency; (2) time spent on gambling; and (3) gambling intensity. Summing up scores, those scoring 4+ points were considered at high risk of problem gambling based on the cutt-off indicated in Rockloff (2012). For the purposes of this paper, the terms "gamblers at high risk of problem gambling" and "problem gamblers" are used interchangeably.

The following independent variables - summarized in Table 1 - entered the analysis: Gender; Perceived family support; Perceived friend support; Days of school missed; Highest parental education; Self-reported family well-off w.r.t. other families in the country; Parental monitoring indicator; Indicator of how often parents give money to their children.

Table 1: Means and standard deviations (between brackets) for the covariates in the total sample and divided by the four examined outcomes.

	Total		Not Player		Player		Not at-risk		At-risk	
	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ
Female	0.529	(0.355)	0.579	(0.494)	0.350	(0.477)	0.385	(0.487)	0.143	(0.350)
Family Support Index	5.747	(1.632)	5.767	(1.624)	5.677	(1.659)	5.703	(1.621)	5.526	(1.854)
Friend Support Index	5.544	(1.647)	5.556	(1.647)	5.502	(1.646)	5.525	(1.615)	5.368	(1.809)
School Missed (Ref: 0 days)										
1-2 days	0.326	(0.469)	0.332	(0.471)	0.305	(0.460)	0.314	(0.464)	0.250	(0.433)
3-5 days	0.201	(0.404)	0.201	(0.401)	0.224	(0.417)	0.225	(0.417)	0.222	(0.416)
5 days or more	0.233	(0.423)	0.217	(0.412)	0.291	(0.454)	0.277	(0.447)	0.375	(0.484)
Highest Parental Education (Ref: Up to non-completed Secondary School)										
Non completed university	0.398	(0.489)	0.391	(0.488)	0.421	(0.494)	0.420	(0.494)	0.432	(0.495)
Completed university	0.408	(0.491)	0.409	(0.492)	0.402	(0.490)	0.403	(0.491)	0.393	(0.488)
Family Well off (Ref: Less off)										
About the same	0.462	(0.499)	0.471	(0.499)	0.428	(0.495)	0.436	(0.496)	0.375	(0.484)
Well off	0.453	(0.498)	0.444	(0.497)	0.487	(0.500)	0.339	(0.473)	0.530	(0.499)
Parental Monitoring (Ref: About Always)										
Sometimes	0.283	(0.450)	0.268	(0.443)	0.335	(0.472)	0.339	(0.473)	0.315	(0.465)
About Never	0.139	(0.346)	0.123	(0.328)	0.198	(0.399)	0.180	(0.384)	0.305	(0.461)
Parents give money (Ref: Seldom/Never)										
Often/Sometimes	0.479	(0.450)	0.480	(0.450)	0.475	(0.499)	0.484	(0.500)	0.418	(0.493)
Almost Always	0.305	(0.460)	0.300	(0.458)	0.325	(0.468)	0.317	(0.465)	0.372	(0.483)
GPI_{slot}	-0.011	(1.006)	-0.053	(0.966)	0.141	(1.125)	0.061	(1.044)	0.600	(1.426)
GPI_{cards}	-0.005	(1.006)	-0.050	(0.987)	0.148	(1.009)	0.112	(0.991)	0.354	(1.084)
$GPI_{lotteries}$	0.005	(1.006)	-0.055	(0.964)	0.218	(1.118)	0.149	(1.037)	0.620	(1.435)
$GPI_{betting}$	-0.007	(0.995)	-0.052	(0.974)	0.166	(1.095)	0.089	(1.022)	0.612	(1.360)
Online Gaming	0.066	(0.249)	0.007	(0.084)	0.280	(0.449)	0.219	(0.413)	0.634	(0.482)
Number of observations	85,420		66,843		18,577		15,837		2,740	

To calculate the Gambling Product Index (GPI) a question was asked for each type of gambling product: Slot machines (fruit machine, new slot, etc.); Cards or dice (poker, bridge, dice,

etc.); Lotteries (scratchcards, bingo, etc.); Betting on sports or animals (horses, dogs etc.). The Gambling Product Index (GPI) is obtained as the standardization of the following formula:

$$GPI_{c,g} = \frac{0 \times N_{c,g,ans1} + 1 \times N_{c,g,ans2} + 24 \times N_{c,g,ans3} + 104 \times N_{c,g,ans4}}{N_c},$$

where c represents the country, g the type of game, $ansx$ indicates the answer that each subject provided to the questions about gambling frequnecy, N represents the number of individuals in our sample. Each $N_{c,g,ansx}$ is multiplied by the yearly frequency of gambling declared in the answers. In order to be as conservative as possible, when the answers indicate an interval, the lower bound of the interval is chosen (e.g. 2-4 times a month corresponds to at least 24 times in a year). Thus, the GPI can be interpreted as an indicator of the average frequency of gambling for a particular game in a specific country.

The analysis is conducted through a probit model with sample selection correction (Heckman, 1979) as proposed by Van de Ven and Van Praag (1981). In particular, in the selection equation all the individual variables are included in order to determine how they influence the probability of being or not a player, and the environmental variables (i.e. GPI_s). In the second step, in order to determine gambler at risk of problematic behavior, the four *GPIs* are removed, but the dummy variable indicating the usage of online gaming, which would have shown a perfectly predicted outcome in the first stage, is included. As a robustness checks, estimation are presented also for two separate probit models, not commented for the sake of brevity, since the correlation between the equation implies inconsistent estimations in these cases (Miranda and Rabe-Hesketh, 2006). Finally, through the estimation of separate models on the subsamples of players and problematic gamblers for each of the four type of games, we are able to plot predicted probabilities (Williams, 2012) for the effect of each game on the others, conditioned to the usage of online gaming.

3. Estimation and Results

Starting from the selection equation (Model 3.1 in Table 2), we can notice that females exhibit less chances of playing, a well-known result in the field. As the support of the family decreases the probability of becoming a player, the opposite happens for the friend support, probably due to a peer effect that makes adolescents gamble when a close friend plays, too. The school experience matters a lot: as many days of school are missed, as greater are the chances of playing. The parental education is weakly significant: surprisingly, parents without a secondary education degree have less chances to have gambling children. As it will be explained, this result could be associated to the lower money availability. Economic conditions do not seem to affect the probability in terms of *social comparisons*: indeed, as adolescents who perceive of being poorer than or in line with the average of families in the country do not differ in terms of probability, so those who think of being richer have greater chances of playing. Also in this case, it seems that money availability is very important in generating a player. This is confirmed by the covariate called *Parents give money*: individuals who claim their parents give them money often or sometimes play more than those who receive money never or seldom, and those who obtain money almost always play more than anyone else. Finally, parents who less control where and with whom children are during evening outings have higher chances to have gambling kids. Looking at the *GPIs* for the four types of games, it is possible to observe that only lotteries have a positive effect on generating players, while all the other indexes are not significant. Indeed, as betting and slot-machines will emerge as triggers for problematic behaviors, and cards are associated to a playful environment, so lotteries are more enslaving for

older people, still a benchmark for adolescents (Welte et al., 2007).

Table 2: Estimations for two separated Probit models and the joint two-equations Heckprobit model. All observations are weighted.

	Probit Outcome: Not Player/Player (1)		Probit Outcome: Not at-risk/At risk (2)		Heckman Probit First Step: Not Player/Player; Second Step: Not at-risk/At risk; (3.1)		(3.2)	
	$\hat{\beta}$	s.d.	$\hat{\beta}$	s.d.	$\hat{\beta}$	s.d.	$\hat{\beta}$	s.d.
Female	-0.540***	(0.035)	-0.521***	(0.056)	-0.539***	(0.034)	0.069	(0.201)
Family Support Index	-0.025***	(0.006)	-0.018*	(0.010)	-0.026***	(0.006)	0.001	(0.009)
Friend Support Index	0.022***	(0.006)	0.004	(0.009)	0.022***	(0.006)	-0.012*	(0.007)
School Missed (Ref: 0 days)								
1-2 days	0.158***	(0.017)	-0.001	(0.036)	0.158***	(0.017)	-0.123***	(0.030)
3-5 days	0.268***	(0.022)	0.087**	(0.035)	0.266***	(0.022)	-0.149**	(0.060)
5 days or more	0.361***	(0.027)	0.255***	(0.041)	0.360***	(0.027)	-0.107	(0.106)
Highest Parental Education (Ref: Up to non-completed Secondary School)								
Non completed university	0.111***	(0.030)	0.081	(0.069)	0.106***	(0.029)	-0.063**	(0.032)
Completed university	0.048*	(0.027)	-0.017	(0.068)	0.049*	(0.027)	-0.082***	(0.030)
Family Well off (Ref: Less off)								
About the same	-0.019	(0.024)	-0.086*	(0.048)	-0.016	(0.024)	-0.026	(0.028)
Well off	0.042*	(0.022)	-0.037	(0.073)	0.047**	(0.021)	-0.020	(0.032)
Parental Monitoring (Ref: About Always)								
Sometimes	0.228***	(0.018)	-0.007	(0.029)	0.228***	(0.018)	0.146***	(0.043)
About Never	0.345***	(0.029)	0.265***	(0.047)	0.344***	(0.029)	0.054	(0.120)
Parents give money (Ref: Seldom/Never)								
Often/Sometimes	0.075***	(0.013)	-0.079**	(0.034)	0.073***	(0.013)	-0.111***	(0.022)
Almost Always	0.145***	(0.018)	0.123**	(0.052)	0.138***	(0.019)	-0.061	(0.046)
Online Gaming	-	-	0.883***	(0.032)	-	-	0.553***	(0.157)
GPI_{slot}	-0.040	(0.079)	-	-	-0.010	(0.064)	-	-
GPI_{cards}	0.035	(0.037)	-	-	0.026	(0.029)	-	-
$GPI_{lotteries}$	0.174**	(0.072)	-	-	0.147*	(0.076)	-	-
$GPI_{betting}$	-0.012	(0.084)	-	-	0.001	(0.067)	-	-
Constant	-0.985***	(0.040)	-1.309***	(0.080)	-1.252***	(0.485)	0.467	(0.417)
Number of observations	85,420		18,577		85,420			
Log-Likelihood	-39950.323		-40471.453		-46829.15			
Pseudo R^2	0.0681		0.1520		-			
Error Correlations	-	-	-	-	-1.252**		(0.485)	

The model 3.2 in Table 2 analyze the probability of becoming a problematic gambler, conditioned to the fact of having played in the last year, as the error correlation term is significant. Surprisingly, controlling for the selection bias we discover that the gender differences in the probability of becoming a problematic player - conditioned to the fact of having experienced gambling, yet - disappear. Also the support of the family has no effect in conditioning the chances of being at risk, even if as much educated the parents are, as little the probability of being problematic is. Nonetheless, the support of friends is weakly significant and negatively correlated with problematic behaviors: apparently, as friends can stimulate playing, so they can be able to save from problematic gambling. Regarding days of school missed, those who miss the few and the most experience the higher risk. Even if perceived economic conditions are not significant in this context, money availability remains an important factor not only for playing, but also for developing gambling problems. In fact, no difference appears among young people who receive money by parents seldom, never, or almost always. Namely, in this case adolescents who receive less money have the same chances of developing problematic behaviors of those who obtain more. Probably, after having become a player, a social comparison effect can more easily arise, which foster the will of improving their own economic condition, as well as a gambling problem. Playing online is positively significant.

Figure 1: Marginal effects for the probability of becoming an at-risk gambler in a specific game by type of game, conditioned to online gaming (95% CIs).

(a) Slot Machines

(b) Lotteries

(c) Cards

(d) Betting
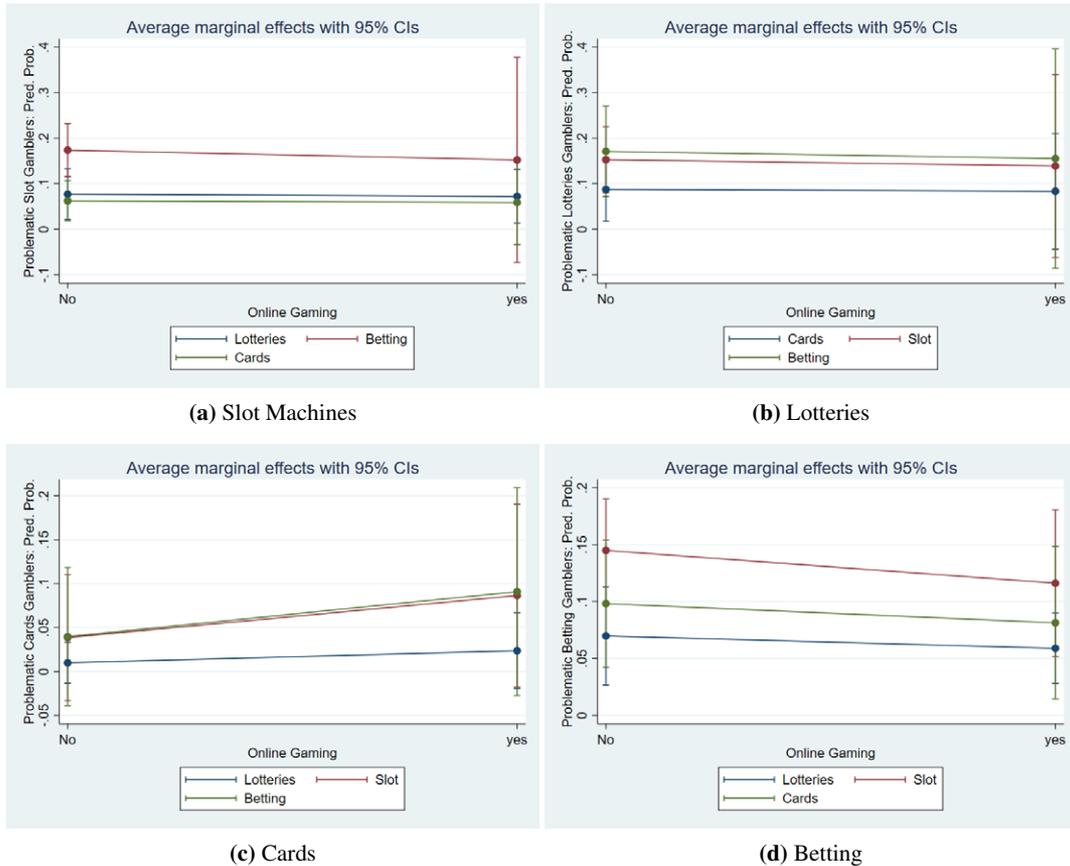
In Figure 1 predicted probabilities are plotted for four separated models in which players are restricted to those who play a specific game and three regressors are added for the other types of game. Thus, it is possible to observe how each game affects the probability of being an at-risk player of another gambling activity. As expected, having been a player of slot-machines and betting increases the probability of being a problematic player on the other games. Accordingly, cards and even more lotteries are the games less effective in causing problematic players in other games. Online gaming increases the chances of problematic behaviors especially in playing cards, while it has no effect with regard to lotteries and slot-machines, and a negative effect looking at betting. Probably, the addiction developed in playing lotteries and slots reflects itself in the high accessibility of online cards game (e.g. poker online).

4. Conclusions

This article, based on 2019 ESPAD cross-sectional survey, explores the determinant of gambling and problematic gambling among European adolescents. As a general conclusion, it seems that starting to gamble attains more to what can be called a "social dimension", while problematic behaviors to the "individual behavior". Namely, playing in the first step is favored

by factors such as friend support, and parental education, which are components involved in the social context lived by kids. On the other side, these factors lose effectiveness for problematic gambling, much more favored by individual characteristics as the perception of their own economic availability. Indeed, both a very high and very low money availability are always important in strengthening both gambling and problematic gambling. At-risk players are also fostered by those countries with higher shares of lotteries gamers. It is confirmed that online gaming, with its high accessibility and availability, is an important trigger for problematic gambling behaviors. Regarding types of games, slot machines and betting emerge as the most addictive.

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