Prev Sci (2016) 17:970–980
DOI 10.1007/s11121-016-0683-y

Adolescent Gambling-Oriented Attitudes Mediate the Relationship Between Perceived Parental Knowledge and Adolescent Gambling: Implications for Prevention

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Published online: 22 July 2016

Abstract Although substantial research has provided support for the association between parental practices and adolescent gambling, less is known about the role of adolescent attitudes in this relationship. The primary purpose of this study was to test an integrative model linking perceived parental knowledge (children's perceptions of their parents' knowledge of their whereabouts and companions) with adolescent gambling while evaluating the mediating effects of adolescents' own gambling approval, risk perception of gambling, and descriptive norms on gambling shared with friends. The data were drawn from the ESPAD® Italia 2012 (European School Survey Project on Alcohol and Other Drugs) study, which is based on a nationally representative sample of Italian adolescent students aged 15–19. The analysis was carried out on a subsample of 19,573 subjects (average age 17.11, 54 % girls). Self-completed questionnaires were administered in the classroom setting. The results revealed that adolescents who perceived higher levels of parental knowledge were more likely to disapprove of gambling and show higher awareness of its harmfulness, which were in turn negatively related to gambling frequency. They were also less likely to perceive their friends as gamblers, which was also negatively related to gambling frequency. These findings suggest that gambling prevention efforts should consider perceived parental knowledge and gambling-oriented attitudes (self-approval, risk perception, and descriptive norms) as factors that may buffer adolescent gambling behavior in various situations.

Keywords Adolescence · Gambling · Parental knowledge · Descriptive norms · Attitudes

Introduction

Although legislative measures generally prohibit underage youth from participating in legalized forms of gambling, engagement in gambling activities during adolescence has dramatically increased in many countries. Several cross-sectional studies indicated that 77–83 % of adolescents were involved in some form of gambling (Blinn-Pike et al. 2010). In Italy, 47 % of high school students gambled in the past 12 months and 11 % of these gamblers were problematic (Bastiani et al., 2013). Problem gambling[1] is a serious public health problem because it can have a number of negative consequences, such as strained relationships with family members and friends, criminal behavior, depressive symptoms, suicidal thoughts and attempts, and substance addiction (Blinn-Pike et al., 2010). Recently, gambling disorder[2] was classified as an addictive disorder in the fifth edition of the Diagnostic and Statistical

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[1] Problem gambling is a more general term that incorporates subclinical conditions where an individual experiences significant negative consequences because of gambling, and as such, this is an appropriate term to use in relation to harm minimization policies (Neal, Delfabbro, & O'Neil, 2005). This term is generally used in research where screening measures are used to identify problem gamblers without confirmation through clinical interviews, and as such, it typically includes those with gambling disorder.

[2] Gambling disorder is an accepted mental health condition that is characterized by difficulty limiting gambling expenditure, chasing losses, lying about gambling, and severe negative consequences of excessive gambling (American Psychiatric Association, 2013).

Manual of Mental Disorders, representing a new category of behavioral addictions similar to substance use disorders in terms of etiology, symptoms, course, correlates, and treatment approaches (Hasin et al., 2013). Problem gambling has been shown to have multiple related risk factors similar to those of other addictive behaviors (Leeman & Potenza, 2012). It should also be noted that many of the identified risk factors for gambling and other addictive behaviors are associated with a number of mental disorders (Hasin et al., 2013). Therefore, given the similarity in the risk factors between gambling and other addictive behaviors, specifically as alcohol and drug (mis)use, it is important to identify specific risks and protective factors. Understanding these similarities could help advance future research on gambling by suggesting, for example, that verified substance abuse models could also be applied to explain problem gambling (Leeman & Potenza, 2012). Previous studies that tested the parental monitoring/knowledge effects on adolescent alcohol/marijuana use, as mediated by adolescents' marijuana/alcohol beliefs, i.e., attitudes and subjective norms, have confirmed the role of family environment in the problem behaviors of adolescents (Kim & Neff, 2010; Lac et al. 2009). To date, no studies have tested similar models with gambling behavior as an outcome. The current study aimed to address this gap in the literature.

Recently, some progress has been made in addressing common risk factors for youth problem behaviors (e.g., substance abuse) by focusing on the roles of parent and teacher. For instance, preventive interventions targeting drug use and associated risk factors have used either a combined school- and family-based intervention or a family-based intervention (Spoth et al., 2014). In light of similarities between adolescent problem gambling and alcohol and substance use in terms of common risk factors (i.e., being male, low self-esteem, high risk-taking propensity, normative anomie, models for deviant behavior, parent-friend normative conflict, poor school work, and school difficulties) and protective factors (i.e., parent family connectedness and perceived school connectedness), Dickson et al. (2002) proposed a conceptual framework for the prevention of gambling problems in youth that included the common elements of tobacco, alcohol, and drug abuse prevention programs. School- and family-based interventions could play an important role in tackling problem gambling. For example, a brief school-based intervention aimed at enhancing impulsive control was able to reduce the high school student's positive attitudes toward gambling (Williams et al. 2012). Hence, it is of fundamental importance to examine factors that are more susceptible to change than others (i.e., gender, race, socioeconomic status) to design interventions aimed at reducing problem gambling in adolescence. One potential candidate for such an examination is the influence of parents. For example, parental monitoring significantly buffers the various types of risk behavior, and intervention studies have shown that it is possible to increase parents' monitoring efforts (Stanton et al., 2004).

Parental Monitoring as Parental Knowledge

According to the current view, parental knowledge is the outcome of a family process that may include parental monitoring behaviors, and it is more proximally determined by adolescents' disclosure of their whereabouts and activities (Stattin & Kerr, 2000). The seminal work of Stattin and Kerr (2000) reinterpreted the construct of parental monitoring by arguing that previous authors had in fact examined passive parental knowledge instead of parents' active regulating behaviors (parental monitoring). Parental monitoring, measured as (perceived) parental knowledge of the child's behavior (passive awareness of child's behavior), is a reliable predictor of problem behavior. However, even after this important reconceptualization, researchers continue to label the construct "parental monitoring" when their measure may represent "parental knowledge" (e.g., Dillon et al. 2008). In a recent review published by Racz and McMahon (2011), 26 out of the 47 reviewed studies examined parental knowledge (and approximately half of them used the term "parental monitoring" to describe their measures of parental knowledge). The lack of specificity in these constructs has made it difficult to distinguish among the effects of knowledge alone, the effects of parental efforts to monitor, as well as the effects of other behaviors, such as youth disclosure of information, on youth behaviors (Lippold et al. 2014). According to Stattin and Kerr (2000), parents' knowledge of behavior has more to do with adolescents' self-disclosure instead of parents' active efforts to achieve this knowledge. However, previous works found that the child's tendency to self-disclose rather than by parents' active soliciting of information causes a relationship between perceived parental knowledge of the child's whereabouts and adolescent problem behaviors (Stattin & Kerr, 2000). The term "perceived parental knowledge" is used throughout this manuscript to indicate children's perceptions of their parents' knowledge of their whereabouts and companions.

A broad and growing body of literature suggests that family influences, such as parental knowledge and monitoring, are related to adolescent behavior via both direct and indirect paths (Halgunseth et al. 2013; Kim & Neff, 2010; Lac et al., 2009). It is important to understand the mechanisms through which these family characteristics exert their effects on adolescents' behavior. Adolescents' attitudes, such as disapproval and perception of a specific risk behavior and their (negative) evaluation of peers' risky behaviors, have been found to mediate the relationship between family factors and risk behaviors (e.g., Walker et al. 2011). Interestingly, the mediating role of adolescent attitudes (e.g., disapproval of behaviors, awareness of the behaviors' harmfulness) and estimate of how often their friends engage in such behaviors have been examined for alcohol and marijuana use and antisocial behaviors (e.g., Lac et al., 2009). However, no studies have considered how

gambling-oriented attitudes may mediate the relation between parental knowledge and gambling participation. The present study aims to address this gap.

Pathways from Parental Knowledge and Monitoring to Adolescent Risk Behaviors

Social learning theory suggests that youth learn behaviors by experiencing, observing, and interacting with individuals in their environment. Parents serve as important socializing agents for adolescents, particularly in their function as disciplinarians (Bandura, 1999). Parental knowledge and parental monitoring have often been conceptualized as important parenting practices buffering problem behaviors (for a review, see Crouter & Head, 2002). Although the debate continues in literature regarding the best conceptualization of "monitoring," many agree that parental knowledge of their children's activities is the critical starting point in preventing youth risk behavior (e.g., Branstetter & Furman, 2013). Parental practices can be a protective factor for adolescent gambling behaviors (for a review, see McComb & Sabiston, 2010). Parental monitoring has been found to reduce adolescent gambling (Molinaro et al., 2014). A longitudinal study that tracked children into young adulthood found that low and/or declining parental monitoring of children aged between 11 and 14 was associated with problem gambling when they reached adulthood (Lee et al. 2014). Taken together, these findings indicate that parents play a fundamental role in buffering different types of risk behavior, be it substance use or gambling behavior. Therefore, in our model, we predicted a direct and negative connection between perceived parental knowledge and gambling frequency.

Adolescent Attitudes and Norms Toward Gambling

The Theory of Reasoned Action (TRA; Ajzen, 1988) suggests that attitudes and perceived subjective norms regarding a behavior influence the intention to perform that behavior. In addition, the Integrated Behavior Model (Montaño & Kasprzyk, 2008), which built and expanded upon the TRA, proposes that perceived norm is based on social acceptance from a family member, significant other, or friend. According to Patel and Fromme (2010), individual attitudes toward substance use as well as perceptions of substance use norms among peers influence adolescents' decisions about whether to use alcohol and other substances. The existing evidence suggests that measures of perceived descriptive norms (perceptions of what others do) are associated with alcohol and drug use (e.g., Walker et al., 2011). In addition, disapproval and perception of a specific risk behavior have been found to reduce risk behaviors (e.g., Kim & Neff, 2010).

With respect to gambling, a recent review (Spurrier & Blaszczynski, 2014) reported that despite an extensive focus in gambling studies on cognitive biases and errors associated with gambling, few studies addressed gamblers' perception of potential risks and harms related to gambling. It was found, however, that more favorable attitudes toward gambling were associated with greater time and money spent on gambling (Spurrier & Blaszczynski, 2014). Additionally, Hanss et al. (2014) found that the perception of gambling carrying negative consequences was associated with less gambling involvement. Regarding descriptive norms, adolescents who perceived their friends as gamblers were more likely to participate in gambling activities (Wickwire et al. 2007; Foster et al. 2014). Martin et al. (2010) highlighted that gambling frequency among college students was associated with their friends' norms and attitudes. Thus, a body of research has addressed these relations among college students and adult gamblers, but it is still unclear how subjective norms and attitudes as well as perception of peer behaviors operate among adolescents. Few studies have examined the relationship between attitudes and subjective norms on adolescent gamblers (Wickwire et al., 2007; described above). Since most of these studies have been conducted in countries, such as the UK and the USA, additional studies should be conducted in other contexts, such as Italy, where the liberalization of the gambling sector facilitated access to and practice of gambling (many tobacco shops and bars now look like small casinos with a wide variety of instant lottery and slot machines). This may have led to an increased "approval" of gambling (Bastiani et al., 2013). Gambling in Italy is an 84.4 billion euro business, with 2200 apps for slot machines, for example. Italy has one slot machine for every 143 residents, compared to 6333 residents in Sweden, 857 residents in Austria, 372 residents in the USA, and 261 residents in Germany. Given the paucity of the existing research and the need for potential applicability of findings to prevention and intervention efforts, the present study focused on gambling-oriented attitudes (self-approval, risk perception) and descriptive norms in a sample of Italian adolescents.

Adolescent Attitudes as Mediators of the Family-Adolescent Behavior Relation

Social learning theory also proposes that social influences, such as parents and peers' effects, operate through psychological mechanisms to produce behavior effects (Bandura, 1997). Parents may seek to positively sway their children's drug attitudes and beliefs (Lac et al., 2009). Accordingly, adolescents who perceive higher levels of parental monitoring are more likely to disapprove of problem drinking and be aware of the risks linked to excessive drinking, which are, in turn, negatively related to alcohol use. Additionally, parental monitoring has

been found to be negatively associated with individuals' estimate of their friends' drinking, which has been found to be positively related to alcohol use (Kim & Neff, 2010). Lac et al. (2009) found that high parental knowledge predicted lower pro-marijuana attitudes and subjective norms in adolescents, leading to increased behavioral intentions to use marijuana in the future.

Therefore, while the results of Kim and Neff (2010), Lac et al. (2009), and Halgunseth et al. (2013) provide some indications of how attitudes and subjective norms mediate the relationship between parents' influence and child's outcomes (e.g., parental knowledge was positively associated with adolescent's disapproval of problem drinking and awareness of the risks of excessive drinking, which were, in turn, negatively related to alcohol use), to our knowledge, no study has examined the pathways of indirect influence on adolescent gambling. A recent review on adolescent problem gambling suggested that future research should examine the effect of family influence on gamblers' perceptions and attitudes, which have an influence on gambling behaviors (Ariyabuddhiphongs, 2013). This review shows that studies on adolescent gambling were guided by the hypotheses of person-gambling (cognitive bias, incentives, excitement seeking, and impulsivity) and environment-gambling relationships (parents and peers). Mediation effects of person and environmental variables should be included in future studies in order to gain a more comprehensive understanding of the existing relationships between person and environment characteristics and problem gambling in adolescence (Ariyabuddhiphongs, 2013).

The Proposed Model

Consistent with the theoretical backgrounds reviewed, the primary aim of the present study was to test an integrative model of the influence of perceived parental knowledge on adolescent gambling while considering the role of gambling-oriented attitudes as a mediating variable in a sample of Italian high school students (see Fig. 1). The proposed model draws extensively on two existing models of substance abuse. One of the models is Kim and Neff's model of parental influences on adolescent alcohol use (2010), which links adolescent drinking to parent-level variables (i.e., parental monitoring) through intrapersonal characteristics, cognitive and attitudinal processes, and peer group characteristics. The other model is the Lac et al. (2009) model that integrates parental knowledge as an antecedent to the Theory of Planned Behavior (TPB; Ajzen, 1991), providing an integrative predictive framework of adolescent marijuana use. These two models suggest, respectively, that (a) the link between parental knowledge and marijuana use is mediated by marijuana beliefs (attitudes, subjective norms) (Lac et al., 2009) and (b) peer influence and perceived alcohol norms mediate the link between parental monitoring and adolescent alcohol use (Kim & Neff, 2010). According to these two models, in the context of parenting practices (e.g., parental knowledge), it is plausible that adolescents are more likely to develop rejection toward gambling, if guidelines for appropriate behaviors are consistently reinforced at home.

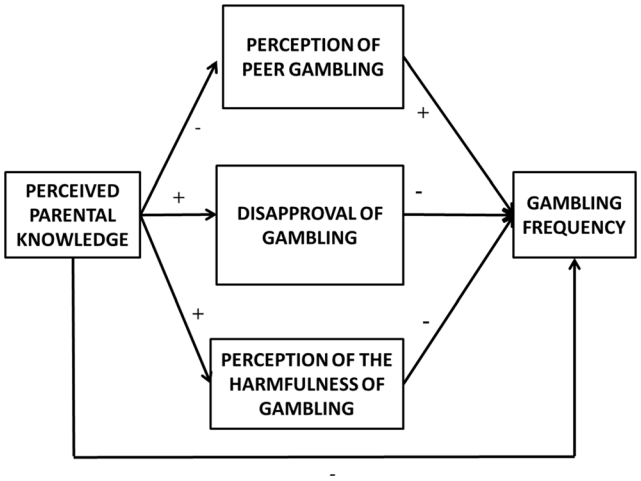

Fig. 1 The proposed model

In the present study, we hypothesized that parents who are aware of upcoming youth activities may be more likely to discuss their views on whether gambling is morally acceptable (and a safe activity) for their children. Hence, adolescents would learn about consequences of gambling, which could in turn help them avoid or reduce their gambling participation. In addition, perceived parental knowledge should limit adolescent opportunities to experience "passive" social pressure (Wood et al. 2001), such as overestimation of friend gamblers, which, in turn, could reduce gambling frequency. More specifically, we hypothesized that adolescents perceiving higher levels of parental knowledge will be (1) more likely to disapprove of gambling and show higher awareness of gambling harmfulness, which will negatively relate to gambling frequency; (2) less likely to perceive their friends as gamblers, which will also be negatively related to gambling frequency; and (3) less likely to participate in gambling activities. Consequently, the primary aim of this study was to investigate both direct and indirect effects of perceived parental knowledge on adolescent gambling.

Method

Participants and Procedure

The data were drawn from the ESPAD® Italia 2012 (European School Survey Project on Alcohol and Other Drugs) study, a national school survey conducted annually by the Institute of Clinical Physiology of the Italian National

Research Council. The data were collected using standard questionnaires completed in school classrooms. Sampled schools, both public and private, were divided into three groups: upper secondary general schools (classical, scientific, linguistic, pedagogic), art institutes, and upper secondary vocational schools (professional, technical). Private schools that were not legally recognized were not included in the sample (0.3 % of total schools). The multistage stratified sampling method was utilized, taking into account the type of school and other variables, such as geographical area (north, center, south, and islands) and population density. Students were sampled in proportion to the size of each stratum. A detailed information about the sampling procedures is available in Hibell et al. (2012). Of the total sampled schools, 92 % participated in the survey, and only less than 0.5 % of the students refused to complete the questionnaire. Non-participating schools were equally distributed concerning the location and type of school. The investigators contacted the sampled schools, asking teachers responsible for health education to present the research project to the school board. The school director was required to provide an authorization to allow students to complete the questionnaire. The survey, edited and approved by the collegial bodies comprising teachers, parents, and students (Legislative Decree no. 297/1994), was included in each school's annual Teaching Programme (Decree of the President of the Italian Republic no. 275/1999, Art. 8). Parents provided passive consent. Students were informed that participation is anonymous and voluntary. Questionnaires were administered to a representative sample of high school students aged 15–19 years according to the ESPAD methodology (Hibell et al., 2012). In a subsample, additional questions about gambling behaviors were asked within a special section, and the theoretical model was tested on a sample of 19,573 students (8958 boys and 10,615 girls). Participants' age ranged from 15 to 19, with a mean of 17.11 (SD = 1.43). Considering its size, the sample was randomly split into three groups and analyzed for different purposes.

Measures

Questionnaires comprised measures drawn from standardized questionnaires of the ESPAD project. The validity of items in the country surveys (e.g., Italy) was similarly high. Each country translated the questionnaire into its own language and thereby adjusted the wordings to make questions as appropriate as possible to the cultural context (see Hibell et al. 2012 for more details). Given the high correlation among several variables, in order to use all available information, some measures were considered as a composite numerical variable. For these measures, internal reliability was tested using Cronbach's alpha, and a value equal to 0.7 or higher indicated good reliability (Nunnally & Bernstein, 1994).

Gambling Frequency

Students responded to eight items assessing the frequency (number of occasions) with which they participated in different gambling activities (for example, sports, betting, and slot machines) in the past year on a 7-point response scale ranging from 1 = *0 times* to 7 = *every day* (Canale et al. 2016). Responses to these items were also used to classify respondents into four groups reflecting the intensity/frequency of being involved in gambling activities in the past year: (1) non-gamblers, (2) occasional gamblers who gamble less than once a month, (3) monthly gamblers who take part in only one or two gambling activities at least once a month, and (4) frequent gamblers who are involved in more than two gambling activities monthly (Kessler et al., 2008). The eight questions had adequate internal reliability (α = .84; 95 % CI = .84–.85).

Perception of the Harmfulness of Gambling

Perception of the harmfulness of gambling was measured using two questions: "How much do you think people risk harming themselves (physically or in other ways) if they gamble: less than once a week (item 1) and once a week or more (item 2)." Students answered each question on a 4-point scale ranging from 1 = *no risk* to 4 = *great risk* (Gori et al., 2014). The two questions had adequate internal reliability (α = .84; 95 % CI = .83–.84).

Disapproval of Gambling

Self-disapproval of gambling was assessed with two questions, "Do you disapprove of people gambling: less than once a week (item 1) and once a week or more (item 2)." Students answered each question on a 3-point scale ranging from 1 = *do not disapprove* to 3 = *strongly disapprove* (Gori et al., 2014). Both items had adequate internal reliability (α = .84; 95 % CI = .83–.84).

Perceived Descriptive Norms

Students' estimations of their friend's gambling were assessed with a single item, "How many of your friends would you estimate gamble" measured on a 5-point scale ranging from 1 = *none* to 5 = *all* (Gori et al., 2014). This measure is similar to that used by Wickwire et al. (2007).

Perceived Parental Knowledge

Perceived parental knowledge comprised three items assessing the extent to which children feel their mothers and fathers have knowledge of their activities: "1. Do your parents know where you spend Saturday nights," (measured on a 4-point scale from *usually do not know* to *know always*); "2. My

parent(s) know who I am with in the evenings"; and "3. My parent(s) know where I am in the evenings' (both measured on a 5-point scale from *almost never* to *almost always*)" (Molinaro et al., 2014). Only the first two items were considered in the analysis because the factor structure with the first two items was better than the one with three items (see the section "Factorial properties of the measures" in the results). The Cronbach's alpha for the two-item scale was .78 (95 % CI = .77–.79).

Demographic Variables

Students reported their age and gender. Since the minimum legal age for gambling in Italy is 18, the age of students was categorized into under the age of 18 (15–17 years) and aged 18 or over (18–19+ years).

Statistical Analyses

The R Package lavaan was used to analyze the models and estimate parameters. A cross-validation with a three-step analytic approach was carried out. The original sample was randomly split into three partitions, all containing 1/3 of the data (see Table 1). In the first step (partition 1), the factorial properties of measures were evaluated. After the factor solution was confirmed, factor scores were calculated for each factor using the diagonally weighted least squares. These scores were used in the follow-up multiple regression analyses to investigate the model. Factor scores were modeled as observed variables. According to Cudeck and Browne (1983), we used a cross-validation strategy to develop the observed variable model (second step) using a calibration data sample (partition 2) and then confirmed (third step) using an independent validation sample (partition 3). The pattern of relationships specified by our theoretical model was examined through path analysis, testing a single factor score for each construct in the model. The parameters of the observed variable models (partition 2, partition 3) were estimated using the maximum likelihood method. To evaluate the overall goodness of fit of the model, we considered the R^2 of each endogenous variable and the total coefficient of determination (J reskog & S rbom 1996). The CD shows the joined effect of the predictor variables on all dependent variables, with higher CD indicating more variance explained. For the mediation effect, lavaan uses the normal approximation method based on the delta method (Casella & Berger, 2002). All analyses were corrected for cluster effects of students within the same school (primary sampling unit) by employing clustered robust standard errors.

Results

Gambling Behavior and Descriptive Statistics

Table 1 shows the frequency of gambling groups by gender and age. Participants were divided into non-gamblers (49 %), occasional gamblers (24 %), monthly gamblers (18 %), and frequent gamblers (9 %). More girls compared to boys were non-gamblers (58 and 39 %, respectively) and occasional gamblers (26 and 23 %, respectively), while boys showed higher rates of monthly gambling (23 %) and frequent gambling (15 %) compared to girls (13 and 2 %, respectively). Regarding age differences, high school students included in the study were quite homogeneous in terms of gambling categories.

Table 2 summarizes the means, standard deviations, and bivariate correlations among the study variables. All bivariate correlations among study variables were in the expected direction. The magnitude of correlation coefficients was relatively modest, ranging from −.36 to .50. In particular, a negative correlation was observed between perceived parental knowledge and gambling frequency. Regarding gambling-oriented attitudes, a negative correlation emerged among disapproval and harmfulness perception of gambling and gambling frequency. Moreover, a positive correlation emerged

Table 1 Frequency counts (and percentage) of participants' characteristics by gender and age

	Non-gamblers $n = 9661$ (49.4)	Occasional gamblers $n = 4749$ (24.3)	Monthly gamblers $n = 3501$ (17.7)	Frequent gamblers $n = 1662$ (8.6)	Partition 1 (measures) $n = 6525$ (33.4)	Partition 2 (calibration) $n = 6525$ (33.4)	Partition 3 (validation) $n = 6523$ (33.2)
Gender							
Males	3473 (38.8)	2031 (22.7)	2090 (23.3)	1364 (15.2)	2958 (45.3)	2998 (45.9)	3002 (46.0)
Females	6188 (58.3)	2718 (25.8)	1411 (13.5)	298 (2.4)	3567 (54.7)	3527 (54.1)	3521 (54.0)
Age					17.13 (1.42)[a]	17.11 (1.41)[a]	17.08 (1.43)[a]
15–17	5840 (52.1)	2589 (23.1)	1911 (17.0)	869 (7.8)			
18–19	3821 (45.7)	2160 (25.8)	1590 (19.0)	793 (9.5)			

[a] *M* (SD)

Table 2 Means, standard deviations, and correlations between variables for the total sample ($n = 19{,}573$)

	1	2	3	4	5	*M* (SD)
1. Perceived parental knowledge	–					3.96 (.73)
2. Perception of the harmfulness of gambling	.10*	–				3.30 (.81)
3. Perception of peer gambling	−.15*	−.32*	–			1.52 (.50)
4. Disapproval of gambling	.15*	.50*	−.36*	–		2.39 (.67)
5. Gambling frequency	−.19*	−.29*	.38*	−.34*	–	1.32 (.62)

*$p < .001$

between perception of peer gambling and gambling frequency. Finally, perceived parental knowledge correlated positively with disapproval and risk perception of gambling and negatively with the perception of peer gambling.

Factorial Properties of the Measures

The first step in the analysis was to evaluate the factorial properties of the measures. Since the type of Likert scale was discrete and ordinal, the factorial properties were evaluated with a polychoric correlation (for the measures with two items) and a confirmatory factor analysis (CFA for the measures with three or more items). Fit indices and R^2 from the gambling frequency CFA were as follows: [$X^2_{(20)} = 1368$, $p < .001$, CFI = .97, RMSEA = .10; R^2: item 1 = .52; item 2 = .56; item 3 = .70; item 4 = .60; item 5 = .69; item 6 = .71; item 7 = .73; item 8 = .62]. The size of the polychoric correlation coefficient for the two items concerning perception of the harmfulness of gambling ($r_{\text{Polychoric}} = .87$) and disapproval of gambling ($r_{\text{Polychoric}} = .88$) indicated a large effect. The results from the perceived parental knowledge CFA suggested that the factor structure with three items was not confirmed due to the item "my parent(s) know where I am in the evenings," which did not perform well on the basis of criteria. Thus, we considered the factor structure with the first two items ($r_{\text{Polychoric}} = .64$).

Testing the Theoretical Model

The second step of the analysis was to test the proposed model on the *calibration sample*. The results obtained from the multivariate regression models validated the hypothesized model. Higher levels of perceived parental knowledge were associated with lower levels of gambling frequency, and gambling-oriented attitudes fully mediated this association. The squared multiple correlations indicated that the model accounts for a modest portion of the variance in study variables, that is, 4 % of the variance in perception of peer gambling, 8 % in disapproval of gambling, 3 % in perception of the harmfulness of gambling, and 36 % in gambling frequency. Moreover, the total coefficient of determination (CD) was .18. Adolescents who perceived higher levels of parental knowledge were more likely to disapprove of gambling and show higher awareness of the harmfulness of gambling, which were, in turn, negatively related to gambling frequency. They were also less likely to perceive their friends as gamblers, which was also negatively related to gambling frequency.

Along with the direct effects shown in Table 3, some significant indirect relationships emerged. Table 3 shows the decomposition of the effects of perceived parental knowledge on gambling frequency. The direct effect of perceived parental knowledge on gambling frequency was significant and negative (−.20). Along with direct effects, perceived parental knowledge had also an indirect relationship with gambling frequency (−.18) through its effect on the perception of peer gambling (−.04), disapproval of gambling (−.11), and perception of the harmfulness of gambling (−.03).

Validation of the Model

Retesting the model on the *validation sample* (partition 3) showed that the standardized parameters (R^2) of each endogenous variable and the total coefficient of determination, as well as the direct and indirect effects of perceived parental knowledge on gambling frequency (Table 3), were largely in accordance with the development sample (partition 2).

Discussion

The primary purpose of this study was to evaluate an integrative model linking the perceived parental knowledge with adolescent gambling while taking into account the mediating effects of adolescent attitudes. The validity of the model was confirmed by the analyses conducted on two subsamples. To test the proposed model, three independent samples were created according to gender and age in order to maximize the likelihood of randomly drawing three representative samples of students. In addition, following Cudeck and Browne (1983), we applied a cross-validation strategy in which an integrative model was first tested on the calibration sample and subsequently re-tested on the validation sample (J reskog & S rbom 1996). This strategy is described in literature as an effective method for testing new theoretical models (e.g., Yuan et al. 2002). The results suggest that perceived parental knowledge has both direct and indirect effects on

Table 3 Estimated parameters, standard errors, and R^2 for two subsamples (partition 2 and partition 3)

Direct effects	Indirect effects (through)	Partition 2 (calibration)		Partition 3 (validation)	
		$n = 6525$		$n = 6523$	
		Estimated	SE	Estimated	SE
Perceived parental knowledge—perception of peer gambling		−.21	.022	−.18	.021
Perceived parental knowledge—disapproval of gambling		.28	.015	.27	.014
Perceived parental knowledge—perception of the harmfulness of gambling		.17	.015	.20	.015
Perceived parental knowledge—gambling frequency		−.20	.010	−.24	.010
	Perception of peer gambling	−.04	.003	−.04	.003
	Disapproval of gambling	−.11	.005	−.09	.004
	Perception of the harmfulness of gambling	−.03	.002	−.03	.002
Perception of peer gambling—gambling frequency		.22	.006	.20	.006
Disapproval of gambling—gambling frequency		−.40	.007	−.35	.008
Perception of the harmfulness of gambling—gambling frequency		−.13	.007	−.16	.008
R^2 perception of peer gambling		.04		.04	
R^2 disapproval of gambling		.08		.07	
R^2 perception of the harmfulness of gambling		.03		.04	
R^2 gambling frequency		.36		.34	
CD		.18		.19	

All parameters estimated are significant ($p < .001$)

SE standard errors adjusted for 419 schools

adolescent gambling. These findings are consistent with the social learning theory, which proposes that parents serve as important socializing agents for adolescents (Bandura, 1999) and operate through socio-psychological mechanisms to produce behavioral effects (Bandura, 1997). The results are also consistent with the previous studies on other youth problem behaviors, such as alcohol use (Kim & Neff, 2010) and marijuana use (Lac et al., 2009). Similarities could indicate that substance use and problem gambling are characterized by overlapping risk/protective factors (Leeman & Potenza, 2012), which suggest that theoretical models for substance abuse could also be useful for problem gambling.

In developing this model, we focused on the protective effect of perceived parental knowledge on preventing or hindering youth gambling to elucidate some of the pathways responsible for this association. As hypothesized in the model, adolescents who perceive higher levels of parental knowledge are less likely to participate in gambling activities. Through knowledge of their adolescent offspring's whereabouts and activities, parents play a fundamental role in buffering different types of risk behaviors, be it substance use (Branstetter & Furman, 2013) or gambling behavior (Molinaro et al., 2014). This might be due to the fact that parents who are knowledgeable about youth activities may have the information necessary to provide the supervision, structure, and discipline indispensable for monitoring peer relationships and subsequently reducing youth deviant behavior (Crouter & Head, 2002).

Although substantial research exists to support the association between parental practices and adolescent gambling, less is known about the role played by adolescent attitudes in this relationship. This study found that adolescents' gambling-oriented attitudes mediated the relationship between perceived parental knowledge and adolescent gambling. Specifically, adolescents who perceived higher levels of parental knowledge were more likely to disapprove of gambling and show higher awareness of the harmfulness of gambling, which are, in turn, negatively related to gambling frequency. The first explanation for this protective effect may be that parents who are aware of upcoming youth activities may be more likely to discuss their views on whether specific problem behaviors (i.e., gambling) are morally acceptable for their child (Lippold et al. 2013). Moreover, when parental practices (e.g., involvement, monitoring/supervision, discipline) are consistently applied, adolescents learn that there are consequences for misbehavior. When these parental practices are not consistently applied, however, children may begin to perceive their standard of conduct as ambiguous (Branstetter & Furman, 2013).

Adolescents who perceive higher levels of parental knowledge are less likely to perceive their friends as gamblers, which is also negatively related to gambling frequency. The results confirmed that a positive family environment (e.g.,

involving parental monitoring/knowledge) could attenuate the potentially negative effect of peers on adolescents' risk behaviors (e.g., Lac et al., 2009). Monitoring efforts perhaps work by limiting adolescent opportunities to experience "passive" (social modeling and overestimation of friends' use) and "active" (explicit drug offers) social pressure (Wood et al. 2001).

The proposed model included a link between adolescent attitudes and gambling frequency. We attempted to explore the relation between adolescents' attitudes (self-approval, risk perception, and descriptive norms) and their gambling behaviors within a representative sample of Italian adolescents. Regarding descriptive norms, adolescents who perceived their friends as gamblers were more likely to participate in gambling activities. Thus, friend models had a significant positive relation with gambling frequency, which is consistent with previous research on adolescent risk behaviors, including problem gambling (e.g., Wickwire et al. 2007). These results are compatible with a false consensus effect or normative fallacy, according to which people believe that others behave as they do (Henry et al. 2011). Although previous studies produced mixed findings regarding the relationship between risk perception and gambling (see Spurrier & Blaszczynski, 2014 for a review), our study indicated that adolescents who perceive higher levels of harmfulness of gambling are less likely to participate in gambling activities. This result confirms that the perception of gambling carrying negative consequences is associated with less gambling (Hanss et al. 2014). For this reason, risk perception may be an important protective factor to be promoted. Regarding self-approval of gambling, our analysis confirmed that disapproval of a behavior is negatively related to the specific behavior (Kim & Neff, 2010).

Implications

The findings from this study have several implications for researchers and health professionals interested in promoting responsible gambling by hindering gambling frequency, which is positively correlated with problem gambling (e.g., Canale et al., 2016). The results indicated that perceived parental knowledge is negatively related to gambling frequency and that gambling-oriented attitudes mediate the relationship between perceived parental knowledge and gambling frequency. Preventive intervention programs may seek to identify adolescents with positive attitudes toward gambling and target parents who need to strengthen their parenting resources. More specifically, prevention programs might focus on increasing student perceptions of parental knowledge. The literature has shown that parental knowledge is in itself dependent on the willingness of young people to disclose to their parent what they are doing and thinking. The first step in prevention programs may be to stimulate parental interest in their children's whereabouts, friend choices, and day-to-day activities. This can positively affect parent-child relations and thus child's inclination to disclose his/her life to his/her parents. Disclosing tendencies and actual parental knowledge may facilitate the discussion on adolescents' gambling-oriented attitudes and subsequently for decreasing gambling behavior. In light of the similarities between adolescent problem gambling and alcohol and substance abuse, the results obtained in the present study can also be used to inform the conceptualization of the future direction of substance use prevention programs in youth.

The results may also have implications for policy and practice, suggesting that actions should focus on societal factors that predict family connectedness and resilience as well as on improving parenting and family functioning. For example, higher expenditure on family benefits (child benefits, child-raising allowances, and so on) may affect the way in which families deploy social and economic resources. This might in turn increase parents' ability to protect and support young people (Viner et al., 2012) through increased parental caring and knowledge, for example.

Limitations and Conclusions

The findings of this study should be interpreted in the light of a number of limitations. Although it was demonstrated that gambling-oriented attitudes significantly mediate the relationship between perceived parental knowledge and gambling frequency, the fact remains that much of the variance in gambling-oriented attitudes remains unexplained. In explaining the potential effect of gambling-oriented attitudes on gambling involvement, most studies posit numerous causal factors, only one of which is perceived parental knowledge. Factors not included in our models are other characteristics of parents [e.g., parental warmth (Lac et al., 2009)] or community characteristics [e.g., accessibility or opportunity to gamble (Kim & Neff, 2010)], which may also predict beliefs about gambling. Although we know that culture often shapes both parental practices and gambling (e.g., Raylu & Oei, 2004), it was not possible to investigate the validity of the model across cultures and different social groups directly in the present study. Since Claes et al. (2005) reported that links between parental practices and deviant behaviors are invariant across three countries (Canada, France, and Italy), the findings from the present study may be generalizable to adolescents in other countries, where the effect of parenting style on risk behaviors is robust (Claes et al., 2005). However, this matter needs to be examined in future studies. In addition, following the "social learning" theory, future models should consider not only perceived parental knowledge but also relevant parental characteristics, including parental permissiveness toward gambling, parents' attitudes toward gambling, parental gambling misuse, as well as teaching children to keep a budget, save money, and take care of their finances (i.e., Leeman et al., 2014). A further limitation is the large sample size used in the study. Larger

sample size makes it easier to detect small differences. Thus, it is especially important to consider practical significance when sample size is large. The present cross-sectional design does not allow us to determine the stability of the effects or to study how the relations between these variables change over time. In addition, the direction of the effects between perceived parental knowledge, attitudes and norms, and gambling frequency cannot be determined using correlational design of this study. Thus, it is also possible that adolescents who do not gamble and have attitudes that do not support of gambling are more likely to have a closer relationship with their parents (i.e., less conflict) and more likely to disclose information. Longitudinal studies of perceived parental knowledge and gambling-oriented attitudes are needed to determine their causal relations with gambling frequency. Another issue concerns the source of parental knowledge data. Although several studies used only adolescent self-reports of parental knowledge (e.g., Lac et al., 2009), including parents' perspectives on their own knowledge would help improve and generalize our findings. In addition, a better measure of perceived parental knowledge of adolescent gambling would improve the explanatory power of our model. In the future, the ESPAD questionnaire may be supplemented with more specific measures (e.g., parental knowledge related to adolescent gambling). Finally, most measures are only based on one or few items.

Despite these limitations, as our review of the literature suggests, the present study is likely to be the first to clarify the mediating effects of adolescent attitudes on the relationship between perceived parental knowledge and gambling frequency. In particular, our findings support the idea that adolescents who perceive higher levels of parental knowledge are more likely to disapprove of gambling and show higher awareness of the harmfulness of gambling, which are in turn negatively related to gambling frequency. These adolescents are also less likely to perceive their friends as gamblers, which is also negatively related to gambling frequency. We examined the model in two samples separately to validate the results. No significant differences emerged between two samples. These results strengthen the generalizability of the proposed model by showing that the cross-validation strategy is a useful method for testing new theoretical models. Thus, those interested in promoting responsible gambling (e.g., decreasing gambling frequency) might want to consider our model's variables, including the attenuating effects of perceived parental knowledge on pro-gambling beliefs.

Acknowledgments The authors would like to thank Elisa Benedetti for her helpful comments on the manuscript.

Compliance with Ethical Standards

Funding None.

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

Ethical Approval Ethical principles were carried out in accordance with the Declaration of Helsinki. The survey was included in each school's annual Teaching Programme (Decree of the President of the Italian Republic no. 275/1999, Art. 8), edited, agreed, and approved by collegial bodies composed of teachers, parents, and students (Legislative Decree no. 297/1994).

Informed Consent Parents provided passive consent.

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