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Attitudes toward gambling among adolescents

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It is well documented that attitudes toward gambling are a good predictor of problem gambling during adolescence. However, so far, little is known about what factors are associated with adolescents' gambling attitudes. This study used cross-sectional data ($N = 2055$, response rate 70.4%) from a representative sample of 17-year-olds in Norway to investigate the relationship between demographic, personality, motivational and social variables and gambling attitudes. Overall, adolescents' attitudes toward gambling were slightly negative. A multivariate analysis revealed that more favourable attitudes toward gambling were most strongly associated with family/peer approval of gambling. In addition, significant associations were found for gender (males more favourable); Sensation Seeking (positive association); Agreeableness (negative association); and family/peer gambling history (positive association for lifetime gambling, negative association for problematic gambling). Although a variety of individual-level and social factors are associated with more favourable attitudes toward gambling, it appears that family and peer approval of gambling are most important.

Keywords: attitude; personality; prevention; peer effects; family

Attitudes toward gambling among adolescents

Public perceptions of gambling are often equivocal. On the one hand, people are usually aware that gambling poses serious risks to those who are predisposed to gamble excessively. However, on the other hand, it is also acknowledged that gambling can have positive consequences for communities (e.g. via providing a source of revenue for sporting clubs or humanitarian causes) and can be an enjoyable pastime for individuals (Abbott & Cramer, 1993; Vong, 2009). The balance of such negative and positive views very likely affects the attitudes that individuals hold toward gambling and ultimately influences their decisions to engage in gambling (Gainsbury, Wood, Russell, Hing, & Blaszczynski, 2012).

There is ample evidence showing that people's attitudes toward gambling are good predictors of how much people gamble and how likely they are to experience gambling-related problems. A common finding is that those who hold more positive attitudes toward gambling are more likely to gamble and to experience gambling-related problems (Chiu & Storm, 2010; Delfabbro, Lambos, King, & Pugliese, 2009; Delfabbro & Thrupp, 2003; Orford, Griffiths, Wardle, Sproston, & Erens, 2009; Wardle et al., 2011; Williams, Connolly, Wood, & Nowatzki, 2006; Wood & Griffiths, 2004). These findings provide support for theories of behaviour and decision-making that assign attitudes an important role in determining people's intentions to act and, indirectly, their actual behaviour; an example is the theory of planned behaviour (Ajzen, 1991; Fishbein, 2000). Authors who have applied this theoretical framework to gambling behaviour (Cummings & Corney,

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1987) as well as more general, health risk-taking behaviours (Fishbein & Cappella, 2006) suggest that attitudes are affected by broader demographic, personality and other individual-level factors. However, in connection with attitudes toward gambling, little is known about the relative importance of the different background influences. As the prevalence rates for problem gambling are higher for adolescents than for adults (Gupta et al., 2013; Nowak & Aloe, 2013), focusing on factors related to attitudes toward gambling for the former group is particularly important, both in terms of prevention and treatment. The prevalence of problem gambling among adolescents in Norway appears to be lower compared to international studies (Brunborg, Hansen, & Frøyland, 2013; Hanss et al., 2014). However, when one also considers the proportion who could be classified as at-risk gamblers, the overall percentage of adolescents reporting some problems with gambling becomes more considerable.

In general, the results of previous studies of adolescent gambling share many similarities with those involving adults. Attitudes toward gambling tend to be mixed (Moore & Ohtsuka, 1997; Wood & Griffiths, 1998), but are generally reliable predictors of whether individuals engage in gambling (Wood & Griffiths, 2004) and experience gambling-related problems (Hanss et al., 2014). For example, as in adult studies (Chiu & Storm, 2010; Smith et al., 2011; Taormina, 2009), young males are typically found to hold more positive attitudes than women about gambling (e.g. that gambling is morally unproblematic; that it is acceptable to legalize gambling) (Jackson, Dowling, Thomas, Bond, & Patton, 2008; Moore & Ohtsuka, 1997; Wood & Griffiths, 1998).

People with more positive attitudes also tend to share certain beliefs about gambling. Those, for example, who are convinced that the development of the gambling industry has positive consequences for the economy tend to hold more positive attitudes (Vong, 2009). There is also evidence that feeling in control over the outcomes of gambling is positively associated with gambling attitudes (Taormina, 2009). Evidence in support of the view that gambling-related knowledge and beliefs are related to gambling attitudes was observed in an intervention study among prison inmates: Those who took part in a programme that informed about problem gambling, possible negative consequences and common misperceptions showed afterwards improved recognition of cognitive errors related to gambling and held less positive attitudes toward gambling (Nixon, Leigh, & Nowatzki, 2006). A similar intervention was effective in producing less positive attitudes toward the economic profitability of gambling in a sample of high school students (Donati, Primi, & Chiesi, 2013).

Another important individual-level factor is personality. Research has shown that Neuroticism and Gregariousness (a sub-dimension of Extraversion) predicted gambling attitudes (positive relation) in a multiple regression analysis together with other variables, such as demographics and values. When bivariate correlations were analysed, attitudes were significantly associated with Gregariousness but not with Neuroticism (Taormina, 2009). Other studies investigated Impulsivity and Sensation Seeking (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993) and found that those with higher scores on those traits had more positive attitudes toward gambling compared to those with lower scores on the corresponding traits (Breen & Zuckerman, 1999; Lee, 2013; McDaniel & Zuckerman, 2003).

Several studies using adult and adolescent samples provide empirical support for the view that social influences are important for understanding an individual's gambling behaviour. For example, believing that one's family and friends approve of gambling and participate in gambling activities (i.e. perceived positive social norms regarding gambling) has been found to be predictive of gambling frequency (Larimer & Neighbors, 2003;

Moore & Ohtsuka, 1999). Moreover, increased parental monitoring was associated with lower levels of adolescent gambling (Magoon & Ingersoll, 2006). Gambling attitudes also appear to be influenced by social factors, including family gambling history and peer relationships. In relation to family gambling history, it appears that the relationship with gambling attitudes may depend on whether or not relevant others experience problems in connection with their gambling. One study reported that adolescents whose parents gambled regularly held less negative attitudes toward gambling compared to those whose parents gambled less frequently. However, those with parents or relatives who had experienced gambling-related problems held more negative attitudes (Orford et al., 2009).

Existing studies on possible antecedents of gambling attitudes have mostly used adult samples. Consequently, little is known about variables that may be important for predicting gambling attitudes among adolescents. In particular, research on social variables, such as parental monitoring and family and peer approval of gambling, is scarce. Furthermore, while there is evidence that some of the Big Five personality traits (Neuroticism, Extraversion, Agreeableness, Conscientiousness and Intellect/imagination) – together with attitudes – predict adolescent gambling involvement (Hanss et al., 2014), little is known about the association between the Big Five traits and gambling attitudes. The present study aims to bridge these gaps in the literature.

Aim of this study

The aim of this study was to explore associations between gender, personality, gambling-related knowledge, social influences and general attitudes toward gambling in a representative sample of 17-year-olds in Norway. Because of the exploratory character of the study, no specific hypotheses were formulated regarding the strength and directionality of the associations investigated. Associations between attitudes and gambling involvement were not investigated in the present study as these associations have been reported elsewhere (Hanss et al., 2014). Moreover, while little is known about possible antecedents of gambling attitudes, there are both theories (e.g. the theory of planned behaviour; Ajzen, 1991) and empirical findings (see introduction) suggesting that gambling attitudes may be a determinant of gambling participation.

Method

Participants and procedure

Three thousand 17-year-olds ($n = 1500$ female), randomly drawn from the Norwegian National Registry, received a postal invitation to participate in a survey about gambling, together with a questionnaire and a prepaid return envelope. The questionnaire could also be completed online. Up to two reminder letters were sent to those who did not reply. All respondents received a gift certificate worth NOK200 (approximately €24) as a compensation for taking part in the study.

Seventy-seven people had to be excluded from the initial sample because they could not be reached (invalid mailing address) or were unable to participate (e.g. due to disability). Of the remaining sample, $n = 2059$ completed and returned the questionnaire. Four of the respondents were excluded from the data set because they were younger than 17 years of age. This resulted in a response rate of 70.4%.

Just over half of the respondents were female (52.9%). The majority were born in Norway (92.4%); had one or more siblings (96.7%); and lived with both parents (62%). Most respondents still went to school (full time, 97.7%) but some had a part-time job (20%).

Measures

The data reported are a subset of a larger survey. Here, we will only describe the measures relevant to the research questions addressed in this study. Cronbach's alpha coefficients reported for the scales are based on analyses of the present data.

Attitudes toward gambling

The 14-item Attitudes Towards Gambling Scale (ATGS) by Orford et al. (2009) was used to assess attitudes. The ATGS items and information about the response alternatives are provided in Table 1. Items that represent positive attitudes were reverse-coded and then a composite score was computed by adding up scores on the 14 items ($\alpha = .83$; Orford et al., 2009). Higher scores reflect more favourable attitudes toward gambling. In Table 1, we report mean values and standard deviations for the single ATGS items as well as for the composite score.

Five-factor personality domain traits

The personality domain traits Extraversion, Agreeableness, Conscientiousness, Neuroticism and Intellect/imagination were measured by the 20-item Mini-IPIP (Donnellan, Oswald, Baird, & Lucas, 2006). Example items are: 'Am the life of the party' (to measure Extraversion), 'Feel others' emotions' (Agreeableness), 'Like order' (Conscientiousness), 'Have frequent mood swings' (Neuroticism) and 'Have a vivid imagination' (Intellect/imagination). Participants rated how accurately each item described them on a 5-point scale ranging from *very inaccurate* (1) to *very accurate* (5). An index variable was computed (mean score) for each personality trait ($\alpha = .79$ Extraversion, $\alpha = .71$

Table 1. Means and standard deviations of ATGS items.

ATGS item	M^a	SD	n
There are too many opportunities for gambling nowadays.	2.21	0.98	2031
People should have the right to gamble whenever they want.†	3.12	0.98	2028
Gambling should be discouraged.	2.81	1.00	2032
Most people who gamble do so sensibly.†	2.85	0.93	2030
Gambling is a fool's game.	3.50	0.99	2037
Gambling is dangerous for family life.	2.60	0.95	2035
Gambling is an important part of cultural life.†	2.24	0.94	2035
Gambling is a harmless form of entertainment.†	2.46	0.92	2031
Gambling is a waste of time.	2.65	1.03	2038
On balance gambling is good for society.†	2.29	0.82	2036
Gambling livens up life.†	2.27	0.87	2030
It would be better if gambling was banned altogether.	3.24	1.03	2037
Gambling is like a drug.	3.07	1.10	2036
Gambling is good for communities.†	2.35	0.86	2036
M composite score variable	37.74		
SD composite score variable		7.48	
n composite score variable			1977

^a Participants answered the items on a 5-point scale ranging from *strongly agree* (1) to *strongly disagree* (5). For the single ATGS items, mean values higher than 3 (for the composite score variable) represent a positive attitude and mean values lower than 3 (for the composite score variable) represent a negative attitude toward gambling. A mean value of 3 (for the composite score variable) represents a neutral attitude toward gambling (cf. Orford et al., 2009).

† Reverse-coded items.

Agreeableness, $\alpha = .66$ Conscientiousness, $\alpha = .65$ Neuroticism, $\alpha = .62$ Intellect/ imagination). Higher scores on the index variables indicate greater levels of the respective traits.

Impulsivity

The 13-item Narrow Impulsiveness Subscale of the Eysenck Impulsivity Scale (Eysenck & Eysenck, 1977) was used to assess Impulsivity. An example item is: 'Do you often buy things on impulse?' Participants answered each item with *yes* (1) or *no* (0). An Impulsivity index was computed by summing up the scores across the 13 items (Kuder-Richardson 20 reliability coefficient = .74). Higher scores indicate greater levels of Impulsivity.

Sensation Seeking

Sensation Seeking was assessed by the 20-item Arnett Inventory of Sensation Seeking (AISS; Arnett, 1994). The AISS covers two dimensions of Sensation Seeking: Need for Novelty and Need for Stimulus Intensity, but since internal consistencies of the two subscales were low¹ ($\alpha = .49$ Novelty; $\alpha = .56$ Intensity) one composite score was computed (average across the 20 items, $\alpha = .64$). An example item is: 'I would like to travel to places that are strange and far away.' Participants answered the items on a 4-point answer scale from *describes me very well* (4) to *does not describe me at all* (1). Higher scores indicate greater levels of Sensation Seeking.

Gambling-related knowledge

Perceived level of gambling-related knowledge was measured by two questionnaire items: 'I know how most gambling games work' and 'I could easily learn how most gambling games work.' Participants answered the items on a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). An index was computed by averaging the answers ($\alpha = .74$). Higher scores indicate greater levels of perceived knowledge.

Parental monitoring

The six-item Parental Monitoring Scale (Silverberg & Small, 1991) was used to assess participants' perceived level of parental monitoring. An example item is: 'My parents know where I am after school/work.' Participants answered the items on a 5-point scale ranging from *never* (1) to *always* (5). An index was computed by averaging answers to the six items ($\alpha = .85$). Higher scores indicate greater levels of parental monitoring.

Family/peer approval of gambling

Four items adopted from Delfabbro and Thrupp (2003) were used to measure family and peers' approval of gambling. Two items capture friends' approval of gambling: 'Most of my friends approve of gambling' and 'Most of my friends gamble a lot.' In the two items assessing family's gambling approval, the word 'friends' is replaced by 'family'; otherwise the statements are identical. Participants answered the items on a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). A composite score was computed by averaging answers to the four items ($\alpha = .74$). Higher scores indicate greater family/peer approval of gambling.

Family/peer gambling history

Gambling history was assessed separately for father, mother and close others (Ellingson, Slutske, & Martin, 2010). Participants were asked whether their father, mother or other close others (family and/or friends) had ever gambled in their lifetime (Item 1), gambled at least once a month for at least six months (Item 2), gambled at least once a week for at least six months (Item 3) and had a period in their life when they had economic, family, legal, work or emotional problems because of their gambling behaviour (Item 4). For each of the items, participants indicated whether the statement applied to their father, mother and/or close others. Based on the answers, the proportion of groups of persons (i.e. n out of 3) to whom the respective statement applied was computed. Items 1 to 3 assess non-problematic gambling involvement and Item 4 assesses problematic gambling.

Data analysis

Means and standard deviations were computed for the single ATGS items and the ATGS composite score. Covariates of gambling attitudes were investigated in two steps: first, bivariate correlations (Pearson) between the ATGS composite score variable and the remaining variables were calculated. Second, to further investigate the relative importance of the covariates, a multiple linear regression analysis was performed in which the ATGS composite score variable was entered as the dependent variable and the remaining variables (gender, personality, knowledge, social variables) comprised independent variables which were entered simultaneously into the model (forced entry). Preconditions for performing linear multiple regression analysis were satisfied: imperfect multicollinearity of predictors (max $r = .67$, VIF values between 1.07 and 2.20, min Tolerance value .46), independent (Dubin-Watson = 2.02) and normally distributed residuals, and homoscedasticity. Missing data were removed listwise.

Results*Attitudes toward gambling: descriptive statistics*

Means and standard deviations of the ATGS items and composite score variable are provided in [Table 1](#).

The mean value of the composite sum score variable ($M = 37.74$) shows that, overall, adolescents' attitudes toward gambling were slightly negative (a value of 42 would indicate a neutral attitude and any value above 42 would indicate a positive attitude). Analysis of the single items showed that disapproval of gambling was expressed particularly regarding the availability of gambling (currently too many opportunities), the cultural importance and societal benefits of gambling (not an important part of cultural life, not good for society and communities), and possible negative consequences of gambling (does not liven up life, not a harmless form of entertainment, dangerous for family life). Overall, there was some agreement that gambling should be discouraged. However, adolescents also expressed more positive views concerning issues that pertain to the regulation of gambling (e.g. not a fool's game, should not be banned, people should be free to decide when they want to gamble).

Correlates of attitudes toward gambling

Bivariate correlations between gambling attitudes, gender, the personality variables, knowledge and the social variables are presented in [Table 2](#). The strongest correlation by

Table 2. Bivariate correlations (Pearson).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. ATGS composite score		-.25	-.06	-.17	-.11	-.10	-.02	.09	.18	.28	-.17	.49	.18	.16	.11	-.02
2. Gender ^a			.04	.29	.04	.34	.004	-.01	-.23	-.29	.25	-.14	.04	.001	.004	-.03
3. IPIP Extraversion				.35	.11	-.16	.12	.20	.23	.07	.07	.04	.00	-.03	-.01	-.03
4. IPIP Agreeableness					.19	.06	.13	-.06	.01	-.08	.23	-.11	.01	-.003	.004	-.05
5. IPIP Conscientiousness						-.15	-.07	-.34	-.13	-.09	.23	-.11	-.03	-.02	-.05	-.03
6. IPIP Neuroticism							.08	.20	-.13	.17	-.004	-.01	-.06	-.04	-.03	.04
7. IPIP Intellect/imagination								.11	.18	.07	.01	-.01	.03	-.01	-.02	-.01
8. Impulsivity									.29	.11	-.27	.14	.04	.06	.07	.09
9. Sensation Seeking										.32	-.19	.17	.09	.06	.05	.03
10. Gambling-related knowledge											-.15	.39	.22	.17	.13	.03
11. Parental monitoring												-.18	-.01	.01	.001	-.10
12. Family/peer approval of gambling													.33	.38	.30	.06
13. Family/peer gambling history																
14. Gambled in lifetime														.53	.38	.02
15. Gambled once a month														.67	.16	.25
16. Gambled once a week																
16. Problematic gambling																

Note: Correlation coefficients displayed in bold numbers are significant < .05 (two-tailed).

^a Gender was coded: male = 0, female = 1.

far was found for family and peer approval of gambling ($r = .49$), indicating that adolescents with relatives and friends who approve of gambling also report more favourable gambling attitudes. Moderate associations (r values between .16 and .28) were found for gender (males more favourable); gambling-related knowledge (positive association – those who felt more knowledgeable also reported more favourable attitudes); Agreeableness (negative association – those who score lower on the trait report more favourable attitudes); Sensation Seeking (positive association); parental monitoring (negative association); and two of the gambling history variables (gambled in lifetime and gambled once a month, both positive associations).

The results of the multiple regression analysis in which the ATGS composite score variable entered as the dependent variable are shown in Table 3. Overall, the model explained about 29% of the variance in attitudes, and six of the independent variables were significant.

Family/peer approval of gambling had the strongest association with gambling attitudes (those who have relatives or friends who approve of gambling have more favourable attitudes) followed by gender (male participants have more favourable attitudes toward gambling than female participants). Of the personality variables, two were significantly associated with attitudes: Agreeableness (people with *lower* Agreeableness scores held more favourable attitudes) and Sensation Seeking (those who scored *higher* on Sensation Seeking held more favourable attitudes).

Furthermore, two of the gambling history variables were significantly associated with gambling attitudes. Having relatives or friends who have gambled at some point in their lives was positively associated with gambling attitudes, whereas having relatives or friends with a history of problematic gambling was negatively associated with gambling attitudes.

In summary, the results indicated that adolescents' attitudes toward gambling were strongly associated with what their families and peers thought of gambling. Furthermore,

Table 3. Multiple linear regression of attitudes toward gambling.

Independent variables	Dependent variable ATGS composite score			
	<i>B</i> (<i>SE</i>)	β	<i>t</i>	<i>p</i>
Constant	31.93 (2.17)	–	14.74	< .001
Gender (male = 0, female = 1)	–2.34 (0.36)	–.16	– 6.51	< .001
IPIP Extraversion	–0.25 (0.21)	–.03	–1.21	.23
IPIP Agreeableness	–0.58 (0.26)	–.05	– 2.24	.03
IPIP Conscientiousness	–0.43 (0.22)	–.04	–1.93	.05
IPIP Neuroticism	–0.28 (0.22)	–.03	–1.29	.20
IPIP Intellect/imagination	–0.24 (0.28)	–.02	–0.85	.39
Impulsivity	0.01 (0.06)	.002	0.08	.93
Sensation Seeking	1.19 (0.50)	.06	2.36	.02
Gambling-related knowledge	0.16 (0.17)	.02	0.91	.36
Parental monitoring	–0.23 (0.24)	–.02	–0.95	.35
Family/peer approval of gambling	4.56 (0.25)	.43	17.92	< .001
Family/peer gambling history				
Gambled in lifetime	1.14 (0.51)	.05	2.24	.03
Gambled once a month	0.06 (0.77)	.002	0.08	.94
Gambled once a week	–1.13 (0.86)	–.04	–1.31	.19
Problematic gambling	–3.75 (1.65)	–.05	– 2.27	.02

$R^2 = .29$; adjusted $R^2 = .29$; $F(15,1762) = 48.89$, $p < .001$

Note: Significant t -statistics are shown in bold letters.

gender was an important covariate of gambling attitudes. This raised the question of whether the strength of association between family/peer approval and adolescents' gambling attitudes might differ between men and women. To explore this question the regression analysis was repeated with an additional independent variable: the interaction term of family/peer approval and gender. The interaction term turned out to be significant ($p = .01$) and gender became non-significant ($p = .80$). Otherwise, the results did not differ markedly from those reported in Table 3. Further exploration revealed that the association between family/peer approval and gambling attitudes was positive and significant for both male and female participants. However, among men the association was slightly stronger than among women ($r = .50, p < .001$, men vs. $r = .45, p < .001$, women).

Discussion

The aim of this study was to extend knowledge concerning the factors which are associated with attitudes toward gambling in adolescents. Using factors previously investigated largely within adult samples, we examined the relative importance of individual-level and social factors in a large representative sample of adolescents in Norway. A key finding is that some of the variables that have been found to be important predictors of gambling attitudes in adult samples were less important covariates in our sample of adolescents. For example, whereas studies using adults have found that the personality traits Neuroticism, Extraversion and Impulsivity were associated with gambling attitudes (Breen & Zuckerman, 1999; McDaniel & Zuckerman, 2003; Taormina, 2009), these traits showed only very weak associations (bivariate correlations) with gambling attitudes in our sample of adolescents. When adjusting for other variables (regression analysis), these associations turned out to be non-significant. However, in line with what has been found in adult samples (Lee, 2013), Sensation Seeking turned out to be an important covariate of gambling attitudes in our study (positive association). Three of the Big Five personality traits – Agreeableness, Conscientiousness and Intellect/imagination – had not been investigated as covariates of gambling attitudes before. Our results indicate that, of the Big Five personality traits, Agreeableness has the strongest association with adolescents' gambling attitudes. Those who scored lower on Agreeableness held more favourable attitudes toward gambling. The finding is in line with a previous study showing that Agreeableness was negatively associated with several behavioural addictions. It can be hypothesized that this finding reflects an avoidance of behaviours that may cause stress/conflicts in interpersonal relationships (Andreassen et al., 2013).

With respect to social variables, previous research has demonstrated that the association between family gambling history and adolescents' attitudes toward gambling depended on whether family members experienced problems related to their gambling (Orford et al., 2009). This finding was replicated by the results of the regression analysis in our study: those who reported having family members or peers who had gambled (category: gambled in lifetime) also reported more favourable attitudes toward gambling compared to those who did not have family members or peers who had gambled. However, those who reported having family members or peers with a history of problematic gambling also reported more negative gambling attitudes. Interestingly, other studies found that those adolescents who reported having close others with gambling problems actually spent *more* time gambling and were more likely to report gambling problems themselves than adolescents who had not experienced gambling problems in their social

environment (Hanss et al., 2014; King, Abrams, & Wilkinson, 2010). It seems possible that experiencing gambling problems in one's close social environment negatively influences one's opinions regarding gambling in general but is not a sufficient protective factor for adolescent gambling participation.

In contrast to the current investigation, most previous studies on adolescents' attitudes toward gambling have not investigated parental monitoring and family and peer approval of gambling as potential correlates. While parental monitoring was only moderately correlated with attitudes and non-significant in the regression analysis, family/peer approval of gambling showed a strong positive association with attitudes, both in the bivariate and multivariate analyses. In fact, family/peer approval showed the strongest association with gambling attitudes among the independent variables in the regression analysis. A possible interpretation of this finding is that the social environment plays a key role in the development of adolescents' attitudes toward gambling. In previous studies, adolescent gamblers reported more often than adult gamblers that they gamble for social reasons – and less often than adult gamblers to win money (Lynch, Maciejewski, & Potenza, 2004). This finding provides some support for the assumption that social variables are important for motivating gambling activities and shaping gambling-related attitudes among adolescents. For example, college students' perceived social norms regarding gambling have been found to predict the students' level of gambling involvement (Larimer & Neighbors, 2003). Two of the items to measure family/peer approval of gambling captured whether most of one's friends and/or family members gamble a lot. Beliefs about gambling involvement of peers may act as a particular strong descriptive social norm among adolescents, influencing both gambling attitudes and gambling participation. Additional analyses showed that the association between family/peer approval of gambling and adolescents' gambling attitudes was stronger for male than for female participants. However, it should be noted that this difference was very small and, thus, needs to be interpreted with care until further studies are conducted. A possible interpretation is that young men are more vulnerable than young women are to influences by their social environment when it comes to gambling attitudes and participation.

Gambling-related attitudes and behaviours of family members may mediate the effects of more basic influences (e.g. socio-economic status) on adolescents' gambling behaviour (McComb & Sabiston, 2010). Presumably, people's attitudes toward gambling are another mediating variable, interacting with perceived – and actual – family and peer approval.

Family and peer approval of gambling may have commonalities with gambling-related knowledge that could explain why knowledge turned out to be non-significant in the regression analysis. For example, it seems likely that adolescents acquire their knowledge about gambling through interactions with family members or peers. Perhaps people who strongly approve or disapprove of gambling are more likely to share their opinion with others, and adolescents' knowledge about gambling may be biased towards the knowledge and beliefs of opinion leaders.

The independent variable showing the second strongest association with gambling attitudes in the regression analysis was gender: male participants held more favourable attitudes toward gambling than female participants did. This finding replicates findings of previous studies using adult (Chiu & Storm, 2010; Smith et al., 2011) as well as adolescent samples (Jackson et al., 2008) and is accordance with the view that, during adolescence, males have a greater propensity than females for risk-taking (Gullone, Moore, Moss, & Boyd, 2000).

Limitations, strengths and implications for future research

Although using a large sample and many standardized measures, there are a number of methodological issues that should be taken into account when interpreting the findings. For example, one limitation of the present study is that we measured adolescents' general attitudes toward gambling using the ATGS. This instrument does not distinguish between different types of gambling, such as gambling in private clubs (e.g. card games with friends) or lottery playing. One study used a different instrument, the Gambling Attitude Scales (GAS; Kassinove, 1998), and showed that university students held more positive attitudes toward playing lottery than toward other gambling options (e.g. betting on horse races). Thus, the GAS may be an option for measuring gambling-type-specific attitudes in future studies.

Another limitation concerns the measurement of gambling-related knowledge. Only two items were used to measure this construct while previous studies have used more comprehensive measurement instruments (Williams et al., 2006). Hence, future studies may extend the instrument to cover a wider spectrum of knowledge components including, for example, knowledge of randomness in gambling outcomes.

In addition, our data is cross-sectional and, hence, no conclusions can be drawn either in terms of causality or directionality. For example, peer approval of gambling may be an antecedent and/or a result of an adolescent's attitudes toward gambling. Longitudinal research is therefore needed to better identify what influences people's attitudes toward gambling during the transition from adolescence to adulthood. For a discussion of the importance of and need for longitudinal research in connection with adolescent gambling, see Volberg, Gupta, Griffiths, Ólason, and Delfabbro (2010).

Furthermore, all data were based on self-report. The results may therefore be influenced by the common method bias (P. M. Podsakoff, MacKenzie, Lee, & N. P. Podsakoff, 2003).

Finally, some of the scales used in the present study had alpha coefficients below .70 (i.e. Conscientiousness, Neuroticism, Intellect/imagination and Sensation Seeking), indicating low reliability; similar alpha coefficients were reported in previous studies that investigated the psychometric properties of the Mini-IPIP and the AISS in adolescent samples (Baldasaro, Shanahan, & Bauer, 2013; Roth & Herzberg, 2004). As for the AISS, the proposed distinction in two latent factors (i.e. Novelty and Intensity) was not supported by our data; further validation of the scale is needed.

Conclusion

The principal conclusion of the study is that social variables are important covariates of adolescents' gambling attitudes. In particular, gambling attitudes showed a strong positive association with approval of gambling by family members and peers. This has implications for treatment and prevention initiatives. Treatments, such as multi-dimensional family therapy, which regards the problem as part of an adolescent behavioural syndrome, may be particularly relevant in this regard (Liddle, Dakof, & Diamond, 1992). Recent studies to test intervention strategies to alter gambling attitudes in a specific target group – for example, high school students (Donati et al., 2013) – seem to not have incorporated the targets' larger circle of significant others (e.g. family members or peers outside school). Our results indicate that the inclusion of adolescents' social environment may be an important success factor for initiatives to change gambling attitudes. Investigating this assumption represents an interesting avenue for future research.

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Note

1. In addition, a confirmatory factor analysis (maximum likelihood estimation) showed that the two-factor structure (i.e. distinction between Novelty and Intensity) had a bad fit with the data [$\chi^2 = 1551.07$, $df = 169$, $\chi^2/df = 9.18$, $p < .001$, CFI = .64, RMSEA = .06 (90 % CI .06 to .07)]. The two latent factors were correlated, $r = .58$.

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