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The Impact of Gambling Advertising: Problem Gamblers Report Stronger Impacts on
Involvement, Knowledge, and Awareness than Recreational Gamblers

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Abstract

Although there is a general lack of empirical evidence that advertising influences gambling participation, the regulation of gambling advertising is hotly debated among academic researchers, treatment specialists, lobby groups, regulators, and policy makers. This study contributes to the ongoing debate by investigating perceived impacts of gambling advertising in a sample of gamblers drawn from the general population in Norway ($n = 6,034$). Three dimensions of advertising impacts were identified, representing perceived impacts on (a) gambling-related attitudes, interest, and behavior ('Involvement'), (b) knowledge about gambling options and providers ('Knowledge'), and (c) the degree to which people are aware of gambling advertising ('Awareness'). Overall, impacts were strongest for the 'Knowledge' dimension, and, for all three dimensions, the impact increased with level of advertising exposure. Those identified as problem gamblers in the sample ($n = 57$) reported advertising impacts concerning 'Involvement' more than recreational gamblers, and this finding was not attributable to differences in advertising exposure. Additionally, younger gamblers reported stronger impacts on 'Involvement' and 'Knowledge' but were less likely to agree that they were aware of gambling advertising than older gamblers. Male gamblers were more likely than female gamblers to report stronger impacts on both 'Involvement' and 'Knowledge'. These findings are discussed with regard to existing research on gambling advertising as well as their implications for future research and policy-making.

Keywords: gambling advertising, advertising exposure, marketing, problem gambling, gambling regulation

The Impact of Gambling Advertising: Problem Gamblers Report Stronger Impacts on Involvement, Knowledge, and Awareness than Recreational Gamblers

Gambling operators spend large sums of money on advertising their products in sports arenas, newspapers, billboards, television, radio, and the Internet (Felsher, Derevensky, & Gupta, 2004; Najavits, Grymala, & George, 2003; Thomas, Lewis, McLeod, & Haycock, 2012). In several countries, such as Sweden (Binde, 2007), the UK (Griffiths, 2013), and the U.S. (Lee, Lemanski, & Jun, 2008), an increase in gambling advertising volume has taken place over the last years. The rationale for investing in the marketing and advertising of gambling products is that expenditures will pay off in the form of increased volume of overall gambling participation and/or increased market share of the operator's gambling products.

Impacts of Gambling Advertising

Hierarchical models of advertising impacts suggest that engaging consumers' attention is a necessary precondition for promoting the purchasing of a product (Felser, 2001). Judging from studies showing that many people recall having seen or heard advertisements for gambling products (e.g., Abbott, Williams, & Volberg, 1999; Amey, 2001; Korn, Hurson, & Reynolds, 2005), gambling operators seem to succeed in engaging consumers' attention. Research findings also show that common features of gambling advertisements, such as the use of bright flashy colors and symbols of winning, are perceived as stimulating and exciting (Derevensky et al., 2007). However, such findings do not necessarily imply that people's behavior is influenced by advertising messages. While gambling operators may evaluate and keep track of the effectiveness of their marketing activities, there is little publicly available data on how individuals respond to or perceive gambling advertising (Derevensky, Sklar, Gupta, & Messerlian, 2010; Thomas et al., 2012; Williams, West, & Simpson, 2012). A small number of studies have investigated *subjective experiences* of gambling advertising impacts. For instance, in one qualitative study among adolescents, one-third of the participants

reported that they were influenced by gambling advertising (Derevensky et al., 2007). However, an approximately equal share of participants claimed they were *not* affected by gambling advertising. A quantitative study among adolescents found that among those who recalled seeing advertisements for lottery tickets, 39% believed that seeing the advertisements made it more likely that they would buy a lottery ticket (Felsher et al., 2004). Another study found that frequent exposure to poker advertising was associated with more positive attitudes toward gambling advertising (Lee et al., 2008). People with more positive attitudes toward gambling advertising also reported stronger intentions to gamble in the future compared to people with less positive attitudes. In contrast, participants in another study disagreed that gambling advertising had powerful impacts on themselves but believed that other adults and children were affected (Youn, Faber, & Shah, 2000).

It has been argued that initiatives to promote gambling products sometimes specifically target population groups vulnerable to developing gambling problems (cf. Griffiths, 2005; Lamont, Hing, & Gainsbury, 2011; Monaghan & Derevensky, 2008). One study showed that adolescents perceive their age group to be the main target of gambling advertising (Derevensky et al., 2007). Some common characteristics of gambling advertisements such as bright flashy colors and sexually provocative depictions of women seem to particularly appeal to men (Derevensky et al., 2007). Younger people (Amey, 2001) and men (Derevensky et al., 2010) have also stood out as groups with amplified self-reported impacts of gambling advertising (e.g., recollection of advertisement and gambling after seeing advertisement). However, other studies have reported no gender differences for perceived susceptibility to gambling advertising (Felsher et al., 2004) or indicated that advertisements for some types of gambling (e.g., sports-betting) were more salient among men whereas advertisements for other gambling types (e.g., bingo) were more salient among women (Amey, 2001).

Advertising and Problem Gambling

While little is known about whether advertising actually contributes to problem gambling, one study investigated whether subjective experiences of advertising impacts were amplified among adolescent problem gamblers. This study (Derevensky et al., 2010) found that problem gamblers were more likely than social gamblers and non-gamblers to report that they sometimes or often gambled after seeing gambling advertisements and that advertising increased their interest in gambling. Furthermore, problem gamblers were less likely than social and non-gamblers to report that they did not pay attention to gambling advertising. No differences between groups of gamblers were found with regard to increased awareness of gambling products due to advertising. Two other studies indicate that problem gamblers perceive advertising as a trigger for continued gambling participation (Binde, 2009; Grant & Kim, 2001). However, one of these studies concluded that participants did not perceive advertising as the main cause of their gambling problems (Binde, 2009). Taking information about the course of problem gambling development into account, it has been reported that rapid progression to problem gambling was associated with higher self-reported susceptibility (i.e., urges to gamble) to advertising (Grant & Kim, 2001). Different explanations have been proposed for why problem gamblers may be more affected by gambling advertising than recreational gamblers. Among these are that problem gamblers automatically have their attention drawn to gambling-related stimuli (Hønsi, Mentzoni, Molde, & Pallesen, 2013), are more receptive (Lamont et al., 2011), and are more exposed to gambling advertisements compared to non-problem gamblers (Derevensky et al., 2007).

Overall, there are good reasons to assume that people believe that gambling advertising affects their gambling attitudes, intentions, and behaviors. Furthermore, some groups with elevated prevalence rates of problem gambling (i.e., adolescents, men) and people who report problems related to their gambling activities seem to feel particularly

affected by gambling advertising. However, most of the existing evidence stems from studies that used adolescent or clinical samples, and little is known to what degree these findings apply to the general population. Therefore, the aim of this study was to investigate perceived impacts of gambling advertising in a sample of gamblers drawn from the general population of Norway. In addition, the study investigated whether subgroups of gamblers differed with regard to perceived advertising impacts.

Hypotheses

Based upon previous findings, it was assumed that gamblers would report advertising impacts on their gambling-related knowledge, attitudes, interest, and behaviors as well as their awareness of gambling advertising. More specific hypotheses were formulated regarding covariates of perceived advertising impacts. These were:

Hypothesis 1 (age): Younger gamblers will report stronger advertising impacts than older gamblers. Hypothesis 2 (gender): Male gamblers will report stronger advertising impacts than female gamblers. Hypothesis 3 (gambling problems): The impact of advertising will increase with severity of gambling problems. Hypothesis 4 (advertising exposure): Advertising impact will increase with exposure to gambling advertising.

Method

Participants and Procedure

Data was collected in a national representative survey conducted in Norway in 2013 (*authors' names omitted for blind review*). In total, 24,000 citizens (aged 16 to 74 years) were randomly selected from the Norwegian National Registry and invited to participate. The response rate was 43.6% ($n = 10,081$ valid answers) after people who were unable to participate (e.g., due to sickness), or could not be reached, were removed from the initial sample. Of those who took part, 6,034 reported that they had participated in gambling in the previous 12 months. The data reported in the present study is from this subsample of

participants, aged between 16 and 74 years ($M = 48.37$, $SD = 14.57$), with 48.8% being female ($n = 2942$). Participants could choose between completing a paper version of the survey ($n = 5699$) or, alternatively, a digital version made available via the Internet ($n = 335$). Both versions of the survey were completed anonymously. The participants that completed the survey via the Internet was on average somewhat younger than the group of participants who completed the paper survey [$M = 42.72$ years, $SD = 13.80$ vs. $M = 48.71$ years, $SD = 14.55$; $t(6032) = -7.34$, $p < .001$], and there was a larger proportion of males among that participates online compared to those that did not [71.30% vs. 50.10%; $\chi^2(1) = 57.36$, $p < .001$]. However, there were no differences between the two groups in relation to their severity of gambling problems. A maximum of two reminders were sent to those who did not reply. Among those who participated, 200 gift certificates – each worth NOK 500 (approx. €60) – were raffled.

Measures

Impact of Gambling Advertising. Nine items were administered to measure advertising impacts. Five of the items were adopted from the Effects of Gambling Advertising Questionnaire (EGAQ; Derevensky et al., 2010; Derevensky et al., 2007). The remaining four items were formulated to investigate aspects of advertising impacts that were not captured by the EGAQ items (e.g., gambling with increased risk). Each item consisted of a specific statement, and participants were asked to answer how strongly they agreed to the statements on a four-point scale ranging from *strongly disagree* (1) to *strongly agree* (4). The items, together with descriptive statistics, are presented in Table 1 (where the five EGAQ items are identified by superscripts).

Exploratory and confirmatory factor analyses were conducted to investigate whether different factors of advertising impacts could be distinguished (the analyses are reported in the ‘Results’ section below). Three factors were identified (‘Involvement’, five items;

‘Awareness’, two items; and ‘Knowledge’, two items), and for each of these factors an index variable was computed by averaging participants’ responses to the items with high loadings ($> .40$; Stevens, 2009) on the respective factor (see Table 1). Cronbach’s alpha values for the three factors were .84 (‘Involvement’), .64 (‘Awareness’), and .85 (‘Knowledge’).

Problem gambling. Gambling problems were measured by the Problem Gambling Severity Index (PGSI) included in the Canadian Problem Gambling Index (CPGI; Ferris & Wynne, 2001). The PGSI comprises nine items, each consisting of a description of a problem gambling behavior (four items) or consequence (five items) which the participants are asked to rate according to their frequency of occurrence. The four-point rating scale ranges from *never* (0) to *always* (3). Cronbach’s alpha across the nine items was .90. Based upon the individual sum score across the nine items, each participant was assigned one of four gambling categories: non-problem gambling (sum score of 0), low risk gambling (sum score of 1 or 2), moderate risk gambling (sum score of 3 to 7), and problem gambling (sum score of 8 to 27). The shares of participants assigned to the four categories were 83% (non-problem gamblers), 12% (low risk gamblers), 3% (moderate risk gamblers), and 1% (problem gamblers).

Exposure to Gambling Advertising. Gambling advertising exposure was assessed using four items. The items asked participants to indicate how often they had seen gambling advertisements during the previous 12 months on television (Item 1), on the Internet (Item 2), in newspapers (Item 3), and in retail outlets (Item 4). Answers were given on a scale with five categories: *never* (coded 0), *less than once per month* (1), *1 to 3 days per month* (3), *1 to 2 days per week* (8), and *3 or more days per week* (12). For each participant, the sum score across the four items was computed. Cronbach’s alpha was .75.

Demographics. Two demographic questions asked for the participants’ age (continuous) and gender (female, coded 1; male, coded 2).

Data Analysis

The data were analyzed in three steps. First, the dimensionality of advertising impacts was investigated by means of an exploratory factor analysis (EFA) followed by a confirmatory factor analysis (CFA). For this purpose, the sample was divided into two mutually exclusive subsamples of approximately equal size using the random sample function provided in the statistical package IBM SPSS 21. Using one subsample ($n = 3,018$), an EFA of the nine items to measure advertising impacts was conducted. The factor structure was then confirmed by a CFA (IBM AMOS 21) using data of the other subsample ($n = 3,016$). Index scores were then computed for all participants ($n = 6,034$), separately for each factor of advertising impacts (see 'Measures' section) and descriptive analyses were conducted with these index scores.

Following this, three multiple linear regression analyses were conducted. In each analysis, one of the advertising impact indices comprised the dependent variable whereas gender, age, the advertising exposure index, and a dichotomous index for gambling problems (non-problem or low risk gambling, coded 0 versus moderate risk or problem gambling, coded 1) were entered simultaneously as independent variables (forced entry). Preconditions for conducting multiple linear regression analysis were satisfied: unbounded dependent variables, imperfect multicollinearity of independent variables (r values between $-.29$ and $.18$, variance inflation factor values between 1.02 and 1.14 , minimum Tolerance value $.88$), independent residuals (Dubin-Watson statistics between 1.94 and 1.99), and homoscedasticity. Residuals were not normally distributed. However, "in large samples, nonnormality of the residuals does not lead to serious problems with the interpretation of either significance tests or confidence intervals" (Cohen, Cohen, West, & Aiken, 2003, p. 120). Missing data were removed listwise.

Finally, the association between problem gambling severity and advertising impacts was investigated in further detail by three one-way ANOVAs with post-hoc tests. In each analysis, one of the three advertising impact factor indices entered as the dependent variable and the four gambling categories (see 'Method' section) served as the independent variable. An additional one-way ANOVA with post-hoc tests was conducted to further investigate the association between problem gambling severity and advertising exposure.

Results

Dimensions of Advertising Impact

An EFA (principal components, oblique direct oblimin rotation, $n = 2,892$ after listwise deletion) was performed using data from a subsample of participants ($n = 3,018$; see 'Data Analysis' section) to explore whether different dimensions of gambling advertising impact could be distinguished; Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = .78; Barlett's test of sphericity: approximate $\chi^2(36) = 9,840.41, p < .001$. Kaiser's criterion (eigenvalues > 1.00) was used to decide how many factors should be retained. Three factors were identified that explained 69.82% of the variance. The correlations between the factors were $r = -.19$ (Involvement and Awareness), $r = -.37$ (Involvement and Knowledge), and $r = -.03$ (Awareness and Knowledge). Item loadings on the three factors and means and standard deviations for the three factor index variables are shown in Table 1. No item cross-loadings were found, using the criterion of .40 suggested by Stevens (2009). A CFA (maximum likelihood estimation) that was performed on a separate subsample of participants ($n = 3,016$; again see 'Data Analysis' section) confirmed the three-factor structure found in the EFA. The measurement model had a good fit with the data¹ [$\chi^2 = 286.06, df = 24, \chi^2 / df = 11.92, p < .001, CFI = .97, RMSEA = .06$ (90% CI .05 to .07)]. Latent factors correlated between $r = .41$ (Involvement and Knowledge) and $r = .004$ (Awareness and Knowledge), and regression weights of the latent factors on the observed variables ranged from .57 to .88. To further

validate the factor structure, the analysis was repeated with an asymptotically distribution-free (ADF) estimation after removing cases with missing values on the advertising impact items (valid $n = 2,873$). ADF estimation performs well with large sample sizes (1,000 to 5,000 cases) even if data are nonnormal (Byrne, 2010). The results supported the three-factor structure: $\chi^2 = 149.91$, $df = 24$, $\chi^2 / df = 6.25$, $p < .001$, CFI = .96, RMSEA = .04 (90% CI .04 to .05).

Insert Table 1 about here

The first factor represented perceived impacts of advertising on gambling attitudes, interest, and behavior; and was consequently labelled ‘Involvement’. The second factor represented paying attention to gambling advertising and whether advertising affects people’s decisions to participate in gambling. The distinguishing feature of the second factor was that one of the items (i.e., Item 5) asked whether individuals paid attention to gambling advertising. Therefore, this factor was labeled ‘Awareness’. The third factor, labelled ‘Knowledge’, concerned people’s beliefs about whether advertising had increased their knowledge of gambling options and operators.

The mean ratings of the items that belonged to the Involvement factor (i.e., Items 1, 3, 4, 8, 9) indicated that participants, on average, felt their gambling attitudes, interest, and behavior were not strongly influenced by gambling advertising. Participants tended to agree with the two items that belonged to the Awareness factor (see mean values of Items 2 and 5 in Table 1). Since these items were negatively formulated (e.g., do *not* pay attention), the results indicated that gambling advertising was not very familiar to the ‘average’ gambler. Nevertheless, participants were inclined to report that gambling advertising increased their knowledge of gambling options and operators (‘Knowledge’ factor; Items 6 and 7). These preliminary conclusions were derived from ratings of the items averaged across all gamblers. The following sections investigate whether subgroups of gamblers differ in their judgments of

advertising impacts. For these analyses, participants' responses on the two items belonging to the Awareness factor (i.e., Items 2 and 5) were reverse coded, and a new index variable was computed by averaging the two reversed items. Higher values on this index variable represented higher awareness of gambling advertising.

Covariates of Advertising Impacts

The results of the three regression analyses to investigate associations between advertising impacts and gambling problems (dichotomous index; see 'Data Analysis' section), exposure to advertising, age, and gender are provided in Table 2.

Insert Table 2 about here

Gambling problems, advertising exposure, and age were associated with all factors of advertising impact. Gender was associated with the factors 'Involvement' and 'Knowledge'. Overall, the associations of the independent variables with advertising impacts were stronger for 'Involvement' and 'Knowledge' than for 'Awareness' (cf. R^2 values, Table 2). With regard to age, it was found that younger gamblers were more likely than older gamblers to report that advertising increased their gambling involvement ($\beta = -.16$) and knowledge ($\beta = -.22$). However, older gamblers were more likely than younger gamblers to report that they were aware of gambling advertising ($\beta = .07$). These findings provide partial support for Hypothesis 1 (age).

Concerning gender, the results indicated that male gamblers were more likely than female gamblers to report that advertising increased their involvement in gambling ($\beta = .04$) and their knowledge about gambling options and operators ($\beta = .09$). These findings provide partial support for Hypothesis 2 (gender). As for gambling problems, the findings indicated that moderate risk and problem gamblers were more likely than low risk and non-problem gamblers to report that advertising increased their involvement in gambling ($\beta = .17$). Associations with the factors 'Awareness' and 'Knowledge' were weak but significant (β

values of .07 and .02, respectively). Moderate risk and problem gamblers were more likely to report that advertising increased their knowledge about gambling options and operators and that they were aware of gambling advertising, compared to low risk and non-problem gamblers. These findings support Hypothesis 3 (gambling problems).

With regard to advertising exposure, those who reported having seen gambling advertising more frequently were also more likely to report that advertising increased their involvement in gambling ($\beta = .13$), their knowledge about gambling options and operators ($\beta = .35$), and that they were more aware of gambling ($\beta = .03$). These findings support Hypothesis 4 (advertising exposure).

Differences in Advertising Impacts Between Gambling Categories

The association between problem gambling and advertising impacts was investigated in further detail via three one-way ANOVAs. The aim of these analyses was to test for differences between gambling categories that were pooled in the dichotomous variable that entered the regression analyses. Each of the three ANOVAs investigated whether non-problem, low risk, moderate risk, and problem gamblers differed with respect to one of the three advertising impact factors.

Significant main effects were found for all three factors (see Table 3). A moderate effect ($\omega^2 = .07$) was found for 'Involvement', with perceived involvement increasing as a function of gambling problem severity. Small effects were found for 'Awareness' ($\omega^2 = .01$) and 'Knowledge' ($\omega^2 = .02$), with non-problem gamblers reporting lower awareness of gambling advertising and less increases in knowledge due to advertising than low risk, moderate risk, and problem gamblers. These findings provide further support for Hypothesis 3 (gambling problems).

Insert Table 3 about here

It has also been argued that problem gamblers may be more influenced by gambling advertising because they are more exposed to such advertising (Derevensky et al., 2007). An additional one-way ANOVA revealed that problem gamblers did not report more frequent exposure to gambling advertising than moderate risk and low risk gamblers. However, the latter three groups reported more frequent exposure than non-problem gamblers (see Table 3).

Discussion

This study investigated perceived impacts of gambling advertising and covariates in a sample of gamblers drawn from the general population in Norway. The few existing studies on this topic have predominantly used adolescent or clinical samples. The present study found that three factors of advertising impact could be distinguished. These were labeled 'Involvement', 'Awareness', and 'Knowledge'. The typical responses to the items belonging to the respective factors revealed that (overall) gamblers think gambling advertising increases their knowledge of gambling options and operators but does not strongly influence their gambling attitudes, interest, and behavior. In addition, participants tended to report that they were not very aware of gambling advertising. Taken together, the perceived impacts of gambling advertising were relatively weak and related mainly to gamblers' knowledge of gambling options and operators.

However, closer inspection of the data showed a more differentiated pattern, in that subgroups of gamblers differed with regard to perceived advertising impacts. Low risk, moderate risk, and problem gamblers were more likely than non-problem gamblers to agree that gambling advertising increased their gambling involvement and knowledge, and that they were aware of gambling advertising. Problem gamblers stood out as the group that was most likely to agree that advertising increased their involvement in gambling. This supports the hypothesis that advertising impacts increase with severity of gambling problems. In line with this finding, previous studies have shown that problem gambling is associated with stronger

perceived advertising impacts in adolescent samples (Derevensky et al., 2010; Derevensky et al., 2007) and that problem gamblers perceive gambling advertising as a trigger for their gambling participation (Binde, 2009; Grant & Kim, 2001).

While it has been argued that problem gamblers may be more affected by gambling advertising because they see or hear such advertisements more often (Derevensky et al., 2007), the data showed that problem gamblers did not report more frequent exposure to gambling advertising than moderate risk and low risk gamblers. Thus, the finding that problem gamblers report stronger impacts of advertising on gambling involvement than moderate risk, low risk, and non-problem gamblers cannot be attributed to differences in advertising exposure.

The present study does not provide any insight as to why problem gamblers may be more susceptible to gambling advertising than other groups of gamblers. Possible reasons might be that problem gamblers are more impulsive, more likely to hold erroneous beliefs about gambling (e.g., high chance of winning), and more interested in gambling (Derevensky et al., 2007). Furthermore, studies on attentional bias indicate that problem gamblers' attention might be automatically drawn to gambling-related stimuli (Hønsi et al., 2013; Molde et al., 2010). More research into these potential underlying reasons would be a welcome addition to the gambling studies field.

A more general finding with regard to advertising exposure was that gamblers who reported seeing gambling advertisements more frequently were also more likely to agree that advertising increased their gambling involvement and knowledge, and that they were aware of gambling advertising. These findings support the hypothesis that the impact of advertising increases with exposure to gambling advertising. One way in which frequent exposure to gambling advertising may increase gambling participation is through social learning (Bandura, 2001). Social learning refers to adopting behaviors from other people after having

observed others perform the behaviors and experience their consequences. Considering that many gambling advertisements display people gambling and experiencing positive outcomes (e.g., enjoyment from winning; Derevensky et al., 2007), frequent exposure to such advertisements may initiate and reinforce gambling participation (Monaghan & Derevensky, 2008). Another possible explanation is that frequent exposure to gambling advertising affects people's attitudes toward the adverts (Lee et al., 2008), the products that are promoted, and gambling in general. Previous research indicates that mere exposure (Zajonc, 1968) to advertisements can enhance people's attitudes toward the brands promoted in the advert (Janiszewski, 1993). Several studies have shown that attitudes toward gambling are positively associated with gambling participation (e.g., Hanss et al., 2014; Wood & Griffiths, 2004), and psychological theories, such as the theory of planned behavior (Ajzen, 1991), assume that people's attitude toward a behavior plays an important role in whether or not people decide to engage in the relevant behavior. Therefore, if frequent exposure to gambling advertising enhances people's attitudes toward the adverts and the products that are promoted, the adverts may also be effective in facilitating and/or stimulating gambling participation.

However, correlations between advertising exposure and perceived advertising impacts do not necessarily mean that observing adverts frequently increases one's receptivity towards them and the content therein. People who feel that advertising has had an effect on their gambling behavior may subsequently pay more attention to gambling advertisements. Alternatively, those people who gamble frequently may be more interested in gambling and may therefore pay more attention to – and find it easier to recall – information about gambling (Binde, 2007; Williams et al., 2012). Consequently, additional research is needed to investigate such assumptions.

With regard to age and gender, some evidence exists that younger people (Amey, 2001) and men (Derevensky et al., 2010) feel more influenced by gambling advertising than

older people and women. In the present study, being younger was associated with *stronger* perceived impacts on gambling involvement and knowledge, but *lower* awareness of gambling advertising. This finding appears somewhat inconsistent, however, it may be that younger gamblers' responses were more of an expression of their general beliefs about how much advertisements influence their everyday behaviors than a reflection of consciously experienced gambling advertising impacts. Another possible explanation relates to the interpretation of the 'Awareness' factor of advertising impacts. This factor may be interpreted as a methodological factor – considering that the two items belonging to the factor were negatively formulated – rather than in terms of being indicative of advertising awareness. Men were more likely than women to report that advertising had an impact on their gambling involvement and knowledge, but gender was unrelated to advertising awareness. Taken together, the associations between age, gender, and perceived advertising impacts are mixed (cf. also Derevensky et al., 2007) and provide only partial support for the hypotheses that younger age and male gender are associated with stronger advertising impacts. More investigation is required to draw more robust conclusions.

Limitations and Implications for Future Research

One obvious limitation of this research is that self-report measures were used to investigate advertising impacts. Because advertising may affect people on the level of pre-attentive processes (e.g., Griffiths, 2005; Janiszewski, 1993), self-reports may not be a good indicator of how much people are actually influenced by advertising. People may be particularly unaware of impacts by more indirect forms of advertising such as depictions of gambling in movies or celebrity testimonials (Monaghan, Derevensky, & Sklar, 2008). Problem gamblers may be more aware of advertising impacts on their behavior than recreational gamblers, because of their struggle with restraining from gambling (Binde, 2007). Self-reports may also be affected by self-serving motivated biases. For example, one study

found that participants thought that casino and lottery advertising had greater impact on other people than on themselves (Youn et al., 2000). Such systematic and self-serving differences in perceptions of the self and others are often referred to as *third-person effect* (Huh, Delorme, & Reid, 2004). In connection with mass media, this effect may be more pronounced if the audience regards being persuaded by the message as a sign of weakness or lack of intelligence, or if the communicator has an explicit persuasive intention or is perceived to be untrustworthy (Gunther, 1991; Youn et al., 2000). Furthermore, the use of self-report measures renders data vulnerable for common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In addition, there may be social desirability biases and recall biases. Therefore, future studies should try to utilize more objective indicators of advertising impacts assessed during actual advertisement exposure or immediately following situations of advertisement exposure. These indicators could include the monitoring of attention processes (e.g., captured by eye-tracking), arousal (e.g., operationalized by levels of skin conductance), behavioral reactions (e.g., high-risk behavior in an experimental gambling task), and behavior change (e.g., monitoring subsequent behavior using online behavioral tracking data).

Another limitation of this research is that the measure of advertising impacts did not distinguish between different gambling advertising media (e.g., television, radio, Internet), contexts (e.g., point-of-sale, sports sponsorship, gambling portrayal in films), content (e.g., humor, sexually provocative content, glamorous lifestyle), and design elements (e.g., use of bright colors, symbols of wealth, sounds of paid-out coins) (see Monaghan et al., 2008 for an overview over gambling advertisement features). Binde (2007) also noted that the impact of advertising may vary depending on whether the advertisement merely informs about a gambling product or aims to convey a certain image of the product or provider (e.g., linking casino gambling with a glamorous lifestyle). Whether advertising impacts differ as a function of such features remains an interesting question for future studies. Because gambling

operators increasingly use the Internet as a medium for promotional activities, investigating features of online advertisements and their impacts on gamblers' attitudes and behaviors constitutes a research topic with high relevance for academic researchers and policymakers alike. Another limitation pertaining to the measurement of advertising impacts was the relatively low reliability of the 'Awareness' subscale. Future studies should include additional variables in an attempt to increase the reliability of this subscale. Furthermore, the relatively low response rate obtained in this research (43.6%) somewhat limits the degree to which the findings can be generalized to a wider Norwegian public. However, it should be mentioned, that response rates in recent population surveys in Norway have been considerably lower than the one of the present study (for an overview see Pallesen, Hanss, Mentzoni, Molde, & Morken, 2014), and that response rates for national gambling surveys have been declining more generally (Wardle, Moody, Spence, et al., 2011)

Finally, this study used cross-sectional data, and, thus, the results do not allow the drawing of conclusions with regard to directionality in the associations found. Future research should include experimental designs to investigate whether specific features of gambling advertising influence gambling-related involvement and knowledge and people's awareness of the advertisements, and whether these influences differ between different subgroups of gamblers. However, as Planzer and Wardle (2012) have asserted, demonstrating the negative effects of gambling as solely attributable to advertising is hard to demonstrate empirically. They note that one of the reasons for this is because advertising effects are not uniform and 'maturity' and 'immaturity' of the market also have an impact. Despite these limitations, the present study has also had a number of strengths that deserve mentioning. More specifically, it is one of very few empirical studies that has investigated impacts of gambling advertising among different subgroups of gamblers. In addition, a major strength was that the study comprised a large sample in a European context.

Conclusions

The regulation of gambling advertising is hotly debated among researchers, prevention and treatment organizations, lobby groups, regulators, and politicians. Much of this debate seems to draw upon beliefs, norms, and values, given that empirical evidence relating to the impact of gambling advertising is scarce. Existing regulations appear to follow the precautionary principle in that they limit advertising activities that are assumed to have a potential for promoting harmful forms of gambling, particularly in vulnerable population groups such as adolescents or problem gamblers. Therefore, a science-informed regulatory approach is needed that uses empirical data to examine the relationship between gambling advertising and disordered gambling (Planzer & Wardle, 2012).

The present study makes an important contribution to the ongoing debate about gambling advertising. To the authors' knowledge, this is the first study to investigate perceived advertising impacts in a sample of gamblers drawn from the general population, including different age cohorts and subgroups of gamblers. With regard to policy-making, the main finding is that certain groups of gamblers (younger men, problem gamblers) feel particularly susceptible to gambling advertising. However, does such a finding justify political agendas to regulate, limit, or ban gambling advertising? On the one hand, the question of whether advertising *actually* affects gambling participation has yet to be answered (Williams et al., 2012). On the other hand, knowing that perceived susceptibility is higher in vulnerable groups of gamblers, and assuming that perceived susceptibility can undermine gamblers' self-efficacy beliefs and discourage those who attempt to discontinue gambling, the present findings may advocate demands for stricter regulatory measures.

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Table 1

Impact of Gambling Advertising: Factor Loadings (Principal Component Analysis with Oblique Direct Oblimin Rotation), Means, and Standard Deviations

Advertising Impact Item	Factors			<i>M</i> ^b	<i>SD</i>	<i>n</i>
	Factor 1	Factor 2	Factor 3			
	Involvement	Awareness	Knowledge			
	Item factor loadings					
1. I am more likely to gamble after seeing a gambling advertisement ^a	.799	-.194	-.307	1.79	0.94	5,943
2. Gambling advertisements do not influence my decision to gamble ^a	-.185	.846	-.054	2.99	1.19	5,947
3. Gambling advertisements increase my interest in gambling ^a	.867	-.147	-.299	1.65	0.90	5,930
4. Gambling advertisements make me think about gambling in the future ^a	.851	-.140	-.328	1.66	0.90	5,922
5. I don't pay attention to gambling advertisements ^a	-.146	.856	-.006	3.05	1.13	5,940
6. Gambling advertisement has increased my knowledge of gambling options	.359	.035	-.934	2.63	1.06	5,912
7. Gambling advertisement has increased my knowledge of gambling providers	.345	.029	-.934	2.60	1.11	5,900
8. I play with higher risk (use more money) because of gambling advertisements	.663	-.141	-.222	1.22	0.59	5,930
9. I think more positively about gambling because of gambling advertisements	.725	-.130	-.312	1.46	0.75	5,938
<i>M</i> factor index ^{b,c}	1.56	1.98	2.62			
<i>SD</i> factor index	0.65	1.00	1.01			
% <i>Var</i> ^d	39.69	17.63	12.50			

Note. ^a Item adopted from the EGAQ.

^b Answers were given on a four-point rating scale ranging from *strongly disagree* (1) to *strongly agree* (4).

^c Items 2 and 5 were reverse coded before the index for the Awareness factor was computed.

^d Factor loadings and explained variance are based upon a subsample of the data ($n = 3,018$); means and standard deviations are based upon the entire sample (cf. section Data Analysis).

Table 2

Multiple Linear Regressions of Advertising Impact

Independent Variables	Dependent Variables: Advertising Impact Factor Indices											
	Involvement				Awareness				Knowledge			
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>
Constant	1.69	0.04	-	42.60**	1.64	0.06	-	25.76**	2.61	0.06	-	45.70**
Gambling problems ^a	0.55	0.04	.17	13.69**	0.37	0.06	.07	5.70**	0.12	0.06	.02	2.10*
Advertising exposure	0.01	0.001	.13	9.80**	0.002	0.001	.03	2.01*	0.03	0.001	.35	28.53**
Age	-0.01	0.001	-.16	-12.59**	0.01	0.001	.07	5.25**	-0.02	0.001	-.22	-18.69**
Gender ^b	0.06	0.02	.04	3.35*	0.03	0.03	.02	1.26	0.18	0.02	.09	7.69**
adj. $R^2 = .10$; $F(4, 5925) = 162.38**$				adj. $R^2 = .01$; $F(4, 5944) = 15.34**$				adj. $R^2 = .24$; $F(4, 5905) = 455.36**$				

Note. * $p < .05$, ** $p < .001$

^a 0 = non-problem or low risk gambling, 1 = moderate risk or problem gambling.

^b female = 1, male = 2

Table 3

Differences in Advertising Impact and Advertising Exposure Between Non-problem, Risk, and Problem Gamblers

Advertising Impact Factor Index	Gambling Category according to PGSI												Welch <i>F</i>	ω^2
	Non-problem			Low Risk			Moderate Risk			Problem				
	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>M</i>	<i>SD</i>	<i>SE</i>		
Involvement	1.49 ^a	0.60	0.01	1.83 ^b	0.73	0.03	2.12 ^c	0.78	0.06	2.40 ^d	1.02	0.14	(3, 205.36) = 100.01*	.07
Awareness	1.93 ^a	1.001	0.01	2.19 ^b	0.96	0.04	2.28 ^b	0.83	0.06	2.43 ^b	1.02	0.14	(3, 209.89) = 27.53*	.01
Knowledge	2.55 ^a	1.02	0.01	2.93 ^b	0.92	0.03	3.04 ^b	0.91	0.06	3.03 ^b	1.02	0.14	(3, 203.60) = 51.82*	.02
Advertising exposure	16.10 ^a	12.18	0.17	20.22 ^b	12.48	0.46	21.89 ^b	12.40	0.87	21.44 ^b	14.25	1.89	(3, 214.16) = 36.91*	.02

Note. * $p < .001$

Higher mean values on the ‘Awareness’ index variable refer to *higher* awareness of gambling advertising.

One-way ANOVAs were conducted to test for differences in advertising impacts between gambling categories. Welch *F* statistics are reported because of unequal variances of the gambling categories (cf. Field, 2009). ω^2 can be interpreted as the proportion of variance that can be explained by gambling category. Hochberg’s GT2 was used as post hoc test because gambling categories differed considerably in size (numbers of people). Means displayed with different superscript letters are significantly different, $p < .05$.