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The Association Between Social Media Use and Hazardous Alcohol Use Among Youths: A Four-Country Study

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Abstract

Aims: To examine the continuing role of daily popular social media use in youth hazardous alcohol consumption in four countries across continents.

Methods: A web-based survey was given to youths aged 15–25 in the USA (n = 1212), South Korea (n = 1192), Finland (n = 1200) and Spain (n = 1212). Hazardous alcohol use (alcohol use disorders identification test-C) was the dependent variable. Main independent variables measured daily use of different social media services. Controls included compulsive Internet use, offline belonging, psychological distress, impulsivity, risk-taking, age and gender. Linear regression models and mediation analyses with bootstrapping were done for each country.

Results: Daily use of Facebook and Instagram was associated with higher hazardous alcohol use among youths in Finland, South Korea and Spain. Daily instant messaging was related to higher hazardous alcohol use among South Korean and Finnish youths. Daily YouTube use was associated with higher hazardous alcohol use among youths in South Korea, but lower hazardous alcohol use among youths in the USA and Finland. Daily Twitter use was related to lower hazardous drinking among youths in Finland but higher hazardous drinking among youths in Spain. The mediation analyses revealed that uploading pictures to social media is a possible facilitator of social media-related hazardous alcohol use among youths in the USA and Spain.

Conclusion: Certain social media platforms might inspire and/or attract hazardously drinking youths, contributing to the growing opportunities for social media interventions.

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INTRODUCTION

Social media and different social networking sites have become popular over the last decade. In particular, emerging adults (18–24-year-old) stand out in the ways they consume social media (Anderson and Jiang, 2018a; Smith and Anderson, 2018) and, as members of a generation who grew up with modern technological advancements, the majority of them are technologically savvy. Since the emergence of the first social media platforms (e.g. MSN Messenger, MySpace and Facebook), numerous new services have joined the market and offered faster, more efficient and sophisticated ways of communicating and sharing content.

According to the Pew Research Center, Americans aged 18–24 embrace various platforms and use them frequently. However, this age group is considerably more likely to use platforms such as Snapchat, Instagram and Twitter when compared to individuals aged 25 years and older, who are more likely to use Facebook. Half of the emerging adult social media users report it would be difficult for them to give up social media, underlining their value in young individuals' life (Smith and Anderson, 2018). The most popular online platforms among teens from 13- to 17-years-old are YouTube, Instagram and Snapchat. Altogether, 95% of American teens have access to a smartphone, and 45% report they are online 'almost constantly' (Anderson and Jiang, 2018b). Similar trends in social media use and smart phone access are recognized across countries. For instance, in Finland, 93% of 16- to 24-year-old youth use social media and nearly all of them have access to a smartphone (Official Statistics of Finland, 2017).

Social media platforms offer many benefits and they serve multiple roles in people's everyday life: they are forums for sharing and accessing information and news, keeping in touch with family and friends, and networking with different communities (Barker, 2009; Holt et al., 2013; Boyd, 2014; Boulianne, 2015). Social media platforms are typically classified into two broad categories: user-oriented and content-oriented (Pallis et al., 2011; Yoo et al., 2018). User-oriented social media, such as Facebook or Instagram, are based on people's relationships and content is mainly shared among users. In these types of social media, users typically have a visible identity. Content-oriented social media like YouTube or Twitter, establish networks around users' shared interests. In these types of platforms, people are mostly anonymous (Pallis et al., 2011; Yoo et al., 2018).

Routine use of social media is beneficial for young people, as it enhances communication and technical skills, increases learning opportunities and information seeking, as well as extends individuals' social connections (O'Keeffe and Clarke-Pearson, 2011). The consequences of social media use, however, are not all positive and using digital media can become risky, even dangerous, in many ways (Herr, 2007; Keipi et al., 2017). Past research has connected active youth social media use to harmful phenomena, such as cyberbullying and online hate (Ybarra and Mitchell, 2008; Oksanen et al., 2014; Whittaker and Kowalski, 2015; Kaakinen et al., 2018a), sexting (i.e. sending, receiving and forwarding content or images that are sexually implicit; Hasinoff, 2013) and violence (Patton et al., 2014).

Given the vast amount of content that spreads around social media, it seems inevitable that young individuals encounter harmful online content at some point. Much of this content is inherently related to alcohol and alcohol use, and influenced by alcohol marketing (Winpenny et al., 2013; Hoffman et al., 2014). By examining alcohol marketing in social media, past research has consistently shown a relation between youth social media use and increased alcohol consumption (Griffiths and Casswell, 2010; McCreanor et al., 2013; Jernigan and Rushman, 2014).

Although countries aim to regulate alcohol marketing in different ways, sophisticated advertisements and promotions of alcohol are visible on social media and other communication channels (WHO, 2010). Indeed, regulating alcohol marketing or otherwise alcohol-related content on social media has proven difficult (Nicholls, 2012). Different regulatory agencies, such as the Alcohol and Tobacco Tax and Trade Bureau in the USA or the Audiovisual Media Services Directive in Europe, in association with alcohol health campaigners, aim to raise awareness and reduce alcohol related harms through different media (European Centre for Monitoring Alcohol Marketing – EUCAM, 2018; Alcohol and Tobacco Tax and Trade Bureau, 2019). However, they struggle to keep pace with advertising and content that takes place in the dynamic social media environment that changes rapidly (Nicholls, 2012; EUCAM, 2018).

Youth also generate alcohol-related content themselves and share these related experiences, images and messages on their social media sites. One study found that out of a sample of 400 young users' online platform profiles, more than half (56%) contained references to alcohol use, frequently displaying motivating use of alcohol (Moreno et al., 2010). A recent meta-analysis by Curtis et al. (2018) concluded that among adolescents and young adults, exposure to substance use content in social media, as well as alcohol-related social media engagement were associated with higher self-reported drinking and alcohol problems. It is possible that social influence and behavioral diffusion (i.e. imitation through social learning; Bandura and Walters, 1977) take place through social media, thus, contributing to the spread of hazardous alcohol use among those young individuals who encounter alcohol-related content and who are susceptible to social influence.

Adolescents and especially emerging adults are in transition toward adulthood. They are more likely to explore identities, lifestyles and new habits (Arnett, 2000). Eventually, they are also more likely to engage in risky behaviors and succumb to peer pressure, leading to problems (Arnett, 2005; Blokland et al., 2005; Fergus et al., 2007; Oksanen et al., 2017). Much of these predispositions are credited to their higher impulsivity and risk-taking tendencies (Romer, 2010; Romer et al., 2011; Blakemore and Robbins, 2012; Fernie et al., 2013), related to immature brain development (Berns et al., 2009; Arain et al., 2013). Even though adolescents and young adults are insightful and have enormous potential to learn (Larson and Hansen, 2005), many engage in problem behaviors, including hazardous alcohol consumption (i.e. a pattern of alcohol consumption that includes a risk of detrimental consequences to the drinker (Babor and Higgins-Biddle, 2001). Past research has linked impulsivity and risk-taking tendencies to both social media use and increased drinking (Fernie et al., 2013; Wu et al., 2013; Patrick and Schulenberg, 2014; Richards et al., 2015).

In 2016, 9% of adolescents and 57% of young adults consumed alcohol in the past month in the USA (SAMHSA, 2018). Hazardous drinking of alcohol in any age group is a serious public health concern, but the risks heighten among young people, as they undergo important developmental stages (Plant, 2002). As past research shows, alcohol can impact brain development among adolescents, lead to risky behaviors, accidents, infectious diseases or even death (Plant, 2002; McMorris et al., 2011; Hallgren et al., 2012; NIHAAA, 2017).

Research has established a strong relationship between youth social media and alcohol use, but little research has focused on this association by separating different types of social media or possible features of social media that could help further to explain this relationship. The current research aims to fulfill this research

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gap and provide additional exploration of the relationship between social media use and youth alcohol consumption, while controlling for possible complex superseding variables: compulsive Internet use, psychological distress, offline belonging, impulsivity and risk-taking tendencies.

In effort to distinguish daily social media use from active Internet use in general, compulsive Internet use is accounted for. Additionally, compulsive or otherwise excessive Internet use has been associated with other harmful behaviors, including alcohol use (Mei et al., 2016; Morioka et al., 2017). High Internet use is also correlated with mental health problems, such as loneliness and depression (Bener and Bhugra, 2013; Gamez, 2014; Ciarrochi et al., 2016), negatively impacting psychological wellbeing (Van den Eijnden et al., 2008; Fioravanti et al., 2012; Best et al., 2014). Research on youth alcohol use, instead, has established a relationship between heavy alcohol use and lower psychological wellbeing (e.g. Wills et al., 1996; Chassin et al., 2002; Schulenberg and Maggs, 2002). On the other hand, young individuals who share similar drinking patterns perceive their friendships higher in quality, even if drinking is problematic (Stogner et al., 2015). These offline friendships may further influence youth drinking patterns (McGloin, 2009; Boman et al., 2013). Moreover, youth who have strong offline social relationships are better protected from the negative impact of harmful online content (Minkkinen et al., 2016; Kaakinen et al., 2018a, 2018b).

This research examines the relationship between youth hazardous alcohol use and different types of popular social media use in four countries: The United States, South Korea, Finland and Spain. To extend our understanding of additional elements of social media that might contribute to this relationship, we investigate whether the positive association between social media use and hazardous alcohol use is mediated by the tendency to share pictures of oneself on social media (Steers et al., 2019). The rationale for this possible mediating relationship lies in reciprocity: content is shared for other users to view and react to, which is a central element of social media. Sharing pictures online is a form of communication driven by social needs, and viewing and sharing photos often occur in tandem (Oeldorf-Hirsch and Sundar, 2016). Active users who upload pictures and post content frequently are also more active in interacting online and viewing and reacting to others' images. This could increase the amount of alcohol-related discussions, content and imagery circulating in social media and over-inflate drinking norms (Steers et al., 2019). Consequently, exposure to alcohol-related user-content may contribute to young users' hazardous alcohol consumption (Boyle et al., 2016; Erevik et al., 2018).

Our cross-national sample consists of technologically advanced countries in which youth engage in social media use to a similar extent (Statista, 2017, 2018a, 2018b, 2019; Anderson and Jiang, 2018b) and allows for testing whether the hypothesized relationships between social media and hazardous alcohol use can be observed across diverse cultural contexts. Given the cultural diversity of these countries (Western vs. Eastern, Nordic vs. Southern European), they offer interesting comparisons when observing social media related youth alcohol use.

METHOD

Participants

The participants were 15–25-year-old adolescents and young adults who entered the study from the USA (n = 1212, 50.17% female, M_{age} = 20.05, SD_{age} = 3.19) in January 2018, South Korea (n = 1192, 50.42% female, M_{age} = 20.61, SD_{age} = 3.24) in February 2018, Finland (n = 1200, 50% female, M_{age} = 21.29, SD_{age} = 2.85) in March–April 2017 and Spain (n = 1212, 48.76% female, M_{age} = 20.07, SD_{age} = 3.16) in January 2019. In order to achieve data that mirrored the current population estimates of each examined country, the data were demographically balanced for age, gender and living area in all four countries.

Procedure

Data collection was established by employing comprehensive web-based surveys. The participants were recruited from a volunteer participant pool administered by Dynata (formerly known as Survey Sampling International). The survey was designed in Finnish and in English. The survey consists of previously validated measures that have been widely used in comparative research. The accuracy and comparability of other items were guaranteed by the back-translation process. In 2018, the data collection expanded to South Korea and Spain, where proficient native Korean and Spanish speakers translated the English survey into Korean and Spanish. These surveys went through the back-translation procedures to assure the survey was internally consistent and the items matched accurately.

Measures

Hazardous alcohol use. The alcohol use disorders identification test (AUDIT-C) was used to measure hazardous alcohol use. The measure includes three questions about alcohol consumption: (1) "How often do you have a drink containing alcohol?" (2) "How many drinks containing alcohol do you have on a typical day when you are drinking?" and (3) "How often do you have six or more drinks on one occasion?" Each question brings 0–4 risk points. The measure is validated for several populations and provides a reliable and quick way to identify individuals with hazardous drinking habits (Bush et al., 1998; Rubinsky et al., 2013). The measure had good internal consistency ($\alpha = 0.87$ in the USA, $\alpha = 0.80$ in South Korea, $\alpha = 0.82$ in Finland and $\alpha = 0.81$ in Spain). The measure was used as a continuous variable in our main analyses. For additional logistic analyses, we dichotomized the variable using a cut-off score of ≥ 3 (Knight et al., 2003; de Meneses-Gaya et al., 2009).

Daily social media use was screened with the question: "How often do you use the following online sites and services?" The online platforms listed in the question were widespread and included Facebook, YouTube, Twitter, Periscope, Instagram, online dating services (e.g. Tinder), instant messaging (e.g. WhatsApp, Snapchat), entertainment streaming services (e.g. Netflix, Amazon video), news sites, general discussion forums, online gaming sites and communities, dark web, online casino sites and online gambling forums or gambling communities. Answers were provided on a scale ranging from 0 to 3 (0 = I do not use, 1 = seldom, 2 = daily and 3 = several times a day). Out of all the social media services screened, five were chosen for the study analyses on the basis of their global popularity, type of orientation and functional capabilities. The social media services included in the analyses were: Facebook, YouTube, Twitter, Instagram and Instant messaging. Each response scale was recoded into a dummy variable in order to separate the daily users from the less active social media users (0 = non-daily user, 1 = daily user).

Uploading pictures was measured with the question "How often do you upload pictures of yourself into social media?" Answers were provided on a Likert scale ranging from 0 (never) to 7 (daily). In order to distinguish those who upload pictures of themselves to

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social media frequently, the variable was dichotomized (0 = never to monthly, 1 = at least once a week). The variable was treated as a mediator in our binary mediation analysis.

Compulsive Internet use was measured with the compulsive Internet use scale (CIUS). The scale consists of 14 items, which target the consequences and states of mind related to Internet use (Meerkerk et al., 2009; Lopez-Fernandez et al., 2019). The scale has good psychometric properties. Responses range on a five-point scale from 0 (never) to 4 (very often), with a higher score indicating compulsive Internet use. The scale has excellent internal consistency ($\alpha = 0.95$ in the USA, $\alpha = 0.94$ in South Korea, $\alpha = 0.94$ in Finland and $\alpha = 0.93$ in Spain).

Offline belonging. To measure and account for the participants' social disposition, we employed the question "How strongly do you feel you belong to the following?" Items included "family," "friendship group," and "school or work community". Strength of belonging was indicated on a scale from 1 (not at all) to 10 (very strongly). The variable was turned into a sum-composite.

Impulsivity. The Eysenck impulsivity scale (Eysenck and Eysenck, 1977) was used to measure impulsive behavior patterns. The measure consisted of five items each targeting different aspects of impulsive behavior. Answer options were dichotomous (1 = yes, 0 = no) and the range of the scale varies from 0 to 5. The scale has good psychometric properties (MacKillop et al., 2006) and it is widely used in research studies examining the role of impulsivity in different problem behaviors (Auger et al., 2010; Dussault et al., 2011). Cronbach's alpha coefficients for the scale were 0.69 in the USA, 0.63 in South Korea, 0.74 in Finland and 0.66 in Spain.

Psychological distress. The General Health Questionnaire, GHQ-12 (Goldberg et al., 1997; Pevalin, 2000) was used to measure psychological distress. The questionnaire is extensively used in mental health research when assessing mental well-being and screening for individuals' likelihood of having, or being at risk of developing, a psychiatric disorder. The measure is designed to detect common mental health problems, such as depression, anxiety and social withdrawal (Werneke et al., 2000). A total of 12 questions with a four-point scale (0 = better than usual, 3 = much less than usual) screen for psychological well-being. A higher score indicates higher psychological distress. The scale has good internal consistency ($\alpha = 0.88$ in the USA, $\alpha = 0.86$ in South Korea, $\alpha = 0.88$ in Finland and $\alpha = 0.86$ in Spain) and reliability.

Risk-taking. A single-item measure was utilized to screen for risk-taking tendencies. The item stated "I enjoy taking risks" to which the participants were asked to provide an answer on a scale from 1 (not very true of me) to 10 (very true of me). The item was drawn from the National Longitudinal Survey of Youth −79 and has been determined a valid measure for risk-taking behaviors (Hawdon et al., 2018; Savimäki et al., 2018).

Statistical analysis

Stata 15.1 software was used to analyze the relationship between daily use of different types of social media and hazardous alcohol use. Descriptive statistics are provided for all target variables as means (*M*) and standard deviations (SD) for continuous variables and as frequencies (*n*) and relational proportions (%) for categorical variables (Table 1). We conducted a linear regression analysis for daily social media use and the AUDIT-C sum variable. The assumptions of ordinary least squares regression were met, but due to heteroscedasticity of the residuals, we ran the models using Huber-White standard errors (i.e. robust standard errors). Analyses were run separately for each social media type to observe possible differences between distinctive forms of social media and their relationship to hazardous alcohol consumption. Individual analyses were conducted for each country to accurately compare the observed effects (Table 2).

We also tested our regression models separately for two age groups: those between 15- and 17-years-old and those between 18- and 25-years-old. Alternative logistic regression analyses were run to observe the results for those young people whose drinking behavior was classified as hazardous (received ≥3 on the AUDIT-C [Knight et al., 2003; de Meneses-Gaya et al., 2009]). These results are provided in Table 3.

An additional binary mediation analysis with a 2000-replication bootstrap was conducted to examine whether the relationship between daily social media use and hazardous alcohol consumption is mediated by pictures young individuals upload of themselves to their social media accounts. The binary mediation analyses were conducted for daily Facebook use and daily Instagram use only. These two social media platforms were chosen for additional analysis due to their global popularity, and because they represent user-oriented social media, where users interact socially, as well as create and share content (Yoo et al., 2018). Thus, Facebook and Instagram exemplify platforms through which users most typically upload and share pictures with others.

RESULTS

Descriptive statistics showed that the mean hazardous alcohol use score (AUDIT-C) was highest in Finland, followed by South Korea, Spain and the USA. Our multivariate analyses discovered that hazardous alcohol use and daily social media use were related in distinctive ways, depending on the social media service used. Daily use of Facebook was a significant predictor of higher hazardous alcohol use in three countries: Finland, South Korea and Spain. A statistically significant association was also found in the USA when adjusting for all controls, except for offline belonging ($B = 0.26$, $P = 0.032$), but the final model lacked statistical significance ($B = 0.23$, $P = 0.070$). Daily use of YouTube was related to lower hazardous alcohol use in the USA and Finland. In South Korea, daily use of YouTube was related to higher hazardous alcohol use. No relationship was observed in the Spanish sample. Daily use of Twitter was associated with higher hazardous alcohol use among the Spanish sample. Among the Finnish sample, daily Twitter use was related to lower hazardous alcohol use. In South Korea and the USA, no significant association between daily Twitter use and hazardous alcohol use was observed.

Daily Instagram use was associated with higher hazardous alcohol use in South Korea, Finland and Spain. In the USA, daily Instagram use did not predict hazardous alcohol use. Daily instant messaging was a significant predictor of higher hazardous alcohol use in Finland and South Korea.

As an additional investigation, we ran the analyses separately for two age groups: those between 15 and 17-years-old and those between 18- and 25-years old (these results not reported in tables). In the USA, daily YouTube use was associated with lower hazardous drinking only among the 18–25 age group ($B = -0.44$, $P = 0.005$). In South Korea, daily use of Facebook, YouTube, Instagram and instant messaging were associated with higher hazardous alcohol use only among the 18–25 age group ($B = 1.4$, $P < 0.001$; $B = 0.71$, $P = 0.001$; $B = 1.1$, $P < 0.001$; $B = 0.99$, $P < 0.001$, respectively). In Finland, daily use of Facebook, Instagram and instant messaging were associated with higher hazardous alcohol use only among the 18–25 age group ($B = 0.53$, $P = 0.001$; $B = 0.39$, $P = 0.026$;

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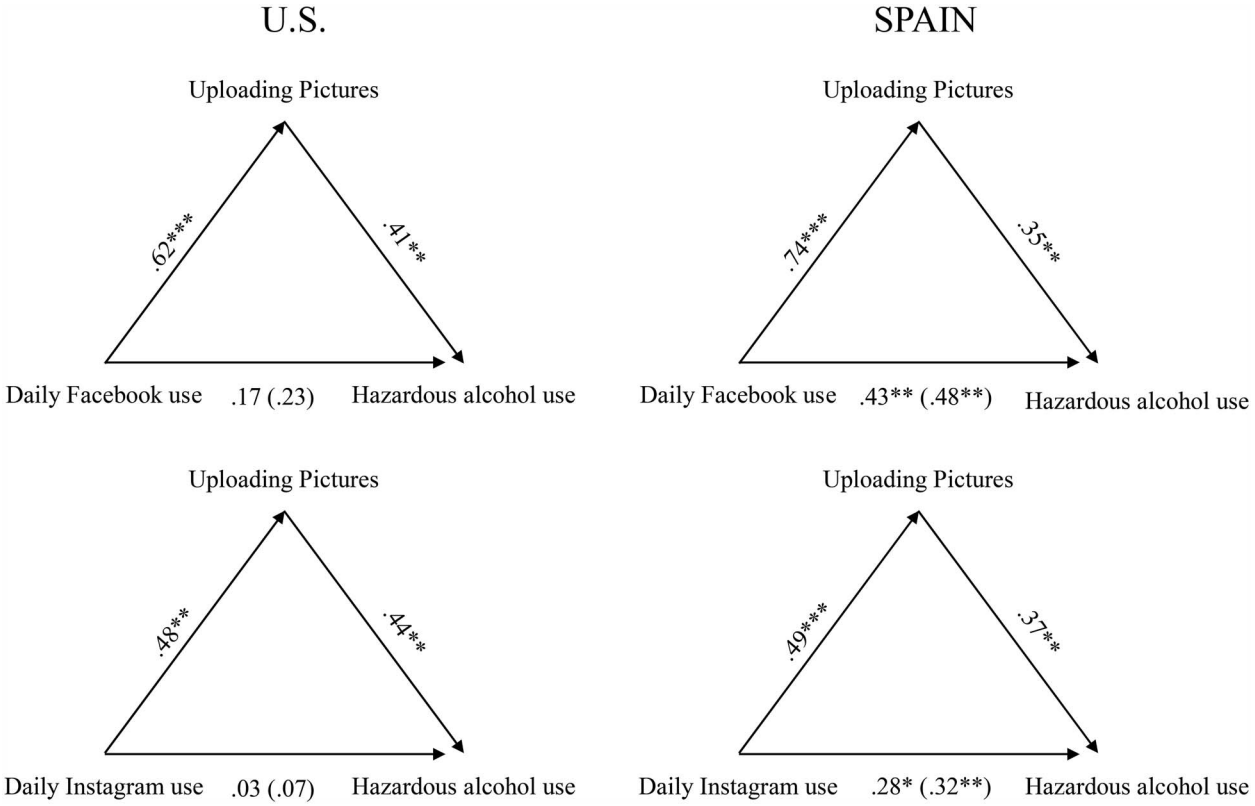


Fig. 1. Mediation effects between daily Facebook use, daily Instagram use, and hazardous alcohol use via uploading pictures to social media in the U.S. and Spain.

Table 1. Descriptive statistics

	United States			South Korea			Finland			Spain		
Variable	*M*	SD	Range	*M*	SD	Range	*M*	SD	Range	*M*	SD	Range
AUDIT-C	1.80	2.30	0–12	3.20	3.15	0–12	3.36	2.69	0–12	2.29	2.17	0–12
Daily social media use	1.52	1.41	0–5	2.18	1.42	0–5	1.84	1.26	0–5	2.18	1.42	0–5
Offline belonging	20.33	6.70	3–30	21.33	5.82	3–30	20.19	6.14	3–30	21.34	5.81	3–30
CIUS	21.72	13.54	0–56	22.13	12.63	0–56	18.79	11.13	0–56	22.17	12.66	0–56
GHQ-12	13.48	6.75	0–36	13.92	6.45	0–36	14.15	6.34	0–36	13.92	6.44	0–36
Impulsivity	2.55	1.42	0–5	2.68	1.34	0–5	2.64	1.46	0–5	2.68	1.34	0–5
Risk-taking	5.74	2.30	1–10	5.40	2.28	1–10	5.12	2.28	1–10	5.40	2.28	1–10
Age	20.05	3.19	15–25	20.61	3.24	15–25	21.29	2.85	15–25	20.07	3.16	15–25
Cat. variables	Coding	*n*	%	Coding	*n*	%	Coding	*n*	%	Coding	*n*	%
Gender	Male	604	49.83	Male	591	49.58	Male	600	50	Male	621	51.24
	Female	608	50.17	Female	601	50.42	Female	600	50	Female	591	48.76
Daily Facebook	Yes	448	36.96	Yes	254	21.10	Yes	490	40.83	Yes	255	21.04
Daily YouTube	Yes	445	36.72	Yes	549	45.60	Yes	435	36.25	Yes	552	45.54
Daily Twitter	Yes	206	17.00	Yes	249	20.68	Yes	90	7.50	Yes	251	20.71
Daily Instagram	Yes	372	30.69	Yes	698	57.97	Yes	388	32.33	Yes	702	57.92
Daily instant msg.	Yes	381	31.44	Yes	877	72.84	Yes	800	66.67	Yes	882	72.77
Upload pictures	Yes	362	29.87	Yes	350	29.07	Yes	115	9.58	Yes	355	29.29

Note. AUDIT-C = Alcohol use disorders identification test, CIUS = compulsive internet use scale and GHQ-12 = general health questionnaire. Daily Instant msg. = Daily instant messaging.

$B = 0.68$, $P < 0.001$, respectively). Also, among Finnish 18–25-year olds, daily YouTube use was associated with lower hazardous alcohol use ($B = -0.52$, $P = 0.002$) and daily Instagram use was associated with higher hazardous alcohol use ($B = 0.30$, $P = 0.034$).

According to our mediation tests (Fig. 1), the indirect effects between daily Facebook use and higher hazardous alcohol use via uploading pictures to social media were significant in the USA ($B = 0.41$, SE = 0.13, 95% confidence interval – CI [0.15, 0.68]) and

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Table 2. Direct regression effects predicting hazardous alcohol use based on social media type in four countries

	United States				South Korea				Finland				Spain			
	B	SE	*β*	*P*	*B*	SE	*β*	*P*	*B*	SE	*β*	*P*	*B*	SE	*β*	*P*
Facebook	0.23	0.12	0.05	0.070	1.14	0.19	0.16	<0.001	0.49	0.15	0.09	0.001	0.48	0.15	0.09	0.002
YouTube	−0.33	0.11	−0.07	0.005	0.72	0.18	0.11	<0.001	−0.44	0.15	−0.08	0.005	0.03	0.11	0.01	0.770
Twitter	0.28	0.15	0.05	0.065	−0.25	0.28	−0.02	0.385	−0.77	0.26	−0.08	0.004	0.31	0.15	0.06	0.043
Instagram	0.07	0.12	0.01	0.587	1.40	0.23	0.14	<0.001	0.34	0.15	0.06	0.031	0.32	0.11	0.07	0.007
Instant msg.	0.12	0.13	0.02	0.356	0.87	0.18	0.14	<0.001	0.67	0.16	0.12	<0.001	−0.04	0.13	−0.01	0.752

Note. Effects calculated separately for each social media. All the regression models were adjusted by compulsive Internet use, offline belonging, psychological distress, impulsivity, risk-taking, age, and gender. Instant msg. = Instant messaging; *B* = unstandardized regression weights; *β* = standardized beta coefficient.

Table 3. Logistic regression effects predicting hazardous alcohol use based on social media type in four countries

	United States				South Korea				Finland				Spain			
	B	SE	OR	*P*	*B*	SE	OR	*P*	*B*	SE	OR	*P*	*B*	SE	OR	*P*
Facebook	0.22	0.15	1.2	0.140	0.66	0.14	1.9	<0.001	0.52	0.13	1.7	<0.001	0.36	0.17	1.4	0.036
YouTube	−0.40	0.15	0.67	0.007	0.49	0.13	1.6	<0.001	−0.40	0.13	0.67	0.003	0.11	0.14	1.1	0.440
Twitter	0.18	0.17	1.2	0.336	−0.37	0.23	0.70	0.106	−0.65	0.25	0.52	0.009	0.32	0.17	1.4	0.054
Instagram	0.07	0.15	1.1	0.641	0.57	0.17	1.8	0.001	0.33	0.14	1.4	0.014	0.29	0.15	1.3	0.051
Instant msg.	0.08	0.15	1.1	0.597	0.53	0.13	1.7	<0.001	0.58	0.14	1.8	<0.001	−0.28	−0.16	0.76	0.752

Note. Effects calculated separately for each social media. All the regression models were adjusted by compulsive Internet use, offline belonging, psychological distress, impulsivity, risk-taking, age and gender. Instant msg. = instant messaging; *B* = unstandardized regression weights and *β* = standardized beta coefficient.

Spain ($B = 0.35$, SE = 0.13, 95% CI [0.10, 0.60]). The bootstrapped indirect effect of daily Facebook use via uploading pictures to social media was 0.011, with a 95% CI [0.002, 0.022] in the USA sample and 0.012 with a 95% CI [0.001, 0.022] in the Spanish sample. Similarly, the mediation analyses indicated an indirect significant relationship between daily Instagram use and higher hazardous alcohol use via uploading pictures to social media among youth in the USA ($B = 0.44$, SE = 0.13, 95% CI [0.17, 0.70]) and Spain ($B = 0.37$, SE = 0.13, 95% CI [0.12, 0.62]). The bootstrapped indirect effect of daily Instagram use via uploading pictures to social media was 0.010 with a 95% CI [0.001, 0.018] in the USA and 0.010 with a 95% CI [0.00, 0.019] in Spain. Among the South Korean and Finnish samples, no indirect effects were found in terms of daily Facebook or daily Instagram use and hazardous alcohol use.

DISCUSSION

This research study examined the relationship between hazardous alcohol use and daily use of popular social media platforms among youth in the USA, South Korea, Finland and Spain. By doing so, this study aimed to contribute to the existing literature and respond to the lack of investigation in how different social media may facilitate and enhance alcohol use among youth around the world. Our results revealed that daily Facebook use was consistently associated with higher hazardous alcohol consumption among young individuals in three countries: South Korea, Finland and Spain, but not directly in the USA. Similarly, daily Instagram use was associated with higher youth hazardous alcohol consumption in South Korea, Finland and Spain, but no direct effect was observed in the USA. Daily instant messaging was strongly linked to higher youth hazardous drinking in South Korea and Finland.

Daily Twitter use was significantly related to higher hazardous alcohol use in Spain, but this relationship did not remain significant after splitting the sample into smaller age-groups; those under and over 18 years. The direction was similar among the USA sample, although the relationship did not remain statistically significant after controlling for compulsive Internet use, offline belonging, psychological distress, impulsivity, risk-taking, age and gender. In Finland, daily Twitter use was related to lower hazardous alcohol use. Daily YouTube use was associated with lower hazardous alcohol use among youth in the USA and Finland, but higher hazardous alcohol use among youth in South Korea. By investigating these associations with two separate age groups, we were able to observe some additional differences between daily social media use and hazardous alcohol use. It seems that emerging adults, in particular, are at risk when it comes to active social media use and hazardous drinking. These results might indicate that young adults (≥18 years of age) have increased access to alcohol products.

These cross-nationally varying relationships between hazardous alcohol use and types of social media offer an opening for critical interpretation. First and foremost, these results provide insight into the diverse user-cultures that prevail within different social media. While user-oriented social media (Facebook, Instagram and instant messaging) rely on social interaction among users, and content created and disseminated by users, content-oriented social media (Twitter and YouTube), provide content that can be viewed and navigated by users without anticipated reciprocal interaction (Yoo et al., 2018). It is likely that different platforms attract distinct types of users, creating unique, even polarized, user-groups within them (i.e. those using Facebook or YouTube focus mostly on these platforms for their specific capabilities). Correspondingly, it is possible that youths who are hazardous drinkers prefer certain social media platforms over others due to unique features.

These user-cultures might also explain some of the variation observed in our results across the different countries. While these platforms are used in a similar fashion across the four countries, they

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might attract very specific types of users depending on the context of the country. For instance, YouTube users in different parts of South Korea might be motivated to use the platform for unique underlying reasons, when compared to youth across different states in the USA or areas of Finland. This might also partly explain our nonsignificant direct findings within the USA sample. It is possible that populations that are more likely to engage in heavy drinking within the country context, such as college students (Slutske, 2005; Hingson, 2010), utilize platforms like Facebook and Instagram for content generation and sharing, or the gratification received from using them. However, our sample did not capture these individuals specifically. Given the high number of social media users and different patterns of use, these speculations should be made cautiously.

According to our results, user-oriented social media use is most consistently related to higher youth hazardous alcohol use. This suggests that these types of social media possess some inherent features allowing the association to surface. We propose that one possible feature is behavior-inspiring imagery, through which the mechanisms of social influence and social learning are relayed. Social media can enable learning experiences in different ways, including by setting examples through images and exchanging experiences (O'Keeffe et al., 2011; Moreno et al., 2013). We also tested this by analyzing whether uploading pictures to social media mediates the relationship between daily social media use and hazardous alcohol consumption among young individuals. This was the case in two of the countries examined: the USA and Spain. Social networking and social media are undeniably pleasurable and positive aspects in young people's life (McCreanor et al., 2013), but they do seem to create environments that are alcohol-promoting and thus contribute to youth hazardous drinking. Consequently, social media can function as behavior-changing agents for young individuals.

It is reasonable that youth who party and engage in drinking, and then post-related images to social media, are not doing so because of social media, but for other underlying reasons. However, user-oriented social media in particular allows the drinking and partying posts to be disseminated to wide audiences and, thus, are likely to influence and further spread youth drinking behavior among other youths encountering the content. Furthermore, content encountered in user-oriented social media is typically created and disseminated by the user's own pre-known offline contacts (friends, family, acquaintances, etc.), which may increase the impact and meaning the content has on the user. Content viewed in content-oriented social media, on the other hand, is most commonly created by individuals outside the user's own offline networks or otherwise unknown to the user.

Content-oriented social media (e.g. YouTube) might be a safer type of social media in general; it allows users to search and view specific topics and content that are of interest to them (e.g. hobbies, product information, politics, etc.; Yoo et al., 2018). In the stream of user-oriented social media, the user cannot as accurately determine and choose what type of content she or he encounters. Our findings further suggest that different platforms attract and circulate different type of behavior-influencing content (Kaplan and Haenlein, 2010; Murthy, 2012; Fuchs, 2017). Given their limited self-regulation capacity and susceptibility to social influence (O'Keeffe and Clarke–Pearson, 2011), we argue that young individuals are at risk of adopting alcohol-use behavior if they see images, messages or circulating challenges in which alcohol is consumed or promoted in a socially desirable way. To some extent, the findings mirror prior research findings showing that active social media use is associated with youth alcohol consumption (e.g. Ali and Dwyer, 2010; Rosenquist et al., 2010; Moreno and Whitehill, 2014; Hoffman et al., 2017).

Some study limitations should be acknowledged. Even with robust cross-national samples, our study was a cross-sectional survey, so causal interpretations cannot be made. In addition, our data are based on self-reported surveys, which are sensitive to social desirability bias. A further limitation is the lack of objective measures of social media use and exposure to alcohol-related content, creating a need for future research. The associations found in our study were relatively weak, however, it should be noted that our findings concerning the association between the use of social media services in general (not particularly alcohol-related use) and alcohol consumption were replicated in four different countries. Our mediation analyses were only significant in the USA and Spain, which might indicate existing differences among youth cultures in those countries versus their counterparts in South Korea and Finland. Future research should aim to replicate these findings in different settings and examine if a mediation effect can be found.

While the AUDIT-C is a validated and reliable screening tool for risky alcohol consumption, it has some limitations. Past research has called into question the appropriateness of brief screening tools, especially those based on questions of consumption, in effort to detect hazardous alcohol use among young people (McCambridge and Thomas, 2009). Additionally, variability in alcohol use behavior during younger years, such as higher levels of binge drinking, or heavy episodic drinking, during adolescence and college-years, may compromise the predictive value of the tool (Kelly et al., 2009; Barry et al., 2015).

The outcomes of active social media use and youth hazardous alcohol use are complex at best, and more research is needed to better understand the possible causal effects between them. Future qualitative research could provide meaningful and deeper understanding on the aforementioned relationships. Another future direction could examine the perceptions and attitudes young people have toward alcohol-related postings and content. While this study analyzed the independent associations between four different social media services and hazardous alcohol use, examining user-oriented and content-oriented social media users as separate groups could be important in future research.

The results of this study help to form a better understanding on how and what type of social media platforms may inspire hazardous alcohol use among young individuals or, in contrast, attract those individuals who already are heavy drinkers. The results emphasize a need for more regulatory vigor from the social media sites in effort to limit the amount and spread of pro-alcohol content. These findings also contribute to the growing opportunities for implementing intervention methods within different social media, where adolescent and young adult populations spend much of their time. For instance, user-oriented social media profiles could be assessed for interplay patterns to identify at-risk or hazardously drinking individuals (Moreno and Whitehill, 2014). Analogous to the spread of alcohol-content, health-promotion and prevention messages could be delivered through social media. Intervention methods, such as peer-group interventions, taking place in the virtual context might improve youth engagement in such programs. This could increase the reach and impact of prevention and intervention initiatives.

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CONFLICT OF INTEREST STATEMENT

None declared.

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