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Is exposure to online content depicting risky behavior related to viewers' own risky behavior offline?☆

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A B S T R A C T

There are public and governmental concerns that social media may encourage risky behavior in the offline environment. Using international survey data from 412 young adults aged between 18 and 25 years of age ($M = 21.20$ years, $SD = 2.31$ years), this study demonstrates that there is a relationship between exposure to online content depicting risky behavior and users' own offline risky behavior. This relationship was found for six behaviors: drug use, excessive alcohol use, disordered eating, self-harm, violence to others, and dangerous pranks. A borderline effect was found for two further behaviors: unprotected sex and sex with a stranger. The relationship between content depicting disordered eating and offline behavior was only significant for females; suggesting that female users may be more vulnerable to effects of viewing content depicting disordered eating habits, and/or use social media content to find material related to their existing behavior. No other gender moderation effects were found. The findings provide preliminary evidence that social media use may influence offline risky behavior in young adults.

1. Introduction

Previous research has linked social media use to online behavior that is perceived to be 'risky' or to put the individual 'at risk'. These risks include, for example, revealing too much personal information (O'Keeffe & Clarke-Pearson, 2011), exchanging sexual content with strangers (Baumgartner, Valkenburg, & Peter, 2010), and sharing content which could negatively impact upon the user's career (Pujazon-Zazik & Park, 2010). There are however also concerns that social media use may exert its influence beyond the online world and influence offline behavior for example, unprotected sex and sex with strangers (Young & Jordan, 2013), excessive alcohol consumption (Moreno, Briner, Williams, Walker, & Christakis, 2009), self-harm (Dunlop, More, & Romer, 2011; Luxton, June, & Fairall, 2012), and eating disorders (Borzekowski, Schenk, Wilson, & Peebles, 2010). Despite existing concerns there is limited research demonstrating a link between social media use and offline risky behavior; and existing research has been limited to using intention/willingness as a measure of future behavior. Young and Jordan (2013) identified the need for research to measure behavior itself. This study addresses this gap in the literature by using a measure of behavior and investigating whether there is a relationship between the type of content viewed on social media and congruent offline risky behavior. For example, we examine whether users exposed to content encouraging excessive drinking tend to drink to excess. The study investigates all current social media platforms (excluding gaming and virtual worlds/role play platforms) and a wide range of risky behaviors (excessive alcohol consumption, illegal drug use, disordered eating, self-harm, violence, unprotected sex, sex with strangers, engaging in dangerous pranks, and bullying or directing hatred towards specific individuals/groups).

Existing theories such as social learning theory (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979; Bandura, 1977, pp. 1–46) can help explain why a relationship between social media use and risky behavior may exist. Social learning theory emphasises the importance of exposure to and internalisation of behavior through observational learning (what individuals see and may imitate) and instrumental learning (how behaviors are reinforced through

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rewards or punishment from others). If individuals are exposed to risky behavior and pro-risky behavior reactions from others, they are more likely to engage in that behavior due to social learning. Although reinforcers of behavior can be non-social (e.g., direct effects of the behavior such as the effect of drugs on the user), social learning theory posits that the principle behavioral effects are a result of social reinforcers (Akers et al., 1979). Social media provides a platform through which users may be exposed to risky behavior, and also other peoples' reactions and attitudes towards risky behavior. Facilitative peer influence can also occur when information from peers makes it easier for the individual to engage in risky behavior for example through providing information on obtaining necessary items (such as drugs/alcohol) or procedural instructions on how to carry out the behavior (Cox & Cox, 1998). This also fits with other behavioral theories such as the theory of planned behavior (Ajzen, 1991) as peer influence can feed into normative beliefs about the behavior and attitudes towards the behavior, whilst facilitative (or informational) peer influence could affect perceived behavioral control (i.e., the individuals perceptions about their ability to conduct the behavior).

This study involves an international sample of young adults from 18 to 25 years of age. Media speculation and public concern suggests that younger users may be more prone to negative influences of the internet and social media (O'Regan, 2014; Topping, 2014). From adolescence onwards, peer group replaces family members as the most important source for social learning (Koon-Magnin, Bowers, Langhinrichsen-Rohling, & Arata, 2016), with adolescence representing a period that can influence future adult behavior (Brook, Whiteman, Czeisler, Shapiro, & Cohen, 1997). The current study therefore includes peer behavior as an additional predictor of risky behavior to identify whether exposure to social media content depicting risky behavior predicts users' own risky behavior above-and-beyond social learning from peers. Risk taking propensity (Meertens & Lion, 2008) is also controlled for in this study. Previous research shows a consistent relationship between gender and risky behavior, with males engaging in risky behavior at a higher rate than females (Browne & Hamilton-Giachritsis, 2005; Koon-Magnin et al., 2016). There are also gender differences in the type of activities that users engage in online (e.g., females more likely to use social media to communicate with pre-existing friends whereas males are more likely to use it for information seeking, making new contacts and entertainment: Branley, 2015; Pujazon-Zazik & Park, 2010). This suggests that there may be gender differences in the type of risky opportunities that arise from users' social media use. Therefore, in the current study, gender is included as a potential moderator of the relationship between exposure to online content depicting risky behavior and users' own behavior.

In summary, this research addresses the following two questions:

1. Does exposure to social media content depicting risky behavior predict users' own engagement in that behavior in the offline environment?
2. Is the relationship between exposure to social media content depicting risky behavior and users' own risky behavior stronger for males?

It is acknowledged that demonstrating a link between exposure to online content and behavior does not provide evidence for a causal link. However as there is very little empirical research in this area, this research represents a first step towards investigating whether a relationship does exist; therefore laying the foundations on which future research can build to identify the *nature* of that relationship.

2. Method

2.1. Sample and survey methodology

An online survey was used to collect data from a diverse sample of 1228 international social media users. Of the original sample, 126 participants were excluded due to not proceeding past the initial demographics page of the survey. From this sample we selected young adults aged between 18 and 25 years ($N = 412$, $M = 21.20$ years, $SD = 2.31$ years). Females accounted for 71.1% ($n = 293$) of the sample, and males accounted for 28.9% ($n = 119$). The majority of participants were from the UK and Ireland (47.6%) and the USA (24.8%). Full demographics are provided in Appendix A.

To be eligible to participate, users were required to be fluent English speakers and to have accessed social media at least once in the last 3-month period. Social media was defined as 'social networking websites and digital applications that enable people, identified by user profiles, to share information. This information can be in the form of 'status updates', messages, news, data, images, audio, maps, comments, video content and so on' and it included the following: Social Networking Sites (e.g., Facebook, Myspace, Google+); Blogging and Microblogging platforms (e.g., Twitter, Tumblr, WordPress); Photo and video-sharing platforms (e.g., Instagram, Pinterest, YouTube); and Location-based platforms (e.g., Foursquare, Facebook Places). These platform sub-types are based upon those identified by Kaplan and Haenlein (2010). Participants were instructed not to include the use of online games and virtual worlds such as Second Life and World of Warcraft because they involve more extreme elements of anonymity, fantasy and role play not traditionally associated with social media where there is generally an expectation that user profiles are at least somewhat representative of the users 'real' (offline) identity (Back et al., 2010; Hardey, 2011). The focus of the current research is to investigate the effect of mainstream, non-gaming/non-fantasy online environments. Participants reported using a wide range of social media applications (Appendix B). Over 93.2% of the participants actively used Facebook. The patterns shown are largely representative of the popularity of the individual social media sites (Lenhart, Purcell, Smith, & Zickuhr, 2010).

The survey was designed by the authors and reviewed by an expert within the field of social media research. The survey was also piloted on a small sample of participants via opportunistic sampling and feedback was obtained regarding the clarity of the survey items and any difficulties encountered by the participants. The survey was revised following this feedback and all necessary amendments were made and piloted prior to recruitment. To help maintain participants interest and to encourage completion of the entire survey, interesting and/or humorous facts were displayed throughout the survey (a technique detailed in Branley, Covey, & Hardey, 2014).

To reach a wide audience of users, the survey was administered online and recruitment took place through a wide range of online platforms (Appendix C). Snowball sampling was also used to help roll out the survey by encouraging participants to share the link to the survey through their social media channels. Snowball sampling is particularly effective when used via social media as these platforms enable users to easily and conveniently share the study with everyone in their social circle.

The survey was completed anonymously, with participants reassured that they would not be identifiable in their answers or in any subsequent reporting of the research. This is one of the most common methods of measuring risky behavior. Reassuring participants of anonymity and confidentiality should help to limit the effect of social desirability bias on participants responses (Davis, Thake, & Vilhena, 2010). Although social desirability is not likely to be eliminated completely, the bias is likely to result in participants under-reporting risky behavior – therefore it should not affect the validity of a significant result. It is important to note that any relationships that are found are likely to underestimate the prevalence of risky behavior and/or the strength of the relationship between social media content and offline behavior (Davis et al., 2010).

As aforementioned, the sample included more females than males. Whilst research suggests that this is representative of social media users (Kimbrough, Guadagno, Muscanell, & Dill, 2013), recent findings also suggest that this gender difference is diminishing (Branley, 2015). Therefore, it is also possible that the greater number of female participants could be – at least partially – due to a gender difference in responding to questionnaires (e.g., Hill, Roberts, Ewings, & Gunnell, 1997). Males still accounted for almost 29% of the sample; therefore this gender difference was not considered problematic.

2.2. Measures and scoring

a. Offline risky behavior (DV)

Offline risky behavior was measured by asking participants "In the last 12 months, how often have you done the following?" Five response options were provided: 0 (never), 1 (rarely), 2 (occasionally), 3 (frequently) and 4 (very frequently). The risky behaviors included: illegal drug use, excessive alcohol consumption, extreme dieting or disordered eating, self-harm, violence on others (e.g., fighting or inflicting harm), unprotected sex, sex with a stranger, dangerous pranks, and bullying or hatred towards specific individuals or groups (e.g., racism).

b. Exposure to content depicting risky behavior

Online exposure to content depicting risky behavior was tested as the main predictor of users' own offline risky behavior. This was measured by asking users to answer the following question in relation to the same list of risky behaviors used for the dependent variable: "Whilst using social media, how often do you come across material that encourages the following behaviors? This can include material that is supportive of these behaviors, encourages and/or provides instruction on how to partake in these behaviors or simply portrays these behaviors in a positive light for example by portraying the behavior as 'fun', 'enjoyable', 'cool', 'fashionable' etc." Five response options were provided: 0 (never), 1 (rarely), 2 (occasionally), 3 (frequently) and 4 (very frequently).

As aforementioned, existing research suggests that peer behavior and risk taking propensity are likely to influence risk taking. These factors are controlled for during the analyses, to identify whether exposure to congruent content online predicts offline behavior above-and-beyond peer behavior and risk propensity.

c. Peers' risky behavior

Peers' risky behavior was measured by asking participants the following question: "To the best of your knowledge, have any of your friends done any of the following things within the last 12 months?" Again, the list of behaviors was the same as used for the dependent variable (and online exposure). Answers were scored as 0 (none of my friends have done this), 1 (know of one friend who has done this) or 2 (know of more than one friend that has done this).

d. Risk propensity score

Tendency to engage in risks was measured using Meertens and Lion's (2008) Risk Propensity Scale (RPS; $\alpha = 0.80$).

3. Results

Prior to analysis, missing data was tested for randomness using Little's MCAR (Missing Completely At Random) test. The results were non-significant indicating that the data was missing completely at random. Consequently, any missing data was addressed using Maximum Likelihood Estimation which has been shown to be a reliable method for dealing with missing data, superior to the deletion of incomplete cases (Enders & Bandalos, 2001).

For the analysis of the data obtained from the two frequency measures (offline risky behavior and online exposure) the responses obtained were recoded into binary variables with two levels (i.e., 0 = have done the following in the last 12 months/have never been exposed to this type of content when using social media and 1 = have done the following in the last 12 months/have been exposed online to this type of content when using social media). This is because participants might have interpreted the response options provided very differently. For example, 'frequently' could be interpreted by some participants as 'once a week' or by others as 'once a month'. Without an unambiguous quantitative reference, the measures are more reliably understood as binary measures of the risky behavior (i.e., whether or not the participant has taken part in the risky behavior in the last 12 months, and whether or not they have been exposed to online content congruent with that type of behavior).

Hierarchical logistic regression analyses were used to identify the predictors for each specific offline risky behavior in turn (Table 1). The Step 1 predictors were: online exposure to the specific behavior, age, gender, risk propensity and peer behavior. As aforementioned (section 2.2), risk propensity and peer behavior were included in order to control for these variables. A gender x online exposure interaction term was then added at Step 2 to test whether gender moderates the relationship between online exposure to content depicting risky behavior and offline behavior. Effect coding (rather than dummy coding) was used for the categorical variables (i.e., −1 = male, 1 = female; −1 = never viewed this type of content whilst using social media, 1 = has viewed this type of content whilst using social media). Although the interaction term was only included in the model if it was significant, this allows us to interpret the effect-coded coefficients as main effects. This is because when there is an interaction term in the model the coefficient tells us what the effect of gender (or exposure) is when the value of exposure (or gender) is zero (0). Since zero (0) is the mean of the two categories of gender (or exposure) the coefficient is a main effect – the effect of gender (or exposure) at the mean value of exposure (or gender).

The results show that online exposure is a significant direct predictor of offline risky behavior for six of the nine risky behaviors included in this study (Table 1): drug use, excessive alcohol use, disordered eating, self-harm, violence to others, and dangerous pranks. The effect was borderline for a further two behaviors: unprotected sex and sex with a stranger.

A significant moderation effect of gender was only found for disordered eating with post-hoc simple effects tests showing that exposure was a significant predictor for females ($OR = 2.184$, $p < 0.01$) but not for males ($OR = 1.148$, $p > 0.05$).

4. Discussion

This study aimed to identify whether there is a link between the content that users are exposed to on social media and their own offline risky behavior and whether there are any gender differences in the strength of this relationship. The findings suggest that there is a strong direct link between online exposure to content depicting risky behavior and users' own engagement in congruent risky behavior in the offline environment for the majority of the

Table 1
Results of logistic regression analysis: Odds-ratios with significance levels for each predictor of offline risky behavior (0 = has never done this type of behavior in the last 12 months, 1 = has done this type of behavior in the last 12 months).

	Drug Use (1)	Excessive Alcohol (2)	Disordered Eating (3)	Self-Harm (4)	Violence to Others (5)	Unprotected Sex (6)	Sex with a Stranger (7)	Dangerous Pranks (8)	Bullying (9)
Age	1.041	1.146*	0.973	0.984	1.020	1.024	1.002	1.021	0.852*
RPS score	1.030**	1.049***	0.997	0.987	1.017	1.007	1.042**	1.040**	1.014
Peer Behavior[a]									
(1 vs. 2)	20.3***	3.24**	4.058***	3.83***	4.279***	9.560***	3.460**	4.439***	15.64***
(1 vs. 3)	30.2***	18.8***	3.531***	2.27*	2.574*	8.782***	3.721**	8.836***	18.13***
Gender[b]	0.694**	0.835	0.801	0.937	0.692*	0.823	0.609***	0.679**	0.807
Exposure[b]	1.640**	3.025***	1.573**	1.712***	1.445*	1.248†	1.284†	1.580*	1.204
Exposure x Gender	–	–	1.412*	–	–	–	–	–	–
(Exposure@Male)			(1.148)						
(Exposure@Female)			(2.184**)						
Nagelkerke R^2	37.4%	38.5%	19.6%	20.8%	17.7%	30.3%	21.6%	35.2%	36.8%

Notes: †p<0.10. *p < 0.05, **p < 0.01, ***p < 0.001.
[a] 1 = not aware of any friends who have done this, 2 = know of one friend who has done this, 3 = know of more than one friend who has done this.
[b] Effect coding (rather than dummy coding) was used for these categorical variables (i.e., −1 = male, 1 = female; −1 = never viewed this type of content whilst using social media, 1 = has viewed this type of content whilst using social media). Effect-coded coefficients can be interpreted as main effects whether the interaction term is included in the model or not.

behaviors included in this study: drug use, excessive alcohol use, disordered eating, self-harm, violence to others, and dangerous pranks. The relationship was borderline for unprotected sex and sex with a stranger but not significant for bullying.

Exposure to social media content and offline behavior was moderated by gender for one of the behaviors, disordered eating; with online exposure being a significant predictor for females but not for males. This suggests that females could be more influenced by exposure to content around disordered eating. Alternatively, they may be more likely to seek out congruent content prior to, or following, engagement in risky behavior.

These findings suggest that some concerns over the influence of the online environment *may* be justified. However, it is important to note that it is not possible to determine causality from this research. It is not clear whether viewing risk-related content online has a direct causal influence upon offline behavior. There are other potential explanations. For example, individuals who already engage in risky behavior (or have a desire to) may be more likely to actively seek risk-related content online. Future research should seek to identify methods to determine the direction of the relationship, i.e., whether exposure to the online content tends to precede, coincide with, or follow the offline risky behavior. For example, participants could be asked to report when they first saw online content encouraging a specific risky behavior and then asked to report the first time they remember engaging in that behavior. Alternatively a longitudinal study could be used to track social media use and behavior over time (Cox & Cox, 1998). In doing so, the researchers may be able to identify which behavior occurred first. It may also be helpful to distinguish between online content that participants' actively search for and content that they were unintentionally exposed to through their general social media use. This may help to further explain the mechanisms underpinning the link between social media and offline behavior, for example whether content is influencing average, everyday users of social media or whether this relationship mainly exists for users who are specifically seeking out risk-related information therefore suggesting pre-existing motivation prior to accessing the content.

To summarise, the findings show a strong relationship between online exposure to content depicting risky behavior and users' own engagement in risky behavior in the offline environment, suggesting that content on social media may influence behavior (and/or users may actively seek risk-related content prior to and/or following engagement in risky behavior). These findings lay the foundations for future research to investigate the mechanisms behind this relationship in more depth.

Appendices

Appendix A. Sample demographics (N = 412).

Country	n	% of sample
United Kingdom & Ireland	196	47.6
United States of America	102	24.8
Canada	31	7.5
Germany	7	1.7
India	7	1.7
Hong Kong	5	1.2
China	4	1
Netherlands	4	1
Russian Federation	4	1
Other (59 countries, each <1% of sample)	52	12.5

Appendix B. Number and percentage of participants using each social media platform

Platform	No profile	Inactive profile (not accessed in last 3 months)	Active profile (accessed in last 3 months)	% of total sample with active profile
Facebook	17	11	384	93.2
YouTube	68	49	295	71.6
Twitter	88	55	269	65.3
Instagram	197	29	186	45.1
Tumblr	253	44	115	27.9
Google+	185	113	114	27.7
LinkedIn	252	48	112	27.2
Pinterest	287	30	95	23.1
WordPress	335	39	38	9.2
Photobucket	283	92	37	9
Flickr	341	42	29	7
Blogger	341	52	19	4.6
Vimeo	372	22	18	4.4
FourSquare	373	24	15	3.6
MySpace	229	172	11	2.7
GoogleLat	386	17	9	2.2
LiveJournal	362	45	5	1.2
Bebo	313	96	3	0.7
Tagged	384	26	2	0.5
Other active profile	370	n/a	42	10.2

Appendix C. Sources for recruitment.

1. Websites and forums: e.g., GradCafe, Social Research Forum, The StudentRoom.
2. Dedicated participation sites: e.g., Social Psychology Network, Online Psychology Research.
3. Social media including Facebook, Twitter, Instagram and LinkedIn (including LinkedIn research interest groups, e.g., PhD survey support, Psychology students, PhD students, Academia PhD network)
4. Mailing lists: e.g., Association of Internet Researchers mailing list and Psychology Postgraduate Affairs Group mailing list.
5. University student participation pool: A university provided website that allows postgraduates to advertise their studies to undergraduate students, who can participate to gain credits necessary to pass to the next stage of their degree.

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