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Using Attitudes and Social Norms to Explain the Association between the Use of Social Networking Sites and Alcohol Abuse among Belgian Adolescents

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Abstract

Both consuming alcohol and using social networking sites (SNS) are popular pastimes among adolescents. The current cross-sectional study ($N=3133$) aims to explore the relation between being exposed to and displaying alcohol-related content on SNS with alcohol abuse among adolescents age 16-20. First, the results support that displaying alcohol-related content on SNS is more strongly associated with alcohol abuse than exposure to this kind of content. Furthermore, the associations of both exposure to and displaying alcohol-related content on SNS with alcohol abuse are mediated through both perceived social norms of friends and attitudes towards excessive alcohol consumption. Yet, whereas alcohol-attitudes and social norms seemed to be equally important mediators in the relation between exposure to alcohol-related content on SNS and alcohol abuse, the association between displaying alcohol-related content on SNS and alcohol abuse seemed to be mediated predominantly through a change in alcohol-related attitudes. Overall, this study sheds more light on the complex relations between SNS use and risky drinking behavior among adolescents.

Keywords: alcohol, social networking sites, adolescents, attitudes, social norms

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Europe is the heaviest drinking region of the world (WHO, 2014). Despite the fact that alcohol can cause much harm, adolescent alcohol consumption is usually tolerated and accepted (Steketee, Jonkman, Berten, & Vettenburg, 2013; WHO, 2014). Though most European countries have set the minimum age for alcohol consumption at 18, Belgium is one of the few countries where the legal age to drink wine and beer is 16. Over 60% of European adolescents aged 15 or younger have already consumed alcohol, while only 50% of US adolescents of this age group have (Degenhardt et al., 2008; WHO, 2014). When looking specifically at Belgian adolescents, the prevalence of underage alcohol consumption is comparable to the European average, and increases to roughly 90% among older adolescents (age 17-18) (Degenhardt et al., 2008; VAD, 2015). By the age of 21, approximately 90% of European and 93% of US emerging adults consume alcohol (Degenhardt et al., 2008).

Content analyses show that images of peers consuming alcohol or updates on drinking and related going out behavior are likely to be encountered when visiting social networking sites (SNS) (Beullens & Schepers, 2013; Moreno et al., 2010) and it has recently been suggested that visiting SNS and consuming alcohol in adolescence may be related. Up until now, only a limited number of studies have examined this relationship (e.g., Huang, Soto, Fujimoto, & Valente, 2014; Huang, Unger, et al., 2014; Moreno, Christakis, Egan, Brockman, & Becker, 2012; Ridout, Campbell, & Ellis, 2012). This study aims to contribute to the existing research on social media use and risk behavior in, at least, three ways. A first contribution is the focus on alcohol use during adolescence. So far, only a very limited amount of prior research on SNS and alcohol use has focused on adolescent drinking behavior (Huang, Soto, et al., 2014; Huang, Unger, et al., 2014). Most studies either focus on college student drinking behavior (e.g.,

Glassman, 2012; Ridout et al., 2012) or adolescents' alcohol-related cognitions (e.g. Litt & Stock, 2011).

Furthermore, this study will focus on *problematic* alcohol use among adolescents. Up until now, the association of SNS with problematic alcohol use has only been investigated among college students (Moreno et al., 2012; Ridout et al., 2012). However, European adolescents too consume alcohol regularly and in large quantities (Steketee et al., 2013; VAD, 2015).

A third contribution is the fact that the current study takes into account that not all adolescents use SNS in the same way. To date, much of the literature either investigates the influence of being exposed to alcohol-related content on SNS (Fournier, Hall, Rieke, & Storey, 2013; Huang, Soto, et al., 2014; Huang, Unger, et al., 2014) or the influence of displaying alcohol-related content on SNS (Moreno et al., 2012; Ridout et al., 2012), but none systematically examine and compare the pathways through which both actions might be related to alcohol consumption.

The Relationship Between Using SNS and Alcohol Abuse

Several content analyses have indicated that alcohol use is omnipresent on SNS, with up to 95% of the SNS-profiles containing references to alcohol use (Beullens & Schepers, 2013; Moreno et al., 2010). These references portray alcohol in a predominantly positive context, and reactions to these posts appear to be positive as well (Beullens & Schepers, 2013; Moreno et al., 2010). Following the Facebook Influence Model (Moreno, Kota, Schoohs, & Whitehill, 2013), being exposed to these positive alcohol messages may affect adolescents. In particular, Moreno and colleagues discerned four large domains through which SNS (and Facebook in particular) may have an impact on their users. First, because youngsters are connected with their peers through their use of SNS, any message (including alcohol-related messages) can spread fast and easily across their network, reaching more people than when the same message was spread through interpersonal means. Second, Moreno et al. (2013) argue that SNS have

particular features (e.g., ubiquitous accessibility, news feature with constant updates) which make it a very addictive experience. These specificities lead to the fact that almost all adolescents visit SNS multiple times a day, changing the nature of communication from face-to-face to screen-to-screen.

Third, Facebook can also affect identity development (Moreno, Kota, et al., 2013). On the one hand, it allows for its users to express their identity and to be heard. On the other hand, it may also have an influence on the identity exploration and formation itself, as users actively shape their online identity and share aspects of themselves that they may not share in offline life, such as excessive alcohol consumption. Finally, Facebook is used as a tool for comparison, satisfying people's curiosity about others by allowing them to watch each other without the other knowing. However, by seeing the tangible 'evidence' of each other's behavior (e.g., alcohol use), individual's perceptions of normal behavior may change (Berkowitz, 2004).

Considering these potential domains of social media influence, it is especially relevant to examine whether and how using SNS is related with *adolescents'* alcohol abuse, since it has been argued that adolescent risk behavior is heavily influenced by peer influences (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Pfeifer et al., 2011; Steinberg, 2008). As social media content is created and displayed by peers in the network of the adolescent, exposure to status updates and pictures displaying peers' alcohol use may be related to adolescent alcohol abuse. Yet, as indicated by Moreno et al. (2013), SNS also play an important role in adolescents' identity construction, as SNS allow and encourage the active creation and distribution of content, a feature adolescents use regularly (ACMA, 2013). This active creation of an alcohol identity on SNS may be a reflection of actual alcohol use (e.g., Glassman, 2012; Ridout et al., 2012). However, self-generated media effects theory (Valkenburg & Peter, 2013) posits that creating and sharing media content can also affect the attitudes, cognitions and

behavior of the creator of the content, either directly, or indirectly through positive feedback from peers.

Following this line of reasoning, both exposure to alcohol-related content on SNS made by others and adolescents' own displays of alcohol-related references may be related to adolescent alcohol abuse. To our knowledge, no other research has examined and compared both of these behaviors in relation to adolescent alcohol abuse. Yet, there is some initial evidence indicating that adolescents' SNS use is positively associated with alcohol-related cognitions and intentions (e.g., Beullens & Vandebosch, 2015; Fournier et al., 2013; Glassman, 2012; Litt & Stock, 2011). Extending this line of research we expect that:

Hypothesis 1: Both exposure to alcohol-related content on SNS and displaying alcohol-related content on SNS predict adolescents' alcohol abuse.

Potential Pathways Explaining the Relation Between Using SNS and Alcohol Abuse

In addition to determining the association between different types of SNS use and alcohol abuse, the current study aims to examine two different pathways through which these relations may occur, namely through attitudes and social norms.

The Attitude Pathway

Attitudes, defined as evaluative judgements of behavior and thoughts, have been shown to play an important role in predicting alcohol consumption (e.g., Houben, Havermans, & Wiers, 2010; Ostafin, Kassman, de Jong, & van Hemel-Ruiter, 2014), and are constructed by analyzing the available attitude-relevant information (Bohner & Dickel, 2011). In the social media context, one source of attitude-relevant information stems from the own behavior of creating and displaying alcohol-related content. Several authors (Griffiths & Casswell, 2010; Ridout et al., 2012) have argued that adolescents share alcohol-related content on their social media profiles in order to consciously portray themselves as someone who is favorable towards drinking and partying. Following self-perception theory (Bern, 1972), this act of posting

alcohol-related content, may eventually result in real-life alcohol consumption, through a change in respondents' attitudes.

Self-perception theory posits that individuals can unconsciously persuade themselves to change their own attitudes and behavior to reflect their communication, because they use their own behavior as a valid source of evidence for their beliefs and attitudes (Bern, 1972). There is some empirical evidence suggesting that individuals indeed internalize certain aspects of their self-presentations in a way that can alter their self-concept (Kelly & Rodriguez, 2006; Moreno, Kacvinsky, Pumper, Wachowski, & Whitehill, 2013; Tice, 1992). In line with these findings, we expect that sharing alcohol-related content on SNS may affect adolescents' attitudes, which in turn predict their engagement in alcohol abuse:

H₂: The relation between displaying alcohol-related content and alcohol abuse is mediated by a more positive attitude towards alcohol use.

However, not all adolescents use their SNS-profiles to actively construct an alcohol-identity and some are only passively exposed to the alcohol-related content their friends are posting. Though they may not consciously and intentionally seek out images and text messages of alcohol-consuming friends, they are likely to encounter peers' alcohol-related content online, because of the high prevalence of alcohol-references on SNS (Beullens & Schepers, 2013; Moreno et al., 2010). The exposure to these alcohol-references may also affect attitudes towards alcohol, as alcohol is usually portrayed positively (Beullens & Schepers, 2013; Moreno et al., 2010). By being repeatedly exposed to these positive portrayals of alcohol, adolescents may learn to associate alcohol use with positive outcomes, resulting in more positive attitudes towards alcohol (Walther, Weil, & Düsing, 2011). In line with this hypothesis we expect that:

H₃: The positive relation between exposure to alcohol-related content on SNS and alcohol abuse is mediated by alcohol attitudes.

The Social Norms Pathway

Considering that many behavioral change theories consider both attitudes and social norms to lie at the base of behavior (e.g., Ajzen, 1991; Gibbons, Gerrard, Blanton, & Russell, 1998), it is also relevant to study perceived social norms as a mediator of the relationship between the portrayal of alcohol on SNS and alcohol abuse. Social norms are the perception of the extent to which peers are supportive of certain behavior (Berkowitz, 2004). According to the social norms theory (Berkowitz, 2004; Perkins & Berkowitz, 1986), individuals observing a minority engaging in highly visible risk behavior remember this behavior more vividly and recall it more quickly than the responsible and common behavior. Therefore, repeated exposure to alcohol-references on SNS may alter the perception of which behavior is characteristic for most people and how socially accepted this behavior is, which may affect the likelihood that adolescents engage in excessive alcohol consumption. Limited evidence for this assumption has already been reported by Litt and Stock (2011) and Beullens and Vandebosch (2015). In line with these findings, it is hypothesized that:

H₄: The relation between being exposed to alcohol-related content on SNS and alcohol abuse is mediated by perceived social norms regarding excessive alcohol consumption.

Finally, displaying alcohol-related content on SNS may affect the perceived social norms of the displayer as well. It has been argued that a minority engaging in unhealthy behavior, such as heavy drinking, is likely to incorrectly perceive most others to be like themselves (Berkowitz, 2004; Ross, Greene, & House, 1977). This false consensus belief is a self-serving bias, allowing individuals to deny that their behavior or attitudes are problematic. It has been argued that the more alarming the behavior and the more passionate the communication about the behavior, the stronger the false consensus belief that the deviant behavior is the norm, especially if the majority not engaging in the risk behavior remain silent (Berkowitz, 2004). Thus, considering that displaying alcohol-related content on SNS is part of the online identity

construction (Griffiths & Casswell, 2010; Ridout et al., 2012) and other SNS users are most likely to ignore alcohol-related content they find inappropriate or disagree with (Wolfer, 2014), displaying alcohol-related content on SNS is likely to affect false consensus beliefs, with higher perceived social norms regarding alcohol use as a result. This line of reasoning results in the following hypothesis:

H₅: The relation between displaying alcohol-related content and alcohol abuse is mediated by perceived social norms with regard to alcohol consumption.

The current study substantially extends the literature in this domain of research, first, by examining the association between both displaying and exposure to alcohol-related content on SNS with alcohol abuse. Second, both attitudes and social norms are examined as mediators of these relationships. Lastly, the current study adds to the existing research by systematically comparing the strength of these different pathways. All hypotheses will be tested while controlling for age, gender and sensation seeking, because these constructs have previously been shown to be related to both SNS use and alcohol consumption (Beullens & Vandebosch, 2015; Huang, Unger, et al., 2014; Moreno et al., 2012; Peluchette & Karl, 2009; Ridout et al., 2012). Together, the knowledge gained from this study will help to identify which SNS uses are a better indicator of alcohol abuse, which may help in identifying those adolescents who are most at risk for developing alcohol-related problems.

Method

Sample

Data were collected among a sample of 3172 adolescents, distributed over 49 secondary schools selected in Belgium. All adolescents of the 5th, 6th and 7th year of the selected high schools were asked to participate in a study on leisure activities, such as media use and going out behavior. If they agreed to participate, they were asked to complete a paper-and-pencil questionnaire during school time with a teacher and research assistant present. The research

assistant explained what was expected of the adolescents, assured the confidentiality of the data and distributed and collected the surveys. The study was approved by the ethical review board of the authors' institution.

In total, 3172 adolescents completed the questionnaire, of which 50.7% was male. 24.4% of the respondents was 16 years old, 44.7% was 17 years old, 22% was 18 years old, 6% was 19 years old and 2% was 20 years old. One percent of the respondents ($n=33$) was either younger than 16 or older than 20 and 6 respondents did not share their age. They were deleted from the sample, so that it would only contain late adolescents. Thus, the total sample on which the analyses of the current study were conducted, consisted of 3133 adolescents with a mean age of 17.14 ($SD=.92$). Half of the adolescents were in the general secondary education system (52.9%). The other half were either in the technical (22.9%) or in the vocational education system (24.2%).

Measures

Exposure to alcohol-related content on SNS. In line with Beullens and Vandenberg (2015) exposure to alcohol-related content was measured with 12 items: 'How often do you encounter...' and 'How often do your friends share...' (a) photos or movie clips referring to going out, (b) textual updates referring to going out, (c) photos or movie clips referring to alcohol use, (d) textual updates referring to alcohol use, (e) photos or movie clips in which they are drunk, (f) textual updates while they are drunk. Responses ranged from (0) 'never' to (6) 'several times a day'. Going out behavior and (excessive) alcohol consumption are considered to be closely related (e.g., Hebden, Lyons, Goodwin, & McCreanor, 2015; VAD, 2013) and factor analysis (principal components; eigenvalue=6.78; explained variance=56.52) confirmed that all items composed one, reliable factor ($\alpha=.94$).

Displaying alcohol-related content on SNS. Displaying alcohol-related content on SNS was measured by using a similar scale and response options as exposure to alcohol-related

content. The questions asked ‘How often do you privately share the following things on any social medium?’ and ‘How often do you publicly share the following things on any social medium?’, followed by items a-f of the exposure measure. ‘Private sharing’ was defined as ‘references shared with a limited amount of people, e.g., through communication via direct messaging, private groups, or group chats’. All 12 items loaded onto one factor (principal components, eigenvalue=7.53, explained variance=62.78) with good internal reliability ($\alpha=.94$).

Alcohol abuse. The AUDIT scale (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) was used to measure alcohol abuse. AUDIT uses 10 questions to screen for hazardous alcohol use (e.g., frequency of heavy drinking), dependence symptoms (e.g., morning drinking) and harmful alcohol use (e.g., alcohol-related injuries). Most questions (e.g., how often do you have six or more standard drinks on one occasion?) use 5-point likert-scales (see Babor et al., 2001, for a full description of the scale). The theoretical maximum score is 40, and a score of 8 or more indicates that the respondent is at risk for problem drinking. All 10 questions loaded onto one factor (principal components, eigenvalue=4.37, explained variance=43.71) with good internal reliability ($\alpha=.84$).

Social Norms. In line with what has been proposed by Fishbein and Ajzen (2010), adolescents were asked to indicate on a 7-point semantic differential scale whether their friends would (1) disapprove or (7) approve of them (a) consuming alcohol, (b) getting drunk, and (c) engaging in binge drinking. All 3 items loaded onto one factor (principal components, eigenvalue=2.16, explained variance=72.03) with good internal reliability ($\alpha=.80$).

Alcohol attitude. In line with theory of planned behavior questionnaire guidelines (Fishbein & Ajzen, 2010), alcohol attitude was measured by asking respondents to indicate how they felt about someone their age (a) getting drunk and (b) engaging in binge drinking. Five adjective pairs (abnormal – normal, harmful – harmless, not fun – fun, bad – good, not cool – cool) were

offered for both (a) and (b). For each adjective pair, respondents had to indicate on a 7-point scale whether they agreed more with the adjective on the left or the one on the right. Factor analysis (principal components, eigenvalue=4.91, explained variance=49.13) indicated that all items loaded onto one factor with good internal reliability ($\alpha=.88$).

Control variables. Adolescents were asked to indicate their age (open question) and gender (0=male, 1=female). Furthermore, sensation seeking was assessed with the previously shown reliable and valid 8-item Brief Sensation-Seeking Scale (BSSS) (Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002). A principal components analysis with oblique rotation indicated that all items but one ('I get restless when I spend too much time alone') loaded onto one factor (eigenvalue=3.14, variance explained=44.75), and reliability analyses confirmed that the internal reliability was highest when that item was removed ($\alpha=.79$). Therefore, we continued our analyses with 7 items.

Analyses

SPSS was used for all analyses. First, descriptive statistics and bootstrapped (1000 samples) correlation analyses were calculated. Second, in order to test the hypotheses, a multiple mediation model was examined. Because the primary research interest was in testing specific paths rather than in assessing overall model fit, we used the Hayes' (2013) PROCESS macro (bootstrapped, 1000 samples). This macro provides a convenient way to conduct conditional process analyses in SPSS and generates results similar to when these models would be estimated with SEM programs. Multicollinearity was checked as proposed by Field (2009) and was not found to be a problem: The largest VIF was 1.37, which is much smaller than 10, the average VIF was not substantially greater than 1 ($VIF_{\text{average}}=1.23$) and there was no tolerance below .2 (smallest tolerance=.73).

Results

Descriptive Analyses

TABLE 1 ABOUT HERE

Table 1 displays the descriptive statistics and bootstrapped correlation analyses of the main constructs in the study. Of the adolescents in the sample, only 2.4% indicated they had never been exposed to alcohol-related content, 18.5% less than once a month, 36.9% several times a month, 27.7% once a week, 11.2% several times a week, and 3.4% indicated to be exposed daily to alcohol-related content on SNS. On the other hand, 32.4% of our sample indicated that they never share alcohol-related content on SNS. Over half of our sample (52.5%) indicated to share alcohol-related content less than once a month, 10.9% indicated to share this content a few times a month, 3.1% once a week, and only 1.1% reported to share alcohol-related content more than once a week.

Testing the Association between SNS and Alcohol Abuse

The PROCESS macro (model 4) was used to examine the multiple pathways through which the different uses of SNS and alcohol abuse were related. Therefore, one bootstrapped multiple mediator model (1000 samples) was constructed in which displaying as well as exposure to alcohol-related content were entered as predictor variables, the AUDIT scores measuring alcohol abuse were entered as the dependent construct, and attitudes and norms were entered simultaneously as mediators operating in parallel. Age, gender and sensation seeking were added to this model as control variables. We opted to test all hypotheses simultaneously in one model. As indicated by Hayes (2013, p. 195), this approach yields an estimate of the part of the effect of one predictor (displaying alcohol-related content versus mere exposure to alcohol-related content) that is unique to that specific predictor variable and relative to the other predictor variables in the model. The results of this analysis are displayed in Table 2.

TABLE 2 ABOUT HERE

The effect sizes indicated that the total effect of displaying alcohol-related content on SNS on alcohol abuse was 2.45 ($t=16.76$, $SE=.15$, 95% bootstrapped confidence intervals $LLCI/ULCI=2.16/2.74$, $p<.001$) and the direct effect of this predictor was 1.96 ($t=14.49$, $SE=.14$, $LLCI/ULCI=1.70/2.23$, $p<.001$). With regard to the indirect effects, both attitudes and norms mediated this relationship significantly (indirect effect social norms=.07 ($SE=.03$, $LLCI/ULCI=.02/.12$), indirect effect attitudes=.41 ($SE=.06$, $LLCI/ULCI=.30/.54$)). However, pairwise comparisons indicated that attitudes accounted for more of the effect of displaying alcohol-related content on alcohol abuse as compared to social norms (pairwise comparison=-.34 ($SE=.06$, $LLCI/ULCI=-.48/-.24$)).

With regard to exposure to alcohol-related content, the effect sizes indicated a total effect of .72 ($t=7.38$, $SE=.10$, $LLCI/ULCI=.53/.92$, $p<.001$), and a direct effect of .42 ($t=4.62$, $SE=.09$, $LLCI/ULCI=.24/.60$). Interestingly, pairwise comparisons for this predictor variable, indicated no significant difference between the strength of the indirect effects (indirect effect social norms=.15 ($SE=.03$, $LLCI/ULCI=.11/.20$); indirect effect attitudes=.15 ($SE=.04$, $LLCI/ULCI=.08/.23$; pairwise comparison= .00 ($SE=.04$, $LLCI/ULCI=-.08/.08$)).

These analyses also provided an indication of which use of SNS (displaying alcohol-references versus exposure) was more strongly associated with alcohol abuse. Both the total and direct effect of displaying alcohol-related content seemed to be much larger than those of exposure to this kind of content. In addition, following the advice of Nathans, Oswald and Nimon (2012), the zero-order correlations (see Table 1) were compared by calculating a Steiger's Z. This test compares correlated correlations within a population and confirmed that displaying alcohol-related content on SNS was a better indicator of adolescents' alcohol abuse than exposure to this type of content ($Z=5.50$, $p<.001$).

Thus, overall, support was provided for all hypotheses. Both exposure to and displaying alcohol-related content on SNS were associated with elevated alcohol abuse scores. Yet, this

relationship appeared to be stronger for those adolescents who shared this content, as opposed to adolescents who reported to be merely exposed to it. The relations between both displaying alcohol-related content and alcohol abuse on the one hand, and between exposure and alcohol abuse on the other hand, were partially mediated by both attitudes and social norms. However, pairwise comparisons of these indirect effects indicated that attitudes accounted for more of the effect of displaying alcohol-references on alcohol abuse as opposed to social norms. For exposure to alcohol-related content no difference between the strength of both explicative mechanisms (attitudes and social norms) was observed.

Discussion

The present research is one of the first to demonstrate a relationship between different uses of SNS and alcohol abuse among adolescents. The results indicated that both displaying alcohol-related content on SNS as well as exposure to the alcohol-related content others produce on SNS are associated with elevated alcohol abuse scores. In addition, following self-perception theory and social norms theory, this study indicated that these associations are partially mediated by adolescents' attitudes towards alcohol use and by their perceived social norms. Several authors have expressed concern about the impact that the portrayals of alcohol use on SNS might have on alcohol consumption (e.g., D'Angelo, Kerr, & Moreno, 2015; Ridout & Campbell, 2014). Examining these relationships among adolescents is especially relevant as most teens are almost continuously connected with each other through SNS (ACMA, 2013) and as they are more vulnerable to peer influences, compared to other age groups (Gerrard et al., 2008; Pfeifer et al., 2011).

In addition to indicating that both exposure to and displaying alcohol-related content on SNS are related to higher alcohol abuse scores, the results also seemed to indicate that displaying alcohol-related content on SNS has a stronger association with alcohol abuse than exposure to this content. It is possible that those sharing this content are already engaging in

heavy alcohol use, but, as indicated by Valkenburg & Peter (2013), sharing this content may also affect the creator of the content directly. Regardless of the fact that the current study cannot establish cause and effect because of its cross-sectional nature, this is important information for the development of prevention campaigns. This finding indicates that those adolescents displaying alcohol use on their SNS-profiles are an important group to target with prevention campaigns. If SNS can help to identify and target high-risk drinkers at a younger age, this could help prevent the negative consequences, such as liver damage or heart failure, at a later age (Babor et al., 2001).

Furthermore, the study showed that both the associations of exposure to and displaying alcohol-related content with alcohol abuse occur, at least partly, through a change in attitudes and social norms. Although both constructs significantly mediated the estimated associations, the attitude-pathway appeared to account for more of the effect of displaying alcohol-related content on alcohol abuse, as compared to the social norms pathway. With regard to the association between exposure to alcohol-related content and alcohol abuse, no significant difference in the strength of both pathways was observed. Self-perception theory (Bern, 1972) could potentially explain this finding. Whereas the self-generated content is considered to be perceived as a valid and influential source of evidence of how the creator's beliefs and attitudes should be shaped, it contains hardly any information about the behavior of others. In contrast, when adolescents are exposed to the alcohol-related content of their peers, the otherwise more concealed drinking behavior becomes more visible, resulting in an overestimation of peers' acceptance of engagement in risk behavior, an idea in line with what has been proposed by social norms theory (Berkowitz, 2004; Perkins & Berkowitz, 1986). Moreover, because of the positive portrayal of alcohol on social media (Beullens & Schepers, 2013; Moreno et al., 2010), adolescents learn to associate alcohol with positive outcomes, resulting in more positive alcohol-attitudes (Walther et al., 2011). Therefore, it makes sense that displaying content on

SNS seemed to be a better indicator of adolescents' attitudes (and only to a lesser extent of social norms), whereas exposure to this content predicted both norms and attitudes.

Though this is one of the first studies to examine two potential pathways explaining the association between displaying alcohol-related content on SNS and alcohol abuse, past research on the effects of publicly committing oneself to an identity has revealed similar pathways to what was found in this study (Kelly & Rodriguez, 2006; Tice, 1992). Our results regarding the underlying processes explaining the relation between exposure to alcohol-related content on SNS and alcohol abuse are also in line with earlier findings, suggesting that social norms (Beullens & Vandenbosch, 2015; Fournier et al., 2013; Litt & Stock, 2011) and attitudes (Litt & Stock, 2011) play important mediating roles in this relation. Together, prior research and the current study suggest that alcohol-related attitudes and social drinking norms may explain how the different uses of social media can affect adolescents' alcohol abuse.

Overall, the results of this study indicate that the association between SNS use and alcohol abuse is a complex one. Unlike traditional media, SNS offer the possibility to both be exposed to content and to create your own media content, which may instigate different processes of behavioral change. Moreover, the alcohol-related content on SNS can be of various natures: not only status updates referencing drinking intentions or pictures taken on a night out, but also advertisements and other content created by alcohol brands. The current study relied on ideas proposed by self-perception theory and social norms theory, but it was not set up to test these theories. Therefore, it is recommended that the principles underlying the relationships between social media use and alcohol abuse are explored into further detail, and to look at full behavioral change models, such as theory of planned behavior.

Furthermore, longitudinal research is recommended to explore how these relations change over time and to establish causality. The current study was cross-sectional, which makes it at this point impossible to draw conclusions on the direction of the association. Though it is likely

that using SNS predicts alcohol abuse, it is equally likely that adolescents engaging in risky drinking behavior seek friends with the same drinking patterns and share more alcohol-related content. Moreover, positive attitudes and perceived social norms may also predict engagement with alcohol on SNS or result from risky drinking behavior, instead of mediating this relation. Slater's (2007) Reinforcing Spirals Model proposes that the most likely relation between media use and behavioral outcomes is transactional. Media selection and media effects could form a reciprocal, mutually influencing process, whereby young people seek media content which is congruent with their alcohol attitudes and drinking behavior, which in turns reinforces their behavior and opinions. We recommend that future studies examine the associations between different uses of SNS and alcohol (ab)use with a longitudinal design, so that we can fully understand the complex associations between these constructs.

As with all research, the present study has a number of limitations. First, the current data were collected among a sample of Belgian adolescents. Intercultural differences with regard to the social acceptance of alcohol use, the use itself and the display of alcohol use on SNS exist between Europe and the United States. For instance, whereas the legal drinking age in the United States is 21, Belgian adolescents are permitted to buy wine and beer from the age of 16. Moreover, European adolescents appear to engage more in binge drinking compared to American youngsters (Steketee et al., 2013; VAD, 2015), and alcohol-related content is more prevalent on Belgian social media profiles (Beullens & Schepers, 2013; Moreno et al., 2010). Given these differences, more research is required to examine whether the results found in the current study hold in other samples and among other populations. In spite of the fact that we cannot generalize the results of the current study, we do believe that they might provide important insights for other populations as well, as the reported results seem to be in line with both European and US previous research (e.g., Beullens & Vandenberg, 2015; Litt & Stock, 2011). In addition, SNS are heavily used among both younger and older individuals throughout

the world. This implies that adolescents who are not legally allowed to drink might be exposed to alcohol messages shared by their older peers or by peers from other countries as well. Cross-cultural research (among different age groups) is required to examine whether the same processes explain the association between SNS and alcohol in other countries and among individuals of different age groups.

Another limitation is that the study relied on self-reports. It is possible that some adolescents over- or under-reported their alcohol usage or that they had trouble remembering how often they engaged with alcohol-related content on SNS. However, the use of self-reports in this type of research is not uncommon and research has indicated that self-report measures on alcohol use are usually reliable (Flisher, Evans, Muller, & Lombard, 2004). Finally, the sample was rather large, which may have resulted in some false positives, because significance is more likely to be found even when the difference in outcomes between groups is negligible. In order to avoid this problem, all analyses were bootstrapped, as proposed by Field (2009). The bootstrap method resamples the sample data in 1000 samples and compares the effect sizes of those samples to estimate the actual effect size.

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Table 1

Descriptive Statistics and Bootstrapped Correlation Analyses

	1.	2.	3.	4.	5.	6.	7.
1. Exposure	<i>Range=6, M=1.93, SD=1.05</i>						
2. Displaying	.47***	<i>Range=6, M=.51, SD=.71</i>					
3. Alcohol Abuse	.36***	.45***	<i>Range=40, M=7.36, SD=5.79</i>				
4. Social Norm	.27***	.20**	.39***	<i>Range=6, M=5.20, SD=1.29</i>			
5. Attitude	.24**	.28***	.52***	.47***	<i>Range=6, M=3.60, SD=1.01</i>		
6. Sensation Seeking	.22***	.24***	.40***	.21***	.29***	<i>Range=4, M=3.33, SD=.79</i>	
7. Age	.13***	.13***	.14***	-.01	.03	.02	<i>Range=4, M=17.15, SD=.92</i>

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 2

Mediation of the Association of Exposure to and Displaying Alcohol-Related Content with Alcohol Abuse through Perceived Social Norms of Friends and Attitudes towards Consuming Excessive Amounts of Alcohol (H₁-H₅)

	Social Norm			Attitude			Alcohol Abuse		
	Coeff	t	Boot LLCI/ULCI	Coeff	t	Boot LLCI/ULCI	Coeff	t	Boot LLCI/ULCI
Constant	5.73***	12.57	4.83/6.62	3.30***	9.59	2.63/3.98	-15.74***	-9.44	-19.01/-12.47
Exposure to alcohol-related content on SNS	.25***	9.96	.20/.30	.09***	4.81	.05/.13	.42***	4.62	.24/.60
Displaying alcohol-related content on SNS	.12**	3.20	.05/.20	.25***	8.91	.20/.31	1.96***	14.49	1.70/2.23
Gender	-.30***	-6.40	-.39/-.21	-.37***	-10.30	-.44/-.30	-1.06***	-6.20	-1.39/-.72
Age	-.10***	-3.78	-.15/-.05	-.04*	-2.20	-.08/.00	.45***	4.87	.27/.62
Sensation Seeking	.22***	7.30	.16/.28	.27***	11.88	.23/.32	1.56***	14.00	1.34/1.78
Social Norm							.61***	8.23	.46/.75
Attitude							1.62***	16.68	1.43/1.81
Model	$R=.34, R^2=.11, F(5,2762)=70.96, p<.001$			$R=.42, R^2=.17, F(5,2762)=115.57, p<.001$			$R=.67, R^2=.45, F(7, 2760)=319.82, p<.001$		

Note: * $p<.05$, ** $p<.01$, *** $p<.001$