

Author postprint version. Article accepted for publication in Media Psychology.

<https://www.tandfonline.com/loi/hmep20>

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A Longitudinal Examination of the Moderating Influence of Peer and Parental
Socialization on Alcohol-Related Social Media Self-Effects Among Late Adolescents

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Acknowledgement

This research was funded by grants from Bijzonder Onderzoeksfonds KU Leuven / Research

Fund KU Leuven

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Abstract

The present study is the first to empirically and longitudinally demonstrate that alcohol-related social media self-effects may occur via attitudes, and that the strength of this association is dependent on peers and parents. A two-wave panel study with a one year interval (N=1006) among late adolescents (age 16-20 at baseline) showed that especially individuals whose peers and parents engaged in alcohol-positive socialization behaviors, held more positive alcohol-related attitudes one year later when they shared alcohol-related self-presentations on SNS. The strength of the alcohol-related social media self-effect was dampened when peers and parents engaged in more negative alcohol-related socialization behaviors. Overall, these results do not only provide support for the idea that some individuals can affect themselves through displaying certain content on SNS, they also suggest that peers and parents continue to play a socializing role, even when adolescents transition into emerging adulthood.

Key words: alcohol, attitudes, social media, self-effects, parents, peers

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A Longitudinal Examination of the Moderating Influence of Peer and Parental Socialization on Alcohol-Related Social Media Self-Effects Among Late Adolescents

Parents, peers, and schools are among the most important sources of alcohol-related socialization in young people's lives (e.g., Oetting & Donnermeyer, 1998). Through interactions with these socializing agents, individuals learn social norms and behaviors. However, recently it has been argued that social networking sites (SNS) can be a source of alcohol-related socialization as well (Moreno, Kota, Schoohs, & Whitehill, 2013). On the one hand, young people's alcohol-related cognitions and behaviors can be affected through exposure to alcohol references of peers (e.g., Litt & Stock, 2011). On the other hand, it has also been argued that individuals can affect *themselves* when they share alcohol references on SNS (e.g., Geusens & Beullens, 2017b).

The present study contributes to this line of research by examining the interactions between more traditional sources of alcohol-related socialization, and social media self-effects. As such it will provide a deeper insight in how the social environment can influence social media self-effects. Specifically, it will be examined whether perceived parental drinking behavior and perceived parental permissibility of alcohol consumption moderate the association between sharing alcohol references on SNS and alcohol attitudes, which can be understood as evaluative judgements of alcohol-related thoughts and behaviors.

In addition, the moderating role of peers' alcohol-related online self-presentations will be examined as well. Peers play an important role in young people's alcohol-related socialization (Oetting & Donnermeyer, 1998), and research shows that this is true in an online context as well (Huang et al., 2014 e.g.,). Moreover, sharing alcohol references usually occurs within specific peer groups (Niland, Lyons, Goodwin, & Hutton, 2014). Yet, the moderating role of peer socialization via exposure to peers' alcohol-related online self-

presentations in the association between own alcohol-related online self-presentations and alcohol attitudes remains unexamined.

Furthermore, the study adds to the current state-of-the art by providing a deeper insight in the processes underlying the association between sharing alcohol-related online self-presentations and drinking behavior. Existing research tends to focus on alcohol *consumption* as the outcome of interest, and it has repeatedly been found that the more alcohol references individuals share, the more likely they are to engage in more heavy drinking behavior (D'Angelo, Kerr, & Moreno, 2014; Geusens & Beullens, 2017b; Moreno, Kacvinsky, Pumper, Wachowski, & Whitehill, 2013). Yet, it remains unclear how this association works. Cross-sectional research hints that attitudes may underlie this association (Geusens & Beullens, 2016b), but longitudinal research does not appear to have examined attitudes towards alcohol as an outcome of online alcohol-related communication yet. Therefore, the current study will examine these associations longitudinally.

Apart from these theoretical and empirical contributions, the current study is also novel from a methodological perspective. In particular, the study uses polynomial regression analysis with response surface modeling (Edwards, 2002; Shanock, Baran, Gentry, Pattison, & Heggstad, 2010) to get the most complete understanding of the interaction between peer and parental influences and own alcohol-related communication. This technique can provide a more nuanced view of these interactions than traditional moderated regression analysis, by allowing us to examine the effects of both agreement and discrepancy between two predictor variables (Shanock et al., 2010).

Alcohol-Related Social Media Self-Effects

Self-expression and peer bonding are two of the most important functions of SNS-use (Ellison & Boyd, 2013). SNS allow their users the freedom to express themselves, and many young individuals have consequently taken their identity negotiations online (Ellison &

Boyd, 2013; Moreno, Kota, et al., 2013). One part of these online identity negotiations relates to an alcohol-related identity (Niland et al., 2014). Many young people share alcohol references online to align themselves with their peer group, and to express that they enjoy drinking and partying (Niland et al., 2014). However, it has been argued that, by doing so, they can also affect their own alcohol consumption (D'Angelo et al., 2014; Geusens & Beullens, 2017b; Moreno, Kacvinsky, et al., 2013).

Sharing alcohol references on SNS has been associated with increased levels of risky alcohol consumption, both in cross-sectional (e.g., Geusens & Beullens, 2016a, 2016b, 2017a; Ridout, Campbell, & Ellis, 2012) and in longitudinal research (D'Angelo et al., 2014; Geusens & Beullens, 2017b; Moreno, Kacvinsky, et al., 2013). It appears that alcohol references on SNS are not just a reflection of prior drinking behavior, but can actually influence future drinking behavior as well. The idea that an individual can affect their own behavior is not new, as research into offline self-effects dates back to at least the 1970s (Bem, 1972). How the association between sharing online alcohol references and drinking behavior works exactly remains to be investigated in more detail, but Valkenburg's recent overview of potential mechanisms of self-effects points towards theories of self-persuasion and self-concept change (Aronson, 1999; Bem, 1972; Valkenburg, 2017).

Both theories of self-persuasion and of self-concept change posit that individuals' self-concepts, beliefs and/or attitudes can be altered or reinforced as a result of internalizing self-presentations (Aronson, 1999; Bem, 1972; Valkenburg, 2017). Individuals may not consciously attempt to convince themselves or others of anything, but people can unconsciously infer their own cognitions and affect by observing their own overt behavior independent of reward or pressure. In other words, their behavior is considered to be 'evidence' for their cognition and affect. Cognition is the collection of attributes an individual ascribes to an attitude object (e.g., alcohol is fun, alcohol can cause cancer), whereas affect is

based on emotional responses to the attitude object or cognitions concerning the attitude object (e.g., alcohol makes me feel relaxed, cancer scares me) (Olson & Kendrick, 2012). Considering the predominantly positive online alcohol portrayals, associated with friendship group belonging and enjoyable memories (Beullens & Schepers, 2013; Niland et al., 2014), this would mean that by considering their own alcohol-related self-presentations, individuals can infer positive alcohol-related cognitions (e.g., alcohol leads to strong friendships) and affect (e.g., I am happy when I drink alcohol).

In turn, cognitions and affect are generally understood to lie at the base of attitude formation processes (Albarracín, 2002; Albarracín & Kumkale, 2003; Olson & Kendrick, 2012). Attitudes are constructed, altered or reinforced by either consciously or unconsciously processing both new and existing attitude-relevant cognitions and affective reactions (Kruglanski & Thompson, 1999; Markman & McMullen, 2003; Olson & Kendrick, 2012). The 'new' cognition and affect information are linked to and integrated with existing beliefs and thoughts about the attitude-object stored in the individual's memory, and the composite of these new and existing pieces of information engender the attitude (Kruglanski & Thompson, 1999; Olson & Kendrick, 2012). Thus, when individuals share alcohol references on SNS, they can potentially infer that alcohol brings them joy (affect) and friendship (cognition), which can reinforce a positive attitude towards alcohol these alcohol-related cognitions and affect are processed.

Peer Socialization Through Online Alcohol-Related Communication

According to primary socialization theory (Oetting & Donnermeyer, 1998), peers are the dominant socialization influence during adolescence. Peers reinforce attitudes and behavior through a transmission of norms (i.e., what is normal behavior) via conversations and shared experiences. Consequently, many researchers have found a strong influence of peers on young individuals' drinking behavior (e.g., Cruz, Emery, & Turkheimer, 2012; Simons-

Morton & Chen, 2006). Moreover, it has recently been argued that peers can not only affect alcohol-related cognitions and behaviors in offline settings, but through online alcohol-related communication as well (Beullens & Vandebosch, 2016; Geusens & Beullens, 2016a, 2016b; Huang et al., 2014; Litt & Stock, 2011).

According to Perkins' and Berkowitz'(1986) social norms theory, peer influence occurs via two types of norms: Injunctive norms and descriptive norms. Injunctive norms are perceptions of what ought to be, and are closely related to attitudes. Descriptive norms, on the other hand, are perceptions of what people actually do. Exposure to peers' online alcohol references can be understood as descriptive norms, as these are perceptions of how often peers share alcohol references, and coincidentally, how often they consume alcohol. By repeated exposure to the alcohol-related online self-presentations of peers, individuals may come to learn that alcohol consumption is normal, harmless and fun, and that to fit in, they should consume alcohol as well (e.g., Litt & Stock, 2011). As with social media self-effects, individuals can use the alcohol-references of peers as cues or arguments to form alcohol-related cognitions and affect, which is expected to be processed and integrated with existing beliefs to reinforce or alter alcohol-related attitudes (Kruglanski & Thompson, 1999; Olson & Kendrick, 2012).

Thereby, it should be noted that both alcohol consumption and online alcohol-related self-presentation are fundamentally social behaviors (Geusens & Beullens, 2017a; Niland, Lyons, Goodwin, & Hutton, 2013; Niland et al., 2014). The enjoyment of alcohol consumption is derived from having fun with close friends through fun social activities throughout the night (Niland et al., 2013). Likewise, young people indicate that the enjoyment of sharing alcohol references stems from the fact that they are sharing memories with friends, and that they bond through this behavior (Niland et al., 2014). Consequently, most young individuals sharing alcohol-related self-presentations on SNS, are simultaneously exposed to alcohol-related

online self-presentations of their friends. Hence, online peer influences should be taken account when studying social media self-effects.

Parental Socialization of Alcohol Attitudes

In addition, alcohol consumption is deeply rooted in culture and society (Bloomfield, Stockwell, Gmel, & Rehn, 2003). From the day they are born, parents teach their offspring the fundamental culture and ideas of the society they live in, and they continue to guide their offspring's behavior even when other socializing agents, such as schools and peer groups, grow in importance (Oetting & Donnermeyer, 1998). By the time individuals reach the legal drinking age (e.g., 16 in Belgium, 18 in many European countries), they will have been exposed to years of alcohol-related socialization. Responsible adult alcohol consumption is the norm in contemporary western society, and many children grow up watching their parents consume alcohol, albeit moderately (Jayne & Valentine, 2015). This, as well as parental monitoring, has been related to earlier alcohol initiation and heavier drinking behavior among young adolescents, even among adolescents who have not yet reached the legal drinking age (Bryant et al., 2006). Nevertheless, as children age, many parents express concern about their own diminishing influence as socializing agents relative to peer socialization (Bryant et al., 2006): Whereas adolescents generally want to conform to peer norms (Perkins & Berkowitz, 1986), they are more likely to struggle with parental socialization (especially explicit rules) because they desire autonomy (Arnett, 2013). However, parents' concerns appear to be unnecessary, as research shows that perceptions of parental alcohol consumption continue to influence their offspring until well after they have reached the legal drinking age and have had their first experiences with alcohol (Hummer, LaBrie, & Ehret, 2013; LaBrie et al., 2011).

This influence of perceptions of parental alcohol consumption should not be understood as simple mimicry of perceived parental drinking behavior. These perceptions are strongly

related to perceptions of parental *permissibility*, or perceptions of how accepting parents are of their children's alcohol consumption (Hummer et al., 2013). It appears that individuals internalize their perceptions of their parents' drinking behavior and alcohol permissibility, and incorporate these into their own attitude towards alcohol (Hummer et al., 2013). This means that older adolescents and emerging adults are less affected by external norms (i.e., their perceptions of parental drinking behavior and alcohol acceptance), but more by internal factors (i.e., their own alcohol-related attitude) (Hummer et al., 2013). In other words: parental socialization does not necessarily affect their offspring's drinking behavior directly (external influence), but instead indirectly through alcohol-related attitudes (internal influence).

Peer and parental Socialization and Self-Persuasion

Offline and online alcohol-related socialization obviously do not occur entirely independent of each other. Most young people sharing and exposed to alcohol references online still have their parents, who either unconsciously or consciously socialize their alcohol-related cognitions and behavior. Research shows that even when emerging adults no longer live at home, parents continue to influence their drinking behavior (Boyd, Corbin, & Fromme, 2014). However, what remains uninvestigated, is how parental socialization and alcohol-related social media effects interact. Likewise, research argues that sharing alcohol online is a group behavior (Geusens & Beullens, 2017a; Niland et al., 2014): Individuals share alcohol to fit in with their peer group and those who share alcohol as part of their online self-presentation are simultaneously exposed to the alcohol-related self-presentations of peers. Yet, it remains unknown whether online peer socialization can affect the self-persuasion of online alcohol-related self-presentation.

Media-effects research argues that social context variables, such as parents and friends, can reduce or enhance the strength of media effects (Slater, 2007; Valkenburg & Peter,

2013). According to Slater (2007) media effects are strongest when individuals are associated with significant others with similar attitudinal values, behavior and/or media use, or when they live in a social environment which supports the media-modeled attitudes and behavior. By receiving a 'double dose' of the same message, they are more likely to internalize this message and cultivate their attitude in line with it.

Young individuals can receive a double dose of the same message when online and offline alcohol-related socialization are in agreement with each other. In the context of this study, a double dose occurs when an individual who regularly shares alcohol references online (1) perceives his/her parents to regularly consume alcohol, (2) perceives his/her parents to have a permissible attitude towards alcohol use, or (3) is regularly exposed to peers' online alcohol references. However, peer and parental factors might potentially also interact. This implies that individuals might also receive a double dose when individuals perceive to be regularly exposed to peers' alcohol updates and perceive their parents to regularly consume alcohol and/or have a permissible attitude towards their child's alcohol consumption. In this case, it is possible that the strength of the relationship between exposure to peers' alcohol updates is strengthened by perceptions of parents' alcohol consumption and attitudes.

However, offline and online socialization are also in agreement with each other when peers don't share online alcohol-related self-presentations, parents rarely consume alcohol and/or parents do not tolerate their offspring's alcohol consumption, and the individual never shares alcohol references on SNS. These individuals potentially have more negative attitudes towards alcohol, that are expected to be reinforced by their peers' and parents' alcohol-negative socialization. Thus, in line with Slater (2007) we propose that:

H1: Perceived parental alcohol consumption (i.e., perceptions of frequent parental alcohol consumption) strengthens the positive association between sharing alcohol references on SNS at baseline and alcohol attitudes one year later.

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H2: Perceived parental permissibility of alcohol consumption (i.e., perceptions of parental acceptance of the individual's alcohol consumption) strengthens the positive association between sharing alcohol references on SNS at baseline and alcohol attitudes one year later.

H3: Perceived positive peer socialization (i.e., perceptions of frequent exposure to peers' online alcohol-related self-presentation) strengthens the positive association between sharing alcohol references on SNS at baseline and alcohol attitudes one year later.

RQ1: Is the strength of the relationship between exposure to peers' alcohol references on SNS and alcohol attitudes one year later dependent on perceived parental alcohol consumption and/or perceived parental permissibility?

The current study consists of a two-wave panel study with a one year interval conducted among a sample of late adolescents who are on the verge of transitioning into emerging adulthood (age 16-20 at baseline). This period in life is characterized by increasing independence of parents and unique opportunities for identity exploration (Arnett, 2005). Consequently, alcohol consumption is especially high among this age group (Arnett, 2005; WHO, 2015). Though all respondents in our sample had reached the legal drinking age at baseline, age will be added as a control variable, as it has been argued that adolescents increase their alcohol consumption as they age (Rosiers, De Paepe, Geirnaert, & Van Damme, 2017). Additionally, girls generally consume less alcohol (de Visser & McDonnell, 2012), and individuals with high levels of sensation seeking generally consume more alcohol (Hittner & Swickert, 2006), which is why gender and sensation seeking will be controlled for as well. Finally, we controlled for effect stability by including the autoregressive relationship of the outcome variable (Frees, 2004). This means that we regressed alcohol-related attitudes at wave 2 on itself at wave 1, which enabled us to partial out the stable variance and assess change in levels of the alcohol-related attitudes over time.

Method

Sample

The data of the present study are part of the Flemish Alcohol and Media Survey (FLAMES) research project (Geusens & Beullens, 2016b, 2017a, 2017b)¹, approved by the ethical committee of the authors' university. A random sample of 50 schools was selected from the official list of all secondary schools in Flanders, Belgium in Spring 2015 (T1, baseline measurement). Secondary education in Belgium is divided over three main structures: general education (e.g., humanities, math), vocational education (e.g., hair dressing, welding), and technical education (e.g., hospitality, accountancy). A small number of schools offer art education or special education for students with disabilities. Secondary school typically consists of 3 cycles, lasting 6 years in total, and students in the vocational and technical education system can opt to follow an additional specialization year (7th year). Consequently, students typically graduate between the ages of 18 and 20, after which they either enter tertiary education or the work force. In general, secondary schools don't offer extensive social media literacy in class.

School principals of general, vocational and technical schools were sent recruitment emails containing the details of the study procedures, which were followed by a personal call. In the selected class groups of the 3rd cycle of secondary education (5th, 6th, and 7th year), all pupils were invited to participate in a study on leisure activities, such as media use and going out behavior. A teacher and research assistant were present during the data collection, and potential respondents were asked to complete a paper-and-pencil questionnaire during school

¹ The FLAMES research project uses data from a large survey containing 83 questions including demographics, a range of alcohol-related variables (e.g., consumption, attitudes, ...), personality structures, school-related questions, social media variables, and questions relating to television and gaming behavior. Some variables in this dataset have already been analyzed in prior publications on alcohol-related social media effects (Geusens & Beullens, 2016b, 2017a, 2017b). The present study adds to these publications by using the second wave of data, focusing on parents and peers as moderators, focusing on attitudes as the outcome, and using the unique analysis technique.

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time. The research assistant explained the procedures, assured the confidentiality of the data, and distributed and collected the surveys. In total, 3558 adolescents completed the questionnaire, of whom 3515 were between the ages of 16 and 20.

Respondents were contacted again one year later (T2, follow-up measurement). They were sent a personalized link to the web survey via email or regular post, and were asked to fill out the new survey online. Of the 2832 adolescents who provided us with at least one way of contacting them at T1, 1016 respondents completed the questionnaire at T2. Ten of them were deleted from the sample because they were younger than 16 or older than 20 at baseline, so the sample would only contain late adolescents at T1 ($n=1006$). Though a 70% attrition rate is high, attrition rates between 30 and 70% are not uncommon (Gustavson, Von Soest, Karevold, & Roysamb, 2012). For example, Beyens, Eggermont and Nathanson (2016) retained 44% of their sample in their study on children's television exposure, and Wall, Carlson, Stein, Lee and Fulton (2011), retained 23% of their sample in their study on multimedia social marketing to promote physical activity. Studies with higher retention rates often recontact respondents via repeated classroom surveys (e.g., Trekels & Eggermont, 2017), but this was not possible for the present study. Specifically, half our sample was transitioning out of secondary education between wave 1 and wave 2, which makes it an especially interesting age group to study, but simultaneously a hard sample to follow.

A multivariate analysis of variance (MANOVA) using Pillai's trace was used to examine the differences between those who participated in both waves and those who participated in only one wave. This showed that non-respondents differed significantly from respondents when examining baseline measurements, $V=.05$, $F(9,3295)=17.97$, $p<.001$, $\eta_p^2=.05$ (see Table 1). Follow-up univariate analyses showed that respondents who participated in the second wave of the study shared less alcohol references on SNS at baseline, believed to be exposed less frequently to alcohol references of others on SNS, perceived their parents to be more

negative towards alcohol, perceived their parents to consume alcohol less frequently, and held more negative attitudes towards alcohol themselves. Additionally, they were also more likely to be female, more likely to be younger, and scored lower on sensation seeking. Thus, it seems that especially risk-takers did not participate in the follow-up survey, which is in line with other research (Post, Gilljam, Bremberg, & Galanti, 2012).

On average, the adolescents in our sample were 17 years old at T1 ($M=16.98$, $SD=.81$) and 18 years old at T2 ($M=18.19$, $SD=.87$). Girls were slightly overrepresented in the follow-up measurement (60.3% females), though gender distributions were equal in the total sample at baseline (50.7% males). The majority of our sample had started a college education (56%), while a minority was still in high school (38%), was working or looking for work (5%), or was doing something else (1%, e.g., a stay-at-home parent).

Measures

Sharing alcohol references on SNS was measured at T1 using a scale adapted from Beullens and Vandebosch (2016). Respondents were asked how often they privately and publicly shared the following six things on any social medium: (a) photos or video clips referring to going out behavior², (b) textual updates referring to going out behavior, (c) photos or video clips referring to alcohol use, (d) textual updates referring to alcohol use, (e) photos or video clips in which you or your friends are drunk, and (f) textual updates while you are drunk. ‘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’. Responses ranged from (0) ‘never’, to (6) ‘several times a day’. Exploratory factor analysis

² An alternative model was tested incorporating only the alcohol-related items in the social media scales (i.e., and not the going out items). However, no significant differences between these models were found, indicating that going out behavior is intrinsically linked to alcohol consumption in individuals’ minds. Consequently, we decided to use the full alcohol-related social media items scale in our analyses (i.e., including the going out references).

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indicated that all 12 items loaded onto one factor with good internal reliability (Principal components, eigenvalue=6.10, explained variance=50.85, $\alpha=.90$).

Exposure to alcohol references of peers was measured at T1 using a scale similar to the one measuring sharing alcohol references on SNS. Individuals were asked how often they saw items (a) through (f) of the sharing scale (1) in general on any social medium, and (2) shared by their friends on any social medium. As with the sharing scale, responses ranged from (0) 'never', to (6) 'several times a day' (principal components, eigenvalue=6.33, explained variance=52.71, $\alpha=.92$).

Perceived parental permissibility. Following guidelines by Fishbein and Ajzen (2010), respondents were asked at T1 to indicate on a 7-point semantic differential scale whether they believed their parents would (1) disapprove or (7) approve of them (a) consuming alcohol, (b) getting drunk, and (c) engaging in binge drinking³ (principal components, eigenvalue=2.02, explained variance=67.26, $\alpha=.76$).

Perceived parental alcohol consumption was measured at T1 by asking respondents to indicate how often they perceived their parents to (a) drink alcohol (b) engage in binge drinking (c) get drunk. Respondents answered on a 7-point Likert scale with answers ranging from (0) 'never' to (6) 'almost daily'. The question was answered for mothers and fathers separately, but analyzed as one variable (principal components, eigenvalue=2.96, explained variance=49.38, $\alpha=.76$).

Attitudes towards alcohol were measured both at T1 and T2 following guidelines by Fishbein and Ajzen (2010). Respondents were asked to indicate how they felt about someone their age (a) drinking alcohol, (b) getting drunk and (c) engaging in binge drinking. They were offered five adjective pairs (abnormal – normal, harmful – harmless, not fun – fun, bad

³ All measures defined binge drinking as consuming four or more (girls) or five or more (boys) glasses of alcohol in a two-hour timespan (NIAAA, 2004).

– good, not cool – cool) for each drinking behavior, and were asked to indicate on a 7-point scale whether they agreed more with the adjective on the left (e.g., abnormal) or the one on the right (e.g., normal). All items loaded onto one factor with good internal reliability both at T1 (principal components, eigenvalue=5.76, explained variance=38.37, $\alpha=.88$) and at T2 (principal components, eigenvalue=4.76, explained variance=47.62, $\alpha=.91$).

Control variables. Gender (0 = male, 1 = female) and age (open question) were added as control variables. Additionally, the brief sensation-seeking scale (BSSS) (Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002) was used to measure sensation seeking (principal components, eigenvalue=3.23, explained variance=40.35, $\alpha=.78$). All control variables were measured only at T1.

Analyses

SPSS 24 was used for all analyses. First, descriptive statistics and bootstrapped (1000 samples) correlation analyses were calculated. Then, bootstrapped polynomial regression with response surface analysis was used to test the hypotheses because this technique gives a more nuanced view of how interaction works than traditional moderated regression (Shanock et al., 2010). The most important benefit of response surface methodology compared to traditional regression analyses of interactions, is the three-dimensional examination of the relationship between combinations of two predictor variables and an outcome variable, instead of the traditional two-dimensional view (Shanock et al., 2010). Consequently, response surface analysis provides much more information about how combinations of the two predictor variables may affect the outcome variable. Moreover, in contrast to response surface methodology, traditional moderated regression cannot assess non-linearity of the (interaction between) predictor variables as related to the outcome variable (Shanock et al., 2010). Therefore, the present study will use polynomial regression with response surface analysis rather than traditional moderated regression to test the hypotheses.

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First, we standardized all variables except the outcome variable (attitudes at T2) and gender as Z -scores ($M=0$, $SD=1$). Then, three new variables were created for each interaction analysis: (a) the square of the standardized alcohol-related sharing variable, (b) the square of the standardized parent (perceived parental consumption or perceived parental permissibility) or peer variable, and (c) the cross-product of the standardized sharing variable and the standardized parent or peer variable, or the cross-product of the standardized peer and parent variable. Next, the polynomial regression was run by regressing the outcome variable (alcohol attitudes at T2) on the control variables (gender, age, sensation seeking, attitudes at T1, and the peer or parental socialization variable not being tested in the interaction), the standardized predictor variables (sharing alcohol references on SNS and either perceived parental consumption, perceived parental permissibility or perceived alcohol-related self-presentation of peers), the product of the standardized predictor variables, and the squared standardized predictor variables into the regression equation (Edwards, 2002; Shanock et al., 2010).

Whereas in a traditional regression analysis the regression coefficients themselves would be examined, in a polynomial regression it is tested whether the variance in the outcome explained by the regression equation (R^2) is different from zero, after which four surface test values are evaluated (Edwards, 2002; Shanock et al., 2010). a_1 represents the slope along the perfect agreement line, a_2 represents the curvature along the perfect agreement line, a_3 represents the slope along the perfect discrepancy line and a_4 represents the curvature along the perfect discrepancy line (See Shanock et al., 2010 for an extensive overview). Once the four surface values have been calculated, a three-dimensional response surface is graphed in Excel to aid interpretation.

Results

Descriptive Analyses

TABLE 1 ABOUT HERE

Table 1 displays the descriptive statistics and correlation analyses of the main constructs in the model. About one third (35.9%) of our sample indicated that they never shared alcohol references on SNS at baseline. Those who indicated they did share alcohol references, did so on average less than once per month ($M=.62$, $SD=.54$). No one indicated to share alcohol references more than once per week (52.5% a few times per year, 9.8% once per month, 1.5% several times per month, .3% once per week). On average, they were exposed to alcohol references of peers at least once per month (.6% never, 22.7% a few times per year, 41.2% once per month, 25.4% several times per month, 8.3% once per week, 1.4% several times per week, .4% every day).

Additionally, respondents in our sample indicated they believed their parents to be relatively negative towards alcohol consumption (29.1% strong disapproval, 54.6% slight disapproval, 15.1% slight approval, 1.2% strong approval), and to drink alcohol less than once per month (5% never, 33.2% a few times per year, 38.7% about once per month, 21.8% a few times per month, 4.2% once per week, 2% more than once per week). Overall, their own attitudes towards alcohol appeared to slightly negative as well, with less than one third reporting clearly positive alcohol attitudes, both at T1 (3.8% very negative, 13.2% moderately negative, 44.9% slightly negative, 5.3% neutral, 30.2% slightly positive, 2.3% moderately positive, .3% very positive) and at T2 (5.4% very negative, 19.2% moderately negative, 43.4% slightly negative, 2.6% neutral, 27.5% slightly positive, 1.7% moderately positive, .2% very positive).

Main Effects

The first step in polynomial regression with response surface analysis is a traditional linear regression analysis, without the product of the standardized predictor variables, and the squared standardized predictor variables. This traditional linear regression analysis indicated that of the main variables in our model, only sharing alcohol references more frequently ($\beta=.08$, $t=2.72$, $\text{BootLLCI/ULCI}=.01/.12$, $p<.05$) and more frequent perceived parental alcohol consumption ($\beta=.06$, $t=2.11$, $\text{BootLLCI/ULCI}=.001/.10$, $p<.05$) predicted more positive alcohol attitudes one year later ($R=.63$, $R^2=.40$, $F(8,986)=79.96$, $p<.001$). There was no main effect of perceived parental permissibility or exposure to alcohol-related self-presentation of peers on alcohol-related attitudes one year later.

Perceived Parental Alcohol Consumption

Next, Table 2 presents the results of the hierarchical polynomial regression and surface response analysis of the interaction between perceived parental socialization and own alcohol-related online self-presentation on alcohol attitudes. The results indicated that R^2 was significantly different from zero when adding the product of the standardized predictor variables, and the squared standardized predictor variables into the regression equation. Thus, we used Shanock et al.'s (2010) template to calculate four surface values and graph our results (see Table 2 and Figure 1).

TABLE 2 ABOUT HERE

Hypothesis 1 predicted that when perceived parental alcohol consumption and sharing alcohol references on SNS are in agreement, perceived frequency of parental consumption would strengthen the positive association between sharing alcohol and alcohol attitudes one year later. Considering that the slope along the perfect agreement line (a_1) is positive and significant, this hypothesis is confirmed. The curvature along the perfect agreement line (a_2) is not significant, meaning that there is a linear, and not a non-linear, effect of agreement

between sharing alcohol references and perceived parental consumption on alcohol attitudes. Thus, attitudes increase as respondents share alcohol references more frequently and perceive their parents to drink alcohol more frequently, and respondents who reported frequent sharing and frequent perceived alcohol consumption of their parents had higher alcohol attitudes one year later than respondents who reported infrequent sharing and infrequent parental alcohol consumption.

FIGURE 1 ABOUT HERE

Next, the influence of discrepancy between alcohol-related self-presentation and perceived parental consumption was examined. The curvature of the line of incongruence (a_4) was negative and significant, pointing to a decrease in the outcome value associated with an increase in discrepancy. Thus, the more incongruent perceived parental consumption and own alcohol-related self-presentation is, the lower alcohol attitudes are one year later. However, the slope of the line of incongruence (a_3) was not significant, meaning that the consequences of the discrepancy between alcohol-related self-presentation and perceived parental consumption was equivalent across all points of discrepancy. Thus, when comparing the alcohol-related attitudes of individuals reporting above average parental drinking frequency, but below average alcohol-related sharing behavior, with those of below average parental drinking frequency but above average alcohol-related sharing behavior, we did not find a difference in the alcohol attitudes one year later.

Perceived Parental Permissibility

Confirming hypothesis 2 we found a linear interaction of agreement between sharing alcohol references on SNS and perceived parental permissibility on alcohol attitudes: Attitudes increased as respondents shared alcohol references more frequently and perceived their parents to be more accepting of their alcohol consumption. In contrast to perceived parental consumption, both the slope (a_3) and the curvature (a_4) of the line of incongruence

between perceived parental permissibility and alcohol-related self-presentation, were significant. Thus, the greater the levels of discrepancy, the lower the attitudes one year later, and alcohol-attitudes are higher when the discrepancy is such that sharing alcohol references on SNS is above average, whereas perceived parental permissibility of alcohol consumption is below average, than when the discrepancy is such that sharing alcohol references on SNS is below average, but perceived parental permissibility is above average.

Exposure to Alcohol-Related Self-Presentation of Peers

In line with hypothesis 3, we found that when exposure to the alcohol-related self-presentation of peers and own alcohol-related self-presentation on SNS are in agreement, increased exposure strengthened the positive association between sharing alcohol and alcohol attitudes one year later. Attitudes increased linearly as respondents shared alcohol references more frequently and were exposed to alcohol-related self-presentations of peers more frequently. The curvature of the line of incongruence between alcohol-related self-presentation and exposure to peers' alcohol-related self-presentation (a_4) was negative and significant, but the slope (a_3) was not significant. Thus, the more incongruent own and peers' alcohol-related self-presentations are, the lower the alcohol attitudes are one year later, but the consequences of this incongruence are equal across all points of discrepancy. Accordingly, attitudes are highest when both own and peers' alcohol-related self-presentation are above average. Yet, when comparing the alcohol-related attitudes of individuals reporting above average exposure to peers' alcohol-related self-presentation and below average own alcohol-related self-presentation, with those of below average exposure but above average alcohol-related sharing behavior, we did not find a difference in the alcohol attitudes one year later.

Interactions between Peer and Parental Socialization

Finally, to answer the research question, it was examined whether parental socialization can reinforce online alcohol-related peer influences. Neither the interaction between exposure to alcohol references of peers and perceived parental permissibility, nor the interaction between exposure and perceived parental consumption explained additional variance in alcohol attitudes one year later. It appears that there is only a direct association between perceptions of more frequent parental consumption and more positive alcohol attitudes. Perceived parental permissibility and perceived exposure to peers' alcohol references is not directly related to alcohol attitudes, nor do they interact with each other.

Discussion

Given the fact that the use of social media has become a quintessential part of young individuals' lives, it is not surprising that there has been an upsurge in studies examining the effects of the different uses of SNS. The current study substantially extends the current state of knowledge on the specific role social media use might play in alcohol consumption by providing a much more nuanced understanding into the relation between alcohol-related SNS use and alcohol attitudes over time. Thereby it also provides deeper insight in how social media effects interact with other known socializing factors such as parents.

In particular, the results of the current study are among the first to provide empirical evidence that sharing alcohol references on SNS relates to positive attitudes towards alcohol one year later. Prior research has already found a longitudinal link between sharing alcohol references on SNS and increased alcohol consumption (e.g., D'Angelo et al., 2014; Geusens & Beullens, 2017b; Moreno, Kacvinsky, et al., 2013). However, it remained unclear how this association could be explained. Valkenburg (2017) argued that, theoretically, an explanation could potentially lie in theories of self-persuasion (Aronson, 1999) and self-concept change (Bem, 1972). Both these theories imply that by engaging in certain behavior (i.e., sharing

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alcohol references on SNS), individuals can internalize this behavior and thus affect subsequent attitudes and behavior. However, this proposition had not yet been empirically examined in an alcohol-related SNS-context. Based on our results, we now have more support to argue that, at least when examining drinking behavior, social-media self-effects can work through attitudes.

Moreover, our results indicated that social-media self-effects are dependent on peers and parents. For both peer and parental socialization, we found that attitudes towards alcohol were most positive when the alcohol-related self-presentation occurred in a context of positive peer or parental alcohol-related socialization. This is in line with Slater's (2007) proposition that media effects are strongest when the social environment is congruent with the media use.

From a prevention perspective, it is especially interesting to find that social media self-effects were weaker when peers and parents show negative attitudes towards alcohol. Though only perceived parental consumption appeared to play a direct role in predicting their children's alcohol-related attitudes, when parental socialization was negative towards alcohol, adolescents sharing alcohol references on SNS held lower alcohol-related attitudes than when parental socialization was positive towards alcohol. This shows that though many parents fear their diminishing influence as their children age (Bryant et al., 2006), parental influences remain present, even among adolescents transitioning into emerging adulthood. Parents are not helpless bystanders in their children's lives once they reach a certain age, and can still protect their children. Consequently, prevention initiatives could potentially benefit from making sure parents understand their role in their children's drinking behavior.

However, it appears that not all parental socialization behaviors are equally important moderators. Though both perceived limited parental alcohol consumption, and perceived disapproval of drinking behavior resulted in lower alcohol-related attitudes when sharing

alcohol references than perceived alcohol-positive socialization, the results seem to suggest that perceived parental consumption may be more important than perceived disapproval. This was also the only direct parental predictor of alcohol attitudes. One explanation lies in the argument that young people partly rely on perceived consumption to deduce parental permissibility (Hummer et al., 2013). Thus, perceived permissibility may already be a second step in the parental socialization process, and could thus potentially have lower protective value when sharing alcohol references on SNS, especially when adolescents perceive their parents' consumption not to correspond to their explicitly communicated permissibility. Likewise, it has been argued that while parents may believe they are clearly communicating certain alcohol-related norms (explicit permissibility), children may perceive something entirely else through their parents non-verbal communication and alcohol consumption (implicit permissibility) (Hummer et al., 2013). Consequently, to get a deeper understanding of how parental socialization can affect alcohol-related social media self-effects, future research could not only differentiate between perceived parental consumption and perceived parental permissibility, but between perceived explicit and implicit permissibility as well.

A second explanation for the difference between the moderating influence of perceived parental permissibility and consumption could potentially lie in the premise that perceptions of consumption start from a much younger age (Jayne & Valentine, 2015). Most children grow up watching their parents consume alcohol, but many parents don't start their alcohol-related education until their children have started drinking (Gilligan & Kypri, 2012). Consequently, young people have been exposed to parental consumption for much longer than they have been to parental communication about alcohol-related norms, which could affect the relative salience of perceived parental consumption and permissibility, and thereupon the harm-reducing effects. This would mean that it is crucial to explain to parents

that their drinking behavior affects their offspring's alcohol-related attitudes, and that they should drink responsibly even when their children are young.

Additionally, we found that the protective value of parental socialization, especially perceived parental consumption, was similar to how incongruence between sharing online alcohol-related self-presentations and online alcohol-related peer socialization operated. The proposition that peers are crucial in young people's risk and drinking behavior is not new (Cruz et al., 2012; Oetting & Donnermeyer, 1998), but we add to this knowledge by showing that *online* peer socialization can play a role as well. Prior research has already argued that exposure to online alcohol-related self-presentations of peers can affect alcohol-related behaviors and cognitions (Geusens & Beullens, 2016b; Huang et al., 2014; Litt & Stock, 2011), but whether and how it interacted with own alcohol-related self-presentations had remained unexplored.

While at the zero order level, exposure to peer references on SNS is positively related to more positive attitudes at T2, in the final model we found no direct association between exposure to peers' online alcohol-related self-presentations and alcohol-attitudes one year later. It appears that the association between exposure and alcohol attitudes exists only through the interaction with self-effects, which points to the inherent interdependence of online peer socialization and social media self-effects. This could also explain why the interactions between *exposure* and parental socialization were not significant: Alcohol-related social media effects appear to be predominantly determined by self-sharing, which also determines the interactions with the other socializing factors. This could be explained by the prior finding that own alcohol-related references and alcohol-related references of friends often show the subjects and their friends drinking together, or refer to events they experienced together (Niland et al., 2014). Consequently, in order to fully understand social

media effects, it is crucial to not only distinguish between exposure and self-effects, but to study these as tied behaviors as well.

Specifically, we found that that individuals' alcohol-related attitudes were lower as a result of these shared alcohol-related self-presentations when they had non-displaying friends, than when they had alcohol displaying friends. This could testify to the social character of sharing alcohol references on SNS: The fun of sharing alcohol references stems from the fact that it is done with friends and to enhance friendships (Niland et al., 2014). Young drinkers who share alcohol references argue the importance of following friendship group norms when constructing their online alcohol-related self-presentations, and offenders can get excluded (Niland et al., 2014). Correspondingly, when adolescents share alcohol-related self-presentations when their friends are not, they are not conforming to the norms of their peer group, and they could potentially experience negative social consequences.

In-group conformity is both driven by the hoped-for positive consequences of social inclusion, and the feared negative consequences of social exclusion (Stallen, Smidts, & Sanfey, 2013). Young people want to fit in, and they don't want to be labeled as disloyal, or lose group membership. Hence, they conform to the in-group norms that are in the majority within their peer group. Additionally, this could lead to an internalization of the group norm (Perkins & Berkowitz, 1986). An internalization of the group drinking norm would also explain why the direction of the discrepancy between self-sharing and exposure did not matter: If their own behavior differs from the group behavior in either direction, individuals are motivated to regress back to the mean. While we did not examine whether these adolescents sharing alcohol-related online self-presentations with non-displaying friends changed their online communication practices over time, the results of the current study seem to suggest that they are not as strongly affected by their previously shared alcohol-related self-presentations as those adolescents whose friends engaged in alcohol-related sharing

behaviors as well. This points towards the premise that these individuals, at least partially, adopted the majority norms within their peer group.

Beyond a clear contribution to the line of research on the association between SNS use and alcohol consumption, the results of the current study also provide interesting insights for research on social media self-effects as a whole. Social media are actively used by most adolescents and emerging adults (ACMA, 2013), and topics they share about range from updates about social activities and everyday life, to diet and exercise, intellectual pursuits, political opinions, accomplishments, etc. (Marshall, Lefringhausen, & Ferenczi, 2015). Consequently, understanding social media effects is highly relevant from a wide range of research perspectives, such as mental and physical health, interpersonal relationships and political engagement. We believe that this study may help bridge some gaps in our knowledge on social media (self-)effects, and that this study's observations may help shape understandings of social media effects in a variety of domains.

Limitations

This study has contributed to the existing knowledge on social media self-effects in several ways. However, as with all research, some limitations should be addressed. First, in spite of the fact that baseline respondents were contacted up to six times, both through email and regular mail, only one third participated in the second wave of the study. Even though 70% is a relatively high attrition rate, this is not uncommon in longitudinal research (Gustavson et al., 2012). A non-response analysis indicated that the respondents differed significantly from the non-responders, which could point to the existence of systematic nonresponse. Yet, it also appeared that, although the sample under consideration held relatively negative alcohol attitudes (especially in wave 2), the sample was not biased towards non-drinking adolescents. In line with national data (Rosiers et al., 2014, 2017), only 13% at baseline and 10% at T2 indicated not to drink alcohol.

Additionally, this study was conducted in a country with a very tolerant alcohol policy. At baseline, all adolescents were at least 16 years old, which is the legal minimum age to drink wine and beer in Belgium. However, in most other countries, the minimum age is 18 or 21. These differences in legal norms could potentially affect young people's alcohol-related behaviors and cognitions, as well as parental alcohol-related socialization processes. Because these differences may limit the generalizability of our findings, we recommend future studies to examine these relations in other samples and among other populations.

Furthermore, we relied on self-reports, and could therefore only assess *perceived* parental and peer socialization, and not *actual* peer and parental behaviors. However, prior research has argued that when it comes to studying risk behavior, *perceived* socialization behaviors may be more important than actual socialization behaviors, because this is what guides young people's behaviors in real life as well (Hummer et al., 2013). Furthermore, we focused on *online* peer socialization and *offline* parental socialization. However, peers can exert offline influence and parents can exert online influence as well. Additional research can deepen our understanding of the roles these online and offline social environments can play in sharing alcohol references on SNS. Finally, we did not differentiate between friends and the wider peer group when examining peer socialization. However, it has been argued that especially close peers or friends are important influencers of (risk) behavior (Paek, 2009). Consequently, distinguishing between different peer groups and peer relationships in future research could refine our understanding of social media exposure effects.

Conclusion

The present study is among the first to empirically and longitudinally demonstrate that alcohol-related social media self-effects may occur via attitudes. Moreover, we showed that the strength of this association is not equal for all individuals sharing online alcohol-related self-presentations. Especially individuals whose peers and parents engaged in alcohol-

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positive socialization behaviors as well, held higher alcohol-related attitudes one year later when they shared alcohol-related self-presentations on SNS. The strength of the alcohol-related social media self-effect was dampened when peers and parents engaged in more negative alcohol-related socialization behaviors. Overall, this shows not only that individuals can affect themselves through displaying certain content on SNS, but that peers and parents continue to play a socializing role, even when adolescents transition into emerging adulthood.

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Table 1

Results of the Bivariate Correlation Analyses of the Main Constructs in the Analyses

	1.	2.	3.	4.	5.	6.	7.	8.		
1. Sharing alcohol references	<i>M(SD)=.40(.53), ΔM=-.10*</i>									
2. Perceived parental consumption	.14***	<i>M(SD)=1.51(1.02), ΔM=-.16***</i>								
3. Perceived parental permissibility	.14***	.30***	<i>M(SD)=2.99(1.26), ΔM=-.24***</i>							
4. Exposure to alcohol references	.41***	.12***	.13***	<i>M(SD)=1.78(.95), ΔM=-.23***</i>						
5. Attitudes T1	.22***	.22***	.33***	.19***	<i>M(SD)=3.66(.81), ΔM=-.20***</i>					
6. Attitudes T2	.23***	.20***	.26***	.19**	.60***	<i>M(SD)=3.50(.85)</i>				
7. Gender	.01	.02	-.07*	-.10**	-.13***	-.19***				
8. Age	.10**	.02	.08*	.15***	-.004	-.001	-.08*	<i>M(SD)=16.99(.82), ΔM=-.22***</i>		
9. Sensation seeking	.23***	.10***	.07*	.17***	.25***	.24***	.01	.03	<i>M(SD)=3.13(.74), ΔM=-.20***</i>	

*Note : * p<.05, ** p<.01, *** p<.001; ΔM represents the mean of responders minus the mean of non-responders*

PEERS AND PARENTS IN SOCIAL MEDIA SELF-EFFECTS

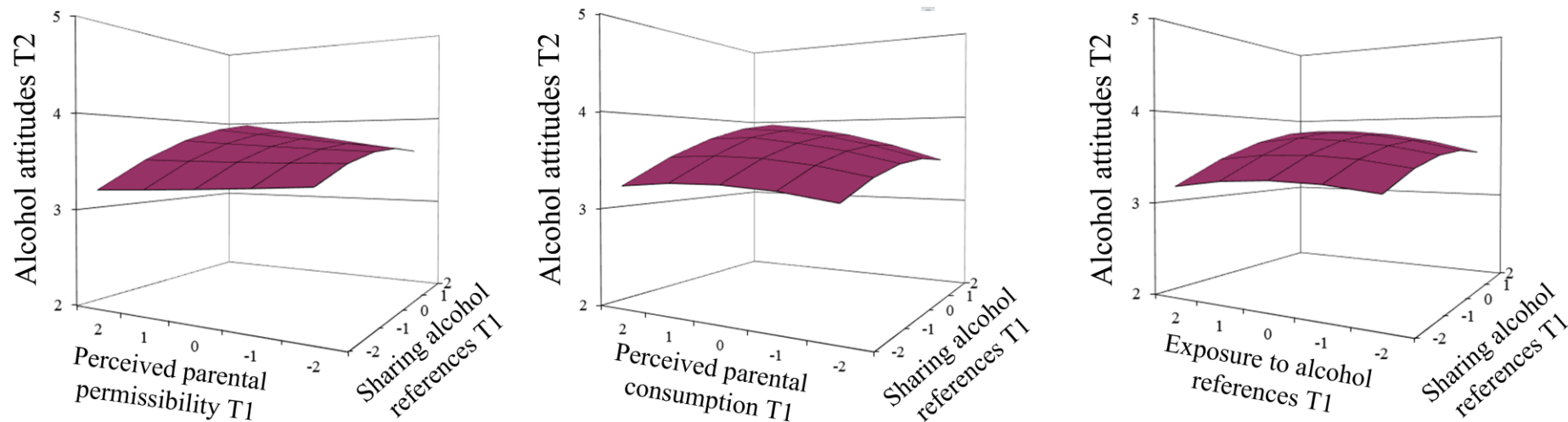
Table 2

Results of the Bootstrapped (1000 samples) Polynomial Regression and Response Surface Analyses of Alcohol Attitudes at T2 on Alcohol-Related Online Self-Presentation and Perceived Parental Consumption, Perceived Parental Permissibility and Exposure to Alcohol References

	ΔR^2	a ₁		a ₂		a ₃		a ₄	
		B(SE)	t	B(SE)	t	B(SE)	t	B(SE)	t
Sharing Alcohol References x Perceived Parental Consumption	.01**	.20(.05)***	4.18	-.03(.03)	-0.99	.06(.05)	1.21	-.08(.03)**	-2.62
Sharing Alcohol References x Perceived Parental Permissibility	.01*	.17(.05)***	3.55	.00(.03)	-.16	.10(.05)*	2.07	-.06(.03)*	-2.29
Sharing Alcohol References x Exposure to Alcohol References	.01*	.16(.04)***	3.94	-.04(.03)	-1.47	.09(.06)	1.58	-.08(.04)*	-2.18
Exposure to Alcohol References x Perceived Parental Consumption	.003								
Exposure to Alcohol References x Perceived Parental Permissibility	.002								

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

PEERS AND PARENTS IN SOCIAL MEDIA SELF-EFFECTS



Note. Predictor and Control Variables are Mean-Centered ($M=0$, $SD=1$)

Due to the traditionally small effect sizes in longitudinal media effects research, the figure is zoomed in for clarity (attitude scale ranges from 1 through 7)

Figure 1. Response Surface Analysis of Attitudes Towards Alcohol as Predicted by Online Alcohol-Related Self-Presentation and Perceived Parental Consumption, Perceived Parental Permissibility or Exposure to the Online Alcohol-Related Self-Presentation of Friends One Year Earlier