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Social Media Use in the Context of Drinking Onset: The Mutual Influences of Social Media Effects and Selectivity

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The article aims to provide a profound understanding of the multifaceted role of adolescents’ social media use in the context of drinking onset. It differentiates between exposure and sharing effects from social media content on drinking behavior and, conversely, exposure to and sharing of alcohol-related content due to drinking in the initiation phase of regular alcohol consumption. We tested our hypotheses based on a two-wave survey among adolescents aged 13 to 17 and focused on those who had not yet been regular drinkers at the first wave of data collection (n = 406). Based on a cross-lagged panel model, we found that exposure to alcohol-related content (exposure effect) as well as the sharing of such content (sharing effect) affected drinking behavior, and that drinking behavior resulted in the sharing of alcohol-related content on social media (selective sharing). We discuss a self-concept verification spiral at the individual level and a social influence spiral at the social level to assess possible risk-reinforcing dynamics.

Most young people begin using alcohol on a regular basis in adolescence (WHO, 2018), a phase in which identity development is a central concern and peers become the most important referents (Koepek & Denissen, 2012; Kroger, 2017). At the same time, social media are a means for expressing identities and connecting with peers (Ellison & Boyd, 2013; Moreno, Kota, Schoohs, & Whitehill, 2013). Thus, it is not surprising that alcohol use is a recurring topic on social media that is predominantly portrayed in a social context and in a positive way (Hendriks, van den Putte, Gebhardt, & Moreno, 2018; Hendriks, Wilsmsen, van Dalen, & Gebhardt, 2019). These observations raise the question of the relationship between social media use and alcohol consumption in the context of drinking onset.

Numerous studies have provided evidence for the overall relationship between social media use and alcohol consumption in adolescence (Curtis et al., 2018). However, the complexity of this relationship has been largely neglected: Adolescents are not only exposed to alcohol-related content, they also share posts about their own drinking behavior on social media. Therefore, beside exposure effects from others’ social media posts, there is a need to consider self-effects from one’s own social media activity on drinking behavior (Valkenburg, 2017). Second, from a transactional perspective, both exposure to and sharing of alcohol-related content should not only be regarded as the cause of drinking behavior (media effects) but also as a factor influencing media use (media selectivity; Slater, 2007).

There have been only a few attempts to disentangle these different processes (Geusens & Beullens, 2018; Geusens, Bigman-Galimore, & Beullens, 2020), and it was only recently that Geusens and Beullens (2020) considered the variety of possible influence processes in one single study. In the context of drinking behavior of late adolescents (aged between 16 and 20), they found neither long-lasting social media effects on drinking behavior from exposure to and sharing of alcohol-related content nor evidence for selectivity processes due to drinking behavior on exposure to and sharing of alcohol-related content.

The present study contributes to the latest state of research in two aspects. First, instead of examining late adolescents who, in large part, have already established regular drinking patterns (WHO, 2018), we focused on adolescents aged 13 to 17 and specifically on those who are not yet regular drinkers to cover the crucial phase of drinking onset. This focus is insightful, as among people who are not yet regular drinkers, alcohol consumption is a rather experimental behavior and, as such, is supposed to be more susceptible to causal social influences than already established behaviors (Scharlow & Bachl, 2019). Second, the present study applied a time lag of four months complementary to the long-term approach of Geusens and Beullens (2020) that was based on one-year time lags. The shorter time frame helped to get a more nuanced understanding of mid-term effects.

Learning more about the relationship between social media use and alcohol consumption in the initiation phase of regular drinking is of vital importance, as starting drinking earlier is associated with adult alcohol problems (e.g., Dooley, Prase, Ham-Rowbottom, & Emptage, 2006) and has also been shown to impact neurocognitive functioning (Nguyen-Louie et al., 2017). Thus, the study’s insights are of relevance for designing.
prevention and intervention programs that aim to delay the age of drinking onset and reduce alcohol consumption and alcohol-related problems in the critical phase of adolescence.

**Drinking Behavior and Social Media Use in Adolescence**

Adolescence is a transitional period between late childhood and the beginning of adulthood, ranging from approximately 13 to 17 years. In this period, one’s identity and self-concept become central concerns (Erikson, 1968; Kroger, 2017). Further, the direct influence of parents declines and the peers become the most important reference group (Koeppke & Denissen, 2012), meaning that adolescents are increasingly preoccupied with their peers’ concerns about their actions, thoughts, and appearance (Erikson, 1968; Kroger, 2017). In this context, drinking behavior as well as social media are gaining importance.

**Drinking Behavior in Adolescence**

Most young people begin drinking alcohol and integrating alcohol-related conceptions into their self-concept during this stage of life, mainly to fulfill personal and social needs and to enhance and initiate contact with peers (WHO, 2018). Drinking onset thereby not only refers to the first consumption of alcohol but to the process in which adolescents begin drinking on a regular basis and develop ongoing patterns of alcohol use (Nguyen-Louie et al., 2017). The age of drinking onset has been shown to be associated with excessive consumption (Dooley et al., 2006; Eliaisen et al., 2009) and alcohol dependence in adulthood (Gruca, Norberg, Bucholz, & Bierut, 2008; Hingson, Heeren, & Winter, 2006), as well as alcohol-related risk behaviors (Hingson, Heeren, Leveson, Jamanka, & Vos, 2002). Furthermore, earlier age of first drinking and weekly drinking have been shown to be factors for poorer neuropsychological performance, such as working memory (Nguyen-Louie et al., 2017). Against this backdrop, the present paper focuses on the phase of drinking onset, which is specified as a phase in which adolescents are not yet regular drinkers and potentially develop a more regular pattern of alcohol use.

**Social Media in Adolescence**

At the same time, social media are an important means for connecting with peers and expressing identities in this developmental phase (Ellison & Boyd, 2013; Moreno et al., 2013). Research indicates that young people share their alcohol practices online to belong to their friends and to present themselves as social and fun-having alcohol consumers (Niland, Lyons, Goodwin, & Hutton, 2014). Facebook has long been considered the most important social media platform in regard to the presentation and negotiation of drinking practices; however, a recent study revealed that Instagram and Snapchat are seen as the most important platforms for alcohol-related posts by adolescents (Boyle, Earle, LaBrie, & Ballou, 2017). The increasing importance of alcohol consumption in adolescence and the meaning of social media as a platform for peer bonding and self-presentation point to the question of the relationship between drinking behavior and social media use in the context of drinking onset.

**The Relationship between Drinking Behavior and Social Media Use**

To analytically disentangle the relationship between drinking behavior and social media use, we refer to two central demands in the current media effect literature (Valkenburg & Peter, 2013). First, we account for the active role of social media users and integrate the notion of self-effects beside exposure effects, as theoretically established by Valkenburg (2017). Self-effects are effects of self-generated media content on the generators themselves (Valkenburg, 2017). We specify them as sharing effects in the present case to directly relate to adolescents’ sharing of alcohol-related content. Second, we follow the transactional perspective as presented in Slater’s (2007) reinforcing spiral. The reinforcing spiral integrates processes of media effects and selectivity and thus propose that outcomes of social media effects, in this case drinking, can also cause social media use. The differentiation between exposure and sharing as two facets of social media use and the integration of social media effects and selectivity as two directions of influence result in four influences processes as presented in Figure 1: exposure effect, sharing effect, selective exposure, and selective sharing.

We built on a longitudinal survey with a four-month time lag between the first and second point of data collection (T1 and T2) to empirically reflect the different causal directions underlying these processes. Further, we examined the influence processes in the context of drinking onset by focusing on those adolescents who had not yet been regular drinkers at T1. The following paragraphs present the hypotheses on the four influence processes.

**Exposure Effect**

The exposure effect—the effect of exposure to alcohol-related content on adolescents’ drinking behavior—can be theoretically explained by social cognitive theory (Bandura, 1986). Social cognitive theory refers to social learning processes in which young people observe their peers online and adapt their behaviors to these observations (Geber & Hefner, 2019; Moreno et al., 2013). Comparably, the Facebook influence model (Moreno et al., 2013) suggests that being exposed to positive alcohol messages affects adolescents’ drinking behavior because adolescents are connected to their peers on social media, and pictures of others’ behavior influence behavior-related perceptions. Various studies have empirically demonstrated that exposure to the drinking-related content of others is associated with drinking behavior (Beullens & Vandenbosch, 2016; Geusens & Beullens, 2017), and longitudinal studies have substantiated the causality of this effect (Boyle, LaBrie, Froidevaux, & Witkovic, 2016). Especially in the phase of drinking onset, drinking-related
pictures might be the crucial impulse to engage in more regular drinking. We therefore formulated the following exposure effect hypothesis:

H1: Exposure to alcohol-related content on social media at T1 positively influences drinking behavior four months later at T2.

**Sharing Effect**

The sharing effect—the effect of sharing alcohol-related content on the drinking behavior of the content creators themselves—can be theoretically substantiated by self-perception theory (Bem, 1967, 1972). This theory posits that individuals infer their self-concepts from retrospectively observing their own overt behavior (Bem, 1972). The observation of oneself engaging in a certain behavior can cause an involuntary internalization of the self-presentation and a change in self-perception, which is followed by behavioral changes to act consistently with this self-perception (Bem, 1972). There is cross-sectional (Geusens et al., 2020) and longitudinal empirical evidence (D’Angelo, Kerr, & Moreno, 2014; Geusens & Beuvels, 2017, 2019) for self-effects from sharing alcohol-related content on social media on drinking behavior. These self-effects might be particularly relevant for the initiation phase of alcohol consumption, in which drinking is a more experimental behavior. Accordingly, we can assume that adolescents’ self-concept, including their sub-concept as an alcohol consumer and thus their drinking behavior, is affected by their prior sharing of alcohol references on social media. Therefore, we stated the following self-effect hypothesis:

H2: Sharing of alcohol-related content on social media at T1 positively influences drinking behavior four months later at T2.

**Selective Exposure**

Selective exposure—exposure to alcohol-related content as a consequence of personal drinking behavior—can be theoretically substantiated within the selective exposure paradigm (Knobloch-Westerwick, 2015; Zillmann & Bryant, 1985). This paradigm postulates that media users select messages “to manage and regulate their self-concept” along with behaviors (Knobloch-Westerwick, 2015, p. 965; see also Zillmann & Bryant, 1985). As young adolescents are still in the phase of developing their drinking-related self-concept, selective exposure is especially identity-relevant and likely to be important in this phase. Indeed, the selective exposure paradigm emphasizes that selective exposure has the potential to produce change when driven by a process where individuals strive to meet standards (Westervick, Johnson, & Knobloch-Westerwick, 2017). Thus, adolescents who experimentally consume alcohol might recognize a need for more regular drinking behavior because of drinking norms in their social context and might selectively expose themselves to drinking-related social media content. Thus, we formulated the following selective exposure hypothesis:

H3: Drinking behavior at T1 positively influences exposure to alcohol-related content on social media four months later at T2.

**Selective Sharing**

Selective sharing—the sharing of alcohol-related content on social media as a consequence of personal drinking behavior—was not originally featured in the selective exposure paradigm (Knobloch-Westerwick, 2015; Zillmann & Bryant, 1985). However, it fits well to the paradigm’s leading idea of motivation-driven media use (Knobloch-Westerwick, 2015; Slater, 2007). Adolescents’ presentation of content on social media that corroborates their self-concept can be regarded as self-presentation (Baumeister & Hutton, 1987). According to the Facebook influence model (Moreno et al., 2013), self-presentation and the development of an online identity are important and unique aspects of social media use. Supporting this argumentation in the context of alcohol consumption, a longitudinal study of Geusens and Beuvels (2017) has revealed that binge drinking predicts sharing of alcohol references on social media one year later. We assume that self-presentation as alcohol consumer is
particularly important for those who start drinking, which is why we formulated the selective sharing hypothesis:

H4: Drinking behavior at T1 positively influences the sharing of alcohol-related content on social media four months later at T2.

Methods

Sample

A two-wave survey was administered among first year students at two secondary schools in Switzerland. Of the 792 students, 94.3% participated in the survey at the first time of data collection (T1, n = 747), 90.5% at the second time (T2, n = 717), and 87.2% (n = 691) at both time points of data collection. The attrition from T1 to T2 was due to illness, doctor appointments, and scheduling difficulties that excluded one school class from participating in one wave. Absent students were subsequently contacted via e-mail and asked to participate in the survey. In consideration of a seriousness check that included three questions on understanding, seriousness, and concentration, 18 students were excluded from the sample. Consequently, the overall sample consisted of 673 adolescents who participated in both waves. Because of its focus on drinking onset, the present study only considered adolescents who had not yet been regular drinkers at T1, that is, who indicated they drank less than once per month. They accounted for 60% of the sample (n = 406), consisted of 64% females, and ranged in age between 13 and 17 years (M = 15.1; SD = 0.83).

Procedure

Prior to the study, the study design was reviewed and approved by the ethics committee of the University of Zurich. After contacting all schools in two governmental districts via mail, phone, and e-mail, four schools agreed to support and ensure the participation of all classes from the first grade (in sum, 33 classes across all schools). The first wave of data collection was carried out in September 2019 (T1) within the first six weeks after school began. The second wave was conducted four months later in January 2020 (T2), at the end of the first semester. In both waves, school classes were visited on-site, and an online survey was carried out in class under the supervision of a member of the research team and the teacher. The procedure took about 45 minutes. Adolescents were informed that participation was completely confidential and voluntary. In accordance with the legal regulation and decision by the ethics committee, no parental consent was necessary. Consent was given by all students participating in the survey. As an incentive, participants could win a tablet in a lottery that was organized once per wave and school.

Measurements

Drinking Behavior

Drinking behavior was assessed via two questions. First, participants were asked if they drink alcohol (“Do you drink alcohol, even if only rarely?”; scale: 0 = no, 1 = yes). Second, those who indicated they drink alcohol were subsequently asked to specify the frequency of their consumption. Both measurements were recoded into one variable: 0 = never, 1 = tried, 2 = several times a year, 3 = once per month, 4 = two to three times per month, 5 = once per week, 6 = two per week, 7 = more often than two times per week. Adolescents who stated they do not drink alcohol were asked about their drinking behavior in the past; if they indicated that they have ever drunk alcohol (scale: 0 = no, 1 = yes), they were considered as 1 = tried in the newly recoded variable. Because of the study’s focus on drinking onset, the following analysis will exclusively focus on adolescents who reported not to be regular drinkers at the first time of data collection, thus, adolescents who indicated they drink less than once per month (n = 406).

Exposure to Alcohol-related Content

Exposure to alcohol-related content was measured with respect to Instagram and Snapchat, the two most relevant social media platforms among adolescents for alcohol-related posts by adolescents (Boyle et al., 2017). For each platform, respondents were asked to indicate on a scale from 1 = never to 5 = very often how often they “see content in which alcohol is present.”

Table 1. Means, standard deviations, and zero-order correlations for all variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>Mdn</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Drinking T1</td>
<td>0.87 (0.66)</td>
<td>1.00</td>
<td>1.00*</td>
<td>0.67***</td>
<td>0.19***</td>
<td>0.11</td>
<td>0.24***</td>
<td>0.24***</td>
<td>-0.08</td>
<td>0.11*</td>
</tr>
<tr>
<td>(2) Drinking T2</td>
<td>1.45 (1.40)</td>
<td>1.00</td>
<td>1.00***</td>
<td>0.27***</td>
<td>0.25***</td>
<td>0.28***</td>
<td>0.46***</td>
<td>-0.07</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>(3) Exposure T1</td>
<td>2.08 (0.99)</td>
<td>2.00</td>
<td>1.00***</td>
<td>0.66***</td>
<td>0.26***</td>
<td>0.35***</td>
<td>0.12*</td>
<td>0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Exposure T2</td>
<td>2.28 (1.08)</td>
<td>2.00</td>
<td>1.00***</td>
<td>0.26***</td>
<td>0.39***</td>
<td>0.11*</td>
<td>-0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Sharing T1</td>
<td>1.08 (0.28)</td>
<td>1.00</td>
<td>1.00***</td>
<td>0.43***</td>
<td>-0.09</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Sharing T2</td>
<td>1.22 (0.48)</td>
<td>1.00</td>
<td>1.00***</td>
<td>-0.04</td>
<td>0.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Gender (female)</td>
<td>0.65 (0.48)</td>
<td>1.00</td>
<td>1.00***</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) Age</td>
<td>15.07 (0.79)</td>
<td>15.00</td>
<td>1.00***</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note. Scales: (1)/(2): 0 = never, 7 = more often than two times per week; (3)-(6): 1 = never, 5 = very often; (7): 0 = male, 1 = female; n = 404–406; T1 = time point 1, T2 = time point 2; M = mean, SD = standard deviation, Mdn = median; ***p < .001 **p < .01, *p < .05.
The mean of both measures was calculated, representing the exposure to alcohol-related content on social media (Table 1).

**Sharing of Alcohol-related Content**
In parallel to exposure, the sharing of alcohol-related content was measured with respect to Instagram and Snapchat. On a scale from 1 = never to 5 = very often, participants were asked to indicate how often they post or send content on Instagram and Snapchat depicting alcohol. The mean of both variables represented the sharing of alcohol-related content on social media (Table 1).

**Analysis Strategy**
Preliminary analyses (Table 1) demonstrated zero-order correlations among all variables, indicating a substantial relationship between social media use and adolescents’ drinking behavior. For the hypotheses test, we used path analyses and estimated all influence processes in a cross-lagged panel model (CLPM). The CLPM addresses the causality of effects by specifying lagged effects that estimate relationships between variables across two time points (Kearney, 2017). Accordingly, we specified the following lagged paths to test hypotheses H1 to H4 and their underlying causality assumption: exposure to alcohol-related content at T1 to drinking behavior at T2 (exposure effect, H1); sharing of alcohol-related content at T1 to drinking behavior at T2 (sharing effect, H2); drinking behavior at T1 to exposure to alcohol-related content at T2 (selective exposure, H3); drinking behavior at T1 to sharing of alcohol-related content at T2 (selective sharing, H4). We additionally controlled for causal influences between exposure to and sharing of alcohol-related content.

![Figure 2](image-url) **Figure 2.** Sample’s distribution of drinking behavior at T1 and T2. Note. T1: n = 406, T2: n = 404; T1 = time point 1, T2 = time point 2.

alcohol-related content, and sharing of alcohol-related content on their T1 measurements. Further, we integrated covariances between the exogenous (T1 measurements) and endogenous variables (T2). As gender and age have been found to be associated with drinking behavior (Inchley et al., 2020; WHO, 2018), they were considered as control variables. The path model was examined using the R package lavaan (Rosseel, 2012).

**Results**
Our data revealed an increase in the sample’s alcohol consumption from T1 to T2. As demonstrated in Figure 2, about one fifth of the adolescents who had not been regular drinkers at T1 had become regular drinkers (who drink at least once per month) within the four months of data collection. The mean values in Table 1 further show that the sample’s exposure to and sharing of alcohol-related content on social media increased in this time as well.

**Figure 3** represents the model that estimates the influence processes between drinking behavior, exposure to alcohol-related content, and sharing of alcohol-related content. The fit of this model was good (Hu & Bentler, 1999): $\chi^2(2) = 8.351, p = .214; \text{CFI} = .995; \text{SRMR} = .018; \text{RMSEA} = .031, 90\% \text{ CI} [.000, .080].$ It demonstrates that exposure to alcohol-related content, sharing of alcohol-related content, and drinking behavior were relatively stable over time (autoregressive effects) but at the same time mutually influenced each other. Concretely, the results on the lagged paths corroborated the social media effect hypotheses, that is, H1 on exposure effects and H2 on sharing effects: exposure to as well as sharing of alcohol-related content at T1 predicted drinking behavior at T2. While the results did not corroborate processes of selective exposure (H3), they were not mutual.
in line with H4 on selective sharing. Drinking behavior at T1 predicted the sharing of alcohol-related content on social media at T2. In summary, our results indicate that the relationship between social media use and drinking behavior is determined by influence processes related to exposure effects (H1), sharing effects (H2), and selective sharing (H4).

**Discussion**

The present study examined the complex relationship between adolescents’ social media use and drinking behavior by differentiating between exposure and sharing effects as well as selective exposure and selective sharing based on a two-wave survey. Our results corroborate causal influence processes of social media effects as well as of social media selectivity in the context of drinking onset.

**Social Media Effects and Social Media Selectivity in the Context of Drinking Onset**

Concretely, we found an exposure effect (H1), that is, a causal effect from exposure to others’ alcohol-related content on social media at T1 on drinking behavior four months later at T2, as well as a sharing effect (H2), the self-effect of sharing alcohol-related content at T1 on drinking behavior at T2. Both effects are comparable in terms of their size and thus seem to have the same importance in the context of drinking onset. They can be interpreted as learning processes that are based on observation of their referent others in the case of the exposure effect (Bandura, 1986) as well as self-observations of personal drinking behavior in the case of the sharing effect (Bern, 1972).

Regarding social media selectivity, our results were not in line with the assumption of selective exposure (H3) but with selective sharing (H4). In other words, we did not find empirical evidence that adolescents turned to drinking-related content of others in order to actively manage and regulate their drinking self-concept. Having said this, it is not precluded that subconscious selection processes took place that are best detectable in experimental designs through unobtrusive behavioral measures (Knobloch-Westerwick, 2015, p. 964). Our data provide evidence for selective sharing and thus the assumption that personal drinking at T1 increased the likelihood to share alcohol related posts on social media at T2. This result indicates that adolescents’ social media use and drinking behavior might be to a certain extent self-concept-driven and guided by the motivation of self-presentation, as also suggested by the Facebook influence model (Moreno et al., 2013).

**Potential Risk-Reinforcing Spirals**

To understand the potential dynamics that these influence processes might unfold mutually, we again refer to the reinforcing spiral of Slater (2007). More specifically, we refer to the idea that social media effects and selectivity “move forward in time, influencing one another, with the likelihood of reinforcing or cumulative effects” (Slater, 2007, p. 284). Thus, the basic idea of such a spiral process is that drinking as the outcome of social media effects is the origin for social media selectivity and that exposure to and sharing of alcohol references, again, make drinking more likely. As a result, social media effects and selectivity collectively form a continuing spiral process that potentially reinforces drinking behaviors among adolescents.

Our results indicate two potential spiral processes that reinforce drinking behavior among young adolescents who start drinking. The first is best described as a self-concept verification spiral. It refers to the result that the sharing of alcohol-related content enforces drinking (sharing effect) and that drinking is presented in alcohol-related posts on social media (selective sharing). Thus, to the extent that both processes can be thought of as occurring sequentially, this result suggests that adolescents get actively aware of their own behavior—presumably to verify and strengthen their self-concept as alcohol consumers—and that this process of self-verification, in turn, reinforces their own drinking.

While the self-concept verification spiral takes place at the individual level, the second spiral develops its dynamics within social contexts and potentially enforces drinking behavior by influences within the reference group. We refer to this process as the social influence spiral; it is based on the finding that exposure to others’ alcohol-related content leads to drinking (exposure effect), and that drinking is presented in alcohol-related posts (selective sharing) that are then visible to others. Thus, again, presuming that both processes are likely to operate continuously, they suggest that through the display of drinking

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**Figure 3.** The mutual influences of social media effects and selectivity in the context of adolescents’ drinking onset. Note. n = 402; robust maximum likelihood estimator (MLR); T1 = time point 1, T2 = time point 2; controlled for gender and age (regressed on T1 measurements); χ²(6) = 8.351, p = .214; CFI = .995; SRMR = .018; RMSEA = .031, 90% CI [.000, .080].
behavior on social media, other group members are likely to be exposed to it, which, in turn, affects their drinking behavior.

The interpretation of the processes as spiral processes that mutually influence each other and enforce adolescents’ drinking behavior raises the question as to whether the spirals will lead to extreme drinking behavior. Based on our results, the current state of research, as well as further theoretical elaborations, we conclude that it is unlikely that these spiral processes will lead to extreme drinking behavior.

First, the descriptive information for both time points of measurement (Table 1) and the path coefficients (Figure 3) suggest that these risk-reinforcing spirals are dynamic but rather slow-evolving processes. Alcohol consumption as well as exposure to and sharing of alcohol increased in the four-month period of data collection, but the changes were rather small. Comparably, the path coefficients demonstrate that the causal effects were small, suggesting rather subtle influence processes that may unfold their impact over time.

Second, as noted in the introduction, our study directly connects to the latest study of Geusens and Beullens (2020), which, however, did not find evidence for causal influence processes underlying the relationship between social media use and late adolescents’ alcohol consumption. We assume that this can be mainly explained by differences in the samples’ age and drinking experience in both studies. This assumption suggests that social media use plays an important role in establishing a drinking-related self-concept during the first experimental phase of alcohol consumption but loses its significance with increasing drinking regularity. We can empirically substantiate this assumption by a further analysis among the regular drinkers in our sample. Indeed, among those who had already been regular drinkers when entering school at T1, we did not find any correlations between social media use and drinking behavior (see Figure A1 in the appendix).

Third, we can assume further factors that moderate spiral processes and limit risk-reinforcing feedback loops (Slater, 2007). One important factor might be that adolescents change their social contexts on a relatively regular basis as a result of their educational careers, meaning that social dynamics as proposed by the social influence spiral are likely to be disrupted. This might also be a reason why Geusens and Beullens (2020) did not find influence processes. The time frame of in sum two years employed in their study encompasses school exits and transitions for half of their respondents and thus shifts in social contexts, which may have interrupted social media-linked influence processes. Further moderating environmental factors presumably include parents as well as institutional and legal conditions, such as that selling or serving alcohol to young people under the age of 16 is prohibited in Switzerland.

**Implications**

The social influence spiral suggests that prevention strategies would be best realized in adolescents’ social contexts. The pupils’ classes might be an adequate and accessible social context for such programs. Workshops in such social settings are promising, as they can stimulate discussions among pupils about how drinking behavior is displayed on social media and what the reality looks like. Normative misperceptions built upon idealized presentations on social media have been found to be an important predictor of engagement in risk behaviors (Berkowitz, 2004; Kenney, LaBrie, & Lac, 2013). Face-to-face discussion among peers, on the other hand, has been found to impact behavior-related perceptions (Geber, Baumann, & Klimmt, 2019; Hendriks, van den Putte, & de Bruijn, 2015) and thus promise to be an effective means for correcting normative misperceptions (Berkowitz, 2004). Comparably, social media campaigns initiated by schools and following a social norms approach might be an effective measure. An evaluation study of a university-wide social norms marketing campaign that has run over thirteen years showed that this approach was effective in reducing high-risk drinking and its consequences among students (Hembroff et al., 2019).

**Limitations**

The longitudinal two-wave study design allowed us to test the causality of influence processes underlying social media use and drinking behavior and thus provided a nuanced understanding of this relationship. However, the study has limitations that must be considered.

First, and most importantly, we used the cross-lagged panel model (CLPM) in accordance with the two-wave design to analyze causal influences. The CLPM, however, does not allow differentiating between-person (variance between onset drinkers) and within-person variance (variance within onset drinkers as a function of time; Rogosa, 1980). That is why the CLPM has been criticized in the past in favor of multiple-wave designs and the random intercept cross-lagged panel model (R-CLPM; Hamaker, Kuiper, & Grasmann, 2015). However, there are empirical arguments that speak for the reliability of our findings: the non-differentiation of variances in the CLPM is mainly a problem when the between-person variance is substantial compared to the within-person variance (Hamaker et al., 2015). In the present analysis, the intraclass correlation coefficient (ICC; that compares the between- with the within-person variance) indicates that the variance between the sample’s members is small, and for drinking behavior and sharing alcohol-related content, with 35% and 26%, far less than the variance within the respondents that is respectively 65% and 74%.4

Second, the two-wave design is not fully appropriate to test spiral processes or, more concretely, the spiral-related assumption that the outcome of an effect serves in a further sequence as a cause for influences. Technically, the empirical test of this assumption requires in its simplest case a three-wave study design (Slater, 2007, p. 284). We assert, however, that to the extent that we found the influence processes to operate concurrently, we can assume that they also occur reciprocally. The four-month time lag between the two waves of data collection is unlikely to reflect the actual duration of these influence processes. It is rather likely that the influence processes are “far shorter lived” (Slater, 2007, p. 286) and that our time lag does not represent one process but encompasses several “ministeps” (Snijders, 2019, p. 35). This makes it plausible that the influence processes as detected in our study are, to a certain extent, already the result of multiple

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4 Between-person variance of exposure to alcohol-related content: 63%; within-person variance of exposure to alcohol-related content: 37%.
unobserved reciprocal processes in which the outcome of one process (e.g., drinking as an outcome of sharing) has served as a cause for a prospective process (i.e., selective sharing).

Third, we collected data within three schools and respectively 33 classes, which may point to the need to control for variances and covariances of the endogenous variables at higher levels (i.e., classes, schools). However, our analysis shows that this multilevel structure is not very pronounced in our setting. For all variables, the ICC (that compares the variance at the class level with the variance within the classes) indicates that the variance at the class level is less than 10% (drinking behavior: 6.7%; exposure to alcohol-related content: 3.1%; sharing of alcohol-related content: 8.1%).

Fourth, we did not integrate the underlying cognitive mechanisms of the influences processes examined in the present study. The theoretical underpinning of the hypotheses refers, more or less explicitly, to some cognitions that might play important roles. Specifically, alcohol-related attitudes (including self-concepts), normative perceptions, and self-presentation motivations should be included in further studies as mediators to gain a better understanding of the processes underlying the relationship between adolescents’ social media use and risk behaviors.

Conclusion

The present study examined the influence processes between social media use and drinking behavior in a longitudinal approach to learn how they operate concurrently and mutually in the context of drinking onset. The results suggest that exposure to alcohol-related content of others as well as the personal sharing of such content causally affect drinking behavior (exposure effect and sharing effect) and that personal drinking behavior is displayed by sharing alcohol-related content (selective sharing). Assuming that these influence processes are likely to occur mutually, the results indicate two spiral processes. The self-concept verification spiral potentially reinforces adolescents’ drinking behavior at the individual level; the social influence spiral takes place at the level of the peer group. Both spirals, however, are rather slow-evolving processes that unfold their impact over time. Beyond the question of spiral processes, our theoretical reasoning and empirical findings suggest advancing this line of research to understand the underlying (social) cognitions and the dynamics of these social influence processes in social networks.

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References


Appendix

Figure A1. Model for regular drinkers. Note. $n = 261$; robust maximum likelihood estimator (MLR); $T_1 =$ time point 1, $T_2 =$ time point 2; controlled for gender and age (regressed on $T_1$ measurements); $\chi^2(6) = 8.442, p = .207$; CFI = .993; SRMR = .022; RMSEA = .039, 90% CI [.000, .095].