

Socially-Framed Text Appeals Predict Drinking Behavior in SNS Alcohol Advertising: An Eye Tracking Study

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Abstract

Background: Alcohol-related marketing on social networking sites (SNS) often combines emotionally framed textual appeals with alcohol imagery, mimicking peer-to-peer communication. While regulatory efforts primarily target visual cues, less is known about the influence of emotionally charged textual content on drinking behavior.

Objective: This study investigated how visual attention to textual versus image-based content in SNS alcohol posts relates to drinking behavior and whether effects differ by emotional message type (social, ego, or sensory appeals).

Methods: A laboratory-based eye-tracking experiment was conducted with 157 young adults (aged 18–30). Participants viewed Instagram-style alcohol advertisements containing one of three textual appeal types paired with alcohol-related imagery. Total fixation duration (TFD) on text and image areas was recorded. Drinking frequency over the past 30 days was assessed via self-report. Multiple linear regression analysis assessed main and interaction effects of attention and message type.

Results: Attention to alcohol imagery was not significantly associated with drinking frequency ($\beta = 0.06$, $P = .41$). However, attention to textual content interacted significantly with message type ($F(2,120) = 4.35$, $P = .015$). Greater fixation on social appeals predicted higher drinking frequency ($\beta = 0.29$, $P = .01$), while fixation on sensory appeals predicted lower drinking frequency ($\beta = -0.25$, $P = .04$).

Conclusions: Emotionally framed textual messages particularly social appeals play a critical role in shaping alcohol use behavior on SNS. Because these peer-like messages resemble authentic communication, they may evade visual-focused regulatory scrutiny. Findings highlight regulatory efforts to address emotionally engaging textual content alongside imagery.

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Original Manuscript

Socially-Framed Text Appeals Predict Drinking Behavior in SNS Alcohol Advertising: An Eye-Tracking Study

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Abstract

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Objective: This study investigated how visual attention to textual versus image-based content in SNS alcohol posts relates to drinking behavior and whether effects differ by emotional message type (social, ego, or sensory appeals).

Methods: A laboratory-based eye-tracking experiment was conducted with 157 young adults (aged 18–30). Participants viewed Instagram-style alcohol advertisements containing one of three textual appeal types paired with alcohol-related imagery. Total fixation duration (TFD) on text and image areas was recorded. Drinking frequency over the past 30 days was assessed via self-report. Multiple linear regression analysis assessed main and interaction effects of attention and message type.

Results: Attention to alcohol imagery was not significantly associated with drinking frequency ($\beta = 0.06$, $P = .41$). However, attention to textual content interacted significantly with message type ($F(2,120) = 4.35$, $P = .015$). Greater fixation on social appeals predicted higher drinking frequency ($\beta = 0.29$, $P = .01$), while fixation on sensory appeals predicted lower drinking frequency ($\beta = -0.25$, $P = .04$).

Conclusions: Emotionally framed textual messages particularly social appeals play a critical role in shaping alcohol use behavior on SNS. Because these peer-like messages resemble authentic communication, they may evade visual-focused regulatory scrutiny. Findings highlight regulatory efforts to address emotionally engaging textual content alongside imagery.

Keywords: social networking sites; alcohol marketing; eye-tracking; emotional appeals; young adults

Introduction

Social networking sites (SNS) have become dominant platforms for both interpersonal interaction and the dissemination of commercial marketing and advertising messages. Although such content is widespread on SNS, regulatory oversight remains limited. Most social media alcohol promotion is regulated through industry-led self-regulatory frameworks, which are often criticized for their lack of enforceability, transparency, and independent oversight [1,2]. As a result, adolescents and young adults are frequently and indiscriminately exposed to persuasive alcohol messaging. This exposure has been linked to increased drinking behavior and more favorable attitudes toward alcohol consumption [3,4]

Prior research has shown that alcohol marketing increases the desire to drink and contributes to the normalization of alcohol use, especially among youth [5,6,7]. Commercial brands often use emotionally rich, multimodal content on platforms like Instagram and YouTube to boost engagement [8]. Emotionally framed ads, in particular, have been shown to increase drinking intentions [9]. On SNS platforms, algorithmic amplification further extends the reach and impact of this content. These patterns underscore the need for stronger and more comprehensive regulatory mechanisms.

Although extensive research has examined the persuasive effects of alcohol marketing, relatively few studies have investigated how specific message features on social networking sites (SNS) interact with user attention to influence alcohol-related perceptions and behaviors. In particular, little is known about how emotionally framed textual content, such as social, ego, or sensory appeals, shapes drinking behavior when measured using objective tools such as eye-tracking. The impact of message format, including differences between visual and textual content, also remains underexplored.

To address these gaps in the literature, this study uses eye-tracking method alongside a typology of emotional message appeals drawing on the Six Wheel Theory [10]. We examine how

visual attention to alcohol advertising, measured by total fixation duration, differs by message type and content format in SNS environments. By assessing these interactions, the study identifies combinations of message framing and modality that may increase vulnerability to alcohol use. The findings aim to inform the development of more targeted regulatory efforts and health intervention strategies, especially for textual content that imitates peer communication and often escapes regulatory scrutiny.

Literature Review

Social Media Alcohol Advertising: Exposure, Persuasive Mechanisms, and Youth Risk

As prominent digital platforms for alcohol marketing, SNS enables alcohol brands to engage users through precision targeting, immersive content, and peer-based amplification. Unlike traditional forms of advertising, these platforms often embed alcohol-related messages within everyday social exchanges, framing drinking as normative, aspirational, and socially rewarding [11,12,13]. As a result, SNS foster persuasive digital environments that reinforce alcohol consumption, especially among adolescents and young adults.

A growing body of research links exposure to digital alcohol marketing with earlier drinking initiation and higher levels of consumption among youth, who are especially vulnerable to persuasive media content [14,15,16]. Evidence indicates that alcohol marketing and promotion often employ high-quality visuals, personalized content, and emotionally charged themes to increase user engagement [13,17]. These strategies capitalize on the dynamics of the “attention economy” [18] where social validation tools such as likes, comments, and shares help reinforce alcohol-related identity and behaviors.

Recent studies across SNS platforms have further investigated these concerns and issues. For instance, Alhabash and colleagues found that Facebook alcohol ads increased drinking intentions, especially for familiar brands [9]. In addition, Critchlow et al. reported that adolescents who interacted with alcohol-related posts were more likely to engage in high-risk drinking [19]. A recent

longitudinal study showed that Instagram alcohol exposure predicted increases in alcohol-related cognitions and behavior [20]. User-generated content also plays a critical role in normalizing drinking. For example, Thompson et al. found that Instagram posts tagged with #Cheers depicted alcohol as part of an idealized lifestyle [21]. In addition, Westberg and colleagues indicated how brands use sport sponsorships and fan-driven social media to embed alcohol messaging into culturally meaningful events [22].

Influencers are increasingly central to this landscape. Recent research showed that nearly two-thirds of popular youth-followed Instagram influencers had posted alcohol-related content, often lacking sponsorship disclosure [17]. Social media posts with disclosures received less engagement, suggesting limited incentives for transparency and fewer regulatory consequences. These patterns are exacerbated by regulatory oversight, [23, 24] highlighting that industry-led self-regulation inadequately protects vulnerable audiences. Alcohol companies often bypass age restrictions through sponsorships, events, and influencer partnerships. In addition, digital formats including branded content, social apps, and contests are particularly effective in reaching youth, often without proper labeling or verification [25,26].

These dynamics contribute to what Griffiths and Casswell describe as “intoxigenic digital spaces,” in which SNS algorithms serve increasingly personalized and persuasive alcohol content based on user behavior and preferences [27]. These environments not only normalize but actively promote consumption through emotionally charged and socially validated messaging [28].

Medium-Message Compatibility and Dual-Processing in Digital Advertising

Media researchers have examined how media properties create differential effects based on differences in modalities. Prior studies empirically demonstrated these effects in traditional media contexts. Bryce and Olney found that visual elements produce stronger memory effects compared to verbal-only messages [29], establishing the "picture superiority effect." Similarly, Liu and Stout demonstrated that modality (audiovisual vs. audio-only) and appeal type (rational vs. emotional)

create differences in emotional response and attitude formation [30], with both serving as mediators in advertising acceptance.

Research drawing on concepts such as processing depth and platform affordances has investigated how modality differences create behavioral differences through distinct cognitive processes. This body of work suggests that text and visual content engage users differently, with platform characteristics influencing how information is processed. For example, Pieters and Wedel found that while pictorial elements capture attention independent of size, text elements capture attention proportional to surface size [31], with sustained textual engagement predicting deeper processing and behavioral outcomes. Heath also noted that affective advertising can be processed at low levels of attention without necessarily leading to behavior change [32]. More recent research supports this distinction, showing that visual attention often involves automatic, low-effort scanning, while textual engagement typically requires more deliberative processing that is more likely to influence decision-making and actual actions.

This distinction is supported by findings from a multimodal discourse analysis. The findings suggest that verbal text can serve as “verbal anchoring” by guiding and clarifying the meaning of visual content [33]. Platform-specific characteristics fundamentally alter these modality effects. Social networking sites create processing environments designed around social connection and authentic communication [34], generating affordances that favor text-based social interaction over visual consumption. In SNS environments, users process textual content as social communication extensions while treating visual content peripherally, fundamentally altering traditional visual superiority effects.

Despite growing interest in modality effects, research on how message modality relates to specific emotional appeals remains limited. Narrative persuasion research suggests that textual and visual elements engage distinct cognitive pathways that shape persuasive outcomes [35]. It is well established that modalities engage distinct processing mechanisms and that platform features

influence these processes. However, less is known about how emotional appeal types interact with presentation modality. Appeals that emphasize sensory experience, personal identity, or social connection may vary in effectiveness depending on whether they are presented through text or visuals. This interaction may be especially important in social media settings where the fit between modality and emotional appeal can strongly affect the impact of advertising.

Difference of Emotional Appeals Between Sensory, Ego, and Social Messages

This study examines three distinct categories of emotional appeals in alcohol advertising text, grounded in Taylor's Six Wheel Theory: *sensory* appeals (pleasure, indulgence, taste), *ego* appeals (confidence, distinction, status), and *social* appeals (connection, belonging, friendship) [36]. While prior evidence has revealed the effectiveness of sensory appeals through their direct activation of hedonic motivation systems, the unique characteristics of SNS environments may fundamentally alter the relative effectiveness of different emotional appeal types.

The social nature of SNS platforms makes them particularly conducive to the persuasive power of social message appeals. These platforms are built around interpersonal communication, peer approval, and community interaction to create an environment where messages emphasizing group belonging and relational connection align with users' expectations and platform functions [37]. As a result, SNS users may perceive social appeals in alcohol advertising as authentic peer communication rather than commercial persuasion. This perception can reduce critical scrutiny that allows the message to bypass the cognitive resistance that is typically triggered by more explicit advertising cues [18,19,21].

In contrast, sensory appeals may face medium-message compatibility challenges in text-based SNS formats. While sensory descriptions can activate embodied cognition processes, their effectiveness may be diminished when presented through textual rather than visual channels, as sensory experiences are inherently tactile and visual in nature. Ego-based appeals represent an intermediate category that may be less naturally aligned with the collaborative social nature of SNS

platforms. To assess the discrepancies in appeal effectiveness and their underlying attentional mechanisms, it is important to utilize objective measurement approaches that can capture automatic processing.

Eye-Tracking as an Objective Tool for Identifying Alcohol Marketing Risk Factors

Eye-tracking methodology provides objective, real-time measurement of visual attention allocation, addressing limitations of self-reported measures that are subject to social desirability bias [38]. This approach captures automatic attentional responses below conscious awareness, enabling precise examination of how alcohol advertising elements influence viewer attention.

Individual differences in alcohol consumption are reflected in distinct eye-tracking patterns. Heavy drinkers show different visual attention patterns compared to light drinkers [39], while adolescent social drinkers demonstrate specific attention bias toward alcohol-related stimuli [40]. Research has also revealed sex-based differences in gaze behaviors when processing alcohol products, with males and females showing distinct attention patterns [41]. In social media contexts, eye-tracking research investigates how adolescents process alcohol content in Instagram Stories, revealing differential attention allocation between alcoholic and non-alcoholic beverages [42]. This provides objective evidence of alcohol marketing's attention-capturing properties in digital platforms where vulnerable populations spend substantial time.

Eye-tracking studies confirm a functional division in visual processing: pictorial elements capture initial attention and shape evaluations, while sustained textual fixation predicts deeper cognitive processing and message acceptance [43]. This distinction, supported by broader attention research [31], is crucial for understanding how visual versus textual advertising components contribute to persuasive effectiveness through different cognitive pathways.

Individual Differences as Consistent Predictors

Drinking identity and perceived social norms are well-established factors predicting alcohol consumption across diverse contexts [44,45]. Drinking identity reflects the extent to which alcohol

use is integrated into an individual's self-concept, with greater identity-behavior alignment linked to heavier drinking [46]. Similarly, perceptions of social norms play a crucial role in shaping drinking behavior through mechanisms such as social modeling and normative pressure, particularly among young adults [47].

The influence of norms, however, depends upon the relevance and proximity of the reference group. Evidence shows that norms from close friends or same-gender peers are more strongly associated with drinking behavior than norms from broader populations, such as the general student body [48]. University-specific norms also differ in their predictive power compared to broader societal norms [49]. These patterns underscore the role of group identification and social proximity in moderating the influence of perceived norms [50]. Given their strong predictive power, both drinking identity and perceived norms are included in the present study, as they allow for a more focused examination of how message framing and visual attention contribute to drinking behavior beyond individual-level susceptibility.

Building on the medium-platform compatibility perspective, we also consider how social message appeals may exert greater persuasive influence on SNS due to their alignment with platform-specific affordances and user expectations. This challenges traditional models that emphasize the dominance of sensory appeals, suggesting instead that the fit between message type and platform context may be a key driver of effectiveness in digital alcohol marketing.

Research Questions

Guided by this theoretical perspective and the empirical gaps outlined above, this study poses the following research questions:

RQ1: How do visual attention patterns to textual messages and alcohol imagery predict drinking behavior in SNS alcohol advertisements?

RQ2: How do individual difference factors (drinking identity, perceived social norms) influence alcohol consumption behavior in response to SNS advertising exposure?

RQ3: Do different types of emotional appeals (sensory, ego, social) interact with visual attention to differentially influence drinking behavior?

Methods

Recruitment

A total of 166 individuals were initially recruited for this study. An a priori power analysis [51] indicated that at least 109 participants were required to detect a moderate effect size ($f^2 = 0.15$; equivalent to $d = 0.5$) with a power of .80 and an alpha level of .05. After excluding 9 participants due to incomplete responses or failure to meet inclusion criteria, the final sample consisted of 157 participants, which exceeded the minimum requirement.

Participants had a mean age of 23.7 years ($SD = 3.58$), and the sample included 88 females and 69 males. All participants were either undergraduate or graduate students enrolled at a university in South Korea and reported having normal or corrected-to-normal vision. The study protocol was approved by the Institutional Review Board of Jeonbuk National University (JBNU IRB 2024-06-026-001), and written informed consent was obtained from all participants.

Procedure

Stimuli Development. The primary objective of the manipulation was to create three distinct message types: ego-oriented, social-oriented, and sensory-oriented grounded in the Six Wheel Theory framework. Each message type consisted of two stimulus sets, for a total of six stimuli. Every stimulus comprised an image paired with a brief text caption.

Social-oriented Message. Highlights interpersonal connection, belonging, and social cohesion. The images show friends reunited over drinks, raising glasses and smiling. The caption—It's been a long time—cheers! When you're with precious people, cheers~ cheers~"—emphasizes shared experiences and mutual support. Together, visuals and text convey that collective celebration and empathy strengthen social bonds.

Ego-oriented Message. Designed to appeal to self-enhancement and personal achievement. The

image features a single individual holding a bottle of soju in a relaxed, contemplative setting, emphasizing a moment of personal enjoyment. The accompanying caption, “Like dew so pure the next day, cheers to precious me tomorrow as well!”, highlights self-care, personal value, and the aspiration to continually improve oneself.

Sensory-oriented Message. Designed to focus on sensory enjoyment and immersive experience. The image features a single individual (promotional model IU) holding a bottle of soju against a bright, verdant background punctuated by refreshing water droplets. The close-up on her hands and the bottle’s label, combined with the soft natural lighting and leafy surroundings, evoke tactile and visual clarity—suggesting the crisp, clean sensation of the beverage. The accompanying caption, “The finish is so clean; as pure as dew, it goes down smoothly,” underscores immediate perceptual engagement by emphasizing taste purity and effortless drinking.

Manipulation Check. Prior to the main experiment, a manipulation check was conducted with 30 undergraduate students recruited from the same university. The sample consisted of 13 male and 17 female participants, with a mean age of 22.27 years ($SD = 2.02$). Participants were randomly assigned to one of three message conditions ($n = 10$ per condition). After viewing the two stimuli assigned to their condition, respondents rated each one’s perceived emotional tone—assessing how egoistic, social, or sensory the message felt—on three separate 7-point Likert scales (1 = “Not at all,” 7 = “Extremely”).

Non-parametric Kruskal-Wallis H tests confirmed that the message types elicited distinct emotional perceptions as intended. Ego-oriented messages received significantly higher egoistic ratings ($H(2) = 21.58, p < .001$), social-oriented messages scored highest on social appeal ($H(2) = 22.47, p < .001$), and sensory-oriented messages led on sensory ratings ($H(2) = 21.65, p < .001$). These results supported the validity of the stimulus classification and justified their use in the main experiment. In the final main experiment, all six stimuli were retained and counterbalanced so that each participant viewed one exemplar of each message type in a randomized order.

Experimental Procedure. Upon arrival, participants were seated in a quiet laboratory and positioned in front of a 24-inch monitor equipped with a Tobii Pro Nano screen-based eye tracker (Tobii Technology, Sweden). The eye tracker was mounted centrally below the screen and recorded gaze data at 60 Hz. Participants were instructed to maintain a viewing distance of approximately 60 cm throughout the session. First, a standard 9-point calibration routine was performed to ensure accurate mapping of gaze coordinates. Participants who failed to achieve acceptable calibration accuracy (average error $> 0.5^\circ$) were automatically excluded from the experiment and replaced.

Once calibration was confirmed, two advertising stimuli (Image 1 and Image 2) were presented sequentially. Each image remained on screen for 10 s, with a fixed 5-s inter-stimulus interval during which a blank gray screen was displayed. Stimulus durations were selected based on prior eye-tracking studies investigating Internet advertising effects. After the second image disappeared, the eye tracker was removed, and participants completed a post-experiment survey. This questionnaire collected demographic information (e.g., age, gender), assessed drinking identity (self-reported affinity with drinking culture), measured perceived social norms regarding alcohol consumption, and recorded recent drinking behavior.

Environmental Control. The experiment was conducted in a controlled laboratory environment with standardized conditions: ambient lighting at 500 ± 50 lux, monitor brightness set to 120 cd/m^2 , and room temperature maintained at $74 \pm 2^\circ\text{F}$. Participants' head movements were minimized using a chin rest positioned 60cm from the screen.

Measures

Eye-Tracking Variables. Areas of Interest (AOIs) were manually defined by two independent researchers for each stimulus. Text AOIs encompassed advertising messages using minimum bounding rectangles, while alcohol image AOIs covered visually identifiable product regions. Inter-rater reliability for AOI definitions achieved substantial agreement ($\kappa > .80$). Our study examined the most common eye movement metric, total fixation duration (TFD), frequently used in the literature.

TFD represents the total time spent fixating on an area of interest (AOI). We defined AOI categories based on two key advertising elements: the advertising text message ($M = 1.01$, $SD = 1.00$) and alcohol image ($M = .48$, $SD = .71$). Accordingly, the TFD measures were labeled as "advertising text message TFD" and "alcohol image TFD" to reflect fixation duration on each respective element. Regarding the reliability of eye-tracking data, this study calculated McDonald's ω to assess the internal consistency of TFD measures across different stimuli within each message type. Reliability coefficients exceeded the acceptable threshold ($\omega > 0.70$) for all message categories (Social: $\omega = .78$, Ego: $\omega = .73$, Sensory: $\omega = .71$), indicating stable attention patterns across stimulus exemplars.

The rationale for selecting these two elements as the primary objects of investigation is that in the fast-scrolling SNS environment, viewers form split-second judgments on the basis of two complementary cues: (a) the textual message, which conveys claims or slogans, and (b) the visual depiction of the alcohol product. Together, these cues constitute the minimal yet sufficient information set through which persuasive intent is delivered. Eye-tracking evidence confirms a functional division of labor: pictorial elements are most effective at capturing initial attention and shaping affect-laden evaluations and choice [31,41], whereas sustained fixation on textual copy predicts deeper cognitive processing, including message recall and belief acceptance [43]. Accordingly, designating the advertising message and the alcohol image as separate AOIs enables us to trace the distinct affective and cognitive pathways through which SNS alcohol advertising influences consumers.

Drinking identity. Participants' drinking identity was assessed using a single self-report item that asked participants to describe their current drinking identity: "At the present time, do you consider yourself (1) a non-drinker, (2) an occasional drinker, (3) a light drinker, (4) a party drinker, or (5) a heavy drinker?" Responses were coded on a 5-point ordinal scale from 1 (non-drinker) to 5 (heavy drinker), with higher scores indicating a stronger drinking identity. The mean score for this item was 2.29 ($SD = .96$), suggesting that participants, on average, identified as occasional to light drinkers.

Perceived social norms. Social norms regarding alcohol use were assessed using a single item:

“What percentage of people in your usual circle of friends do you think drink alcohol?” Participants responded using a five-point scale indicating their perception of the prevalence of drinking among their friends: (1) 0%, (2) 1–25%, (3) 26–50%, (4) 51–75%, and (5) 76–100%. Higher scores reflected a stronger perceived norm of alcohol use within one’s peer group. This item was treated as a continuous moderator in the analysis. The mean score for this item was 3.67 ($SD = .96$).

Drinking behavior. Drinking behavior was assessed using a single self-reported frequency item.

Participants reported how often they drank by choosing one of six ordered response categories: (1) less often, (2) about 1 day per month, (3) 2–3 days per month, (4) 3–4 days per week, (5) 1–2 days per week, or (6) every day. The resulting coded score ranging from 1 to 6 (1 = less often, 6 = every day) was used as a continuous measure of alcohol use frequency in the analysis ($M = 2.40$, $SD = 1.53$).

Results

Linear regression analysis was carried out to examine the effects of advertising message type and visual attention on alcohol-related cognitive and behavioral responses (see Table 2). The model included the following predictors: participants' gender, drinking identity, perceived social norms, total fixation duration (TFD) on advertisement messages, TFD on alcohol images, message type (sensory, ego, social), and interaction terms between message type and TFD on advertisement messages. The overall model was statistically significant and explained 37% of the variance in drinking behavior ($adjusted R^2 = .37$), $F(11, 114) = 11.30$; $P < .001$.

Among the control variables, gender was significantly associated with drinking behavior ($\beta = .64$, $SE = .22$; $P = .005$), suggesting that, compared to females, males were more likely to engage in drinking. Regarding the main effects of message type, neither the sensory message nor the ego message significantly predicted drinking behavior relative to social messages.

For RQ1, neither TFD on advertisement text ($\beta = .18$, $SE = .22$; $P = .42$) nor TFD on alcohol-related images ($\beta = -.02$, $SE = .16$; $P = .88$) independently predicted alcohol consumption behavior. These results suggest that attention allocation alone is insufficient to identify the precise cognitive processes that influence drinking behavior, indicating the need to consider additional factors that affect cognitive processing mechanisms. This pattern suggests that the mere allocation of visual attention, regardless of content type, does not directly translate into behavioral influence without considering contextual factors such as message framing.

For RQ2, the analysis identified two psychosocial factors as significant predictors of drinking behavior. First, drinking identity showed a strong positive relationship with alcohol consumption ($\beta = .83$, $SE = .12$; $P < .001$). Participants who identified more strongly as heavy drinkers reported higher levels of alcohol consumption, which aligns with identity–behavior consistency theory suggesting that self-concept and actual behavior tend to correspond (Stets & Burke, 2000; Stryker & Burke, 2000). Perceived social norms also positively predicted drinking behavior ($\beta = .42$, $SE = .12$; $P < .001$). Specifically, participants who believed that a larger proportion of their peers consumed alcohol also reported higher personal consumption, consistent with social norms theory suggesting that perceived peer behavior influences individual drinking patterns through social modeling and normative pressure [47,52]. These findings confirm that individual vulnerability factors play crucial roles in determining susceptibility to alcohol advertising effects.

For RQ3, the interaction between sensory appeal and text message TFD was significant ($\beta = -.74$, $SE = .32$; $P = .02$), while the interaction involving ego appeal was not significant ($\beta = -.43$, $SE = .28$; $P = .12$). Because social appeal served as the reference category, these results indicate that textual attention produces significantly different effects across message types. This pattern demonstrates that the effectiveness of sustained textual processing is entirely dependent on the emotional framing of the message content.

Simple slope analyses revealed the specific nature of these differential effects (see Figure 2). The analysis showed contrasting patterns across message types: in the social condition, greater textual attention was associated with increased drinking behavior, demonstrating a positive relationship between sustained engagement with social-themed messages and alcohol consumption. In contrast, in the sensory condition, greater textual attention was associated with decreased drinking behavior, showing a negative relationship. The ego condition showed no significant relationship between textual attention and drinking behavior.

These findings indicate that social appeals represent the highest-risk message type, where deeper cognitive engagement with textual content significantly amplifies drinking motivation due to their alignment with SNS social interaction norms. In contrast, sensory appeals demonstrate poor medium-message fit in text-based SNS environments, where sustained reading makes their commercial intent more apparent, leading to user avoidance and reduced persuasive effectiveness. Ego appeals appear to occupy a middle ground, showing neither the facilitative effects of social appeals nor the counterproductive effects of sensory appeals in this context.

Discussion

This study investigated how message type moderates the relationship between textual attention and drinking behavior in the context of SNS alcohol advertising. Three key findings emerged from the analysis. First, individual vulnerability factors (drinking identity and perceived peer norms) significantly predicted alcohol use, aligning with prior research. Second, while visual attention to alcohol imagery did not significantly influence behavior, the effects of textual attention varied by message type. Third, social appeals exhibited the highest risk profile, with sustained textual engagement significantly associated with increased drinking behavior. These findings challenge prevailing regulatory frameworks that emphasize visual content restrictions, suggesting that text-based messaging, particularly socially framed appeals may warrant greater scrutiny.

As anticipated, our findings confirmed established patterns related to individual differences.

Participants who reported stronger drinker identities and higher perceptions of peer drinking also reported greater alcohol consumption. These results corroborate with prior evidence on identity-behavior correspondence [44,46] and the influence of perceived norms [45]. Thus, our findings reinforce the importance of considering individual vulnerability profiles in regulatory strategies aimed at reducing alcohol-related harm. For example, regulations could prioritize limiting exposure to emotionally resonant alcohol content among users identified as high-risk, such as adolescents or individuals with strong drinking self-concepts.

The absence of main effects for visual attention measures, alongside significant interaction effects, supports both medium-message compatibility and dual-processing theories. Specifically, the impact of visual attention appears to depend upon the congruence between platform characteristics and message type. This context-dependent nature of attentional processing may explain why interaction effects, rather than main effects, emerged as the primary predictors of drinking behavior.

Social appeals demonstrate strong alignment between message content and platform characteristics by emphasizing themes of belonging, camaraderie, and celebration. These themes resonate with the norms of social interaction on SNS platforms. When users engage with social-themed textual content, they process normative cues that legitimize drinking within familiar social frameworks. This type of engagement activates social identity mechanisms, which frame alcohol use as a behavior that affirms group membership [53]. At the same time, the social nature of the platform conceals the commercial intent behind the message, enabling it to remain persuasive through peripheral-route processing [54]. The positive association between textual attention and drinking behavior in the social appeal condition demonstrates that congruence between platform features and message content can sustain persuasive impact, even during deeper levels of cognitive engagement [55].

In contrast, sensory appeals face fundamental compatibility challenges in SNS text-based environments. These messages are misaligned with platforms designed for social interaction rather

than product promotion, while textual modality imposes severe constraints on conveying sensory experiences. This medium-message incompatibility forces users into central-route processing when encountering sensory-themed textual content, triggering deliberative evaluation that exposes commercial intent and reduces persuasive effectiveness. Thus, the negative relationship between textual attention and drinking behavior in the sensory condition reflects the failure of sensory appeals to maintain persuasive potency when processed through incompatible media channels.

Ego appeals offer additional insights into motivational hierarchies within social networking site (SNS) environments. These platforms often reflect a tension between self-expression and social interaction, as personal content is typically shared in pursuit of social validation. The null effects for ego appeals suggests that motives related to social connection may take precedence over individual enhancement in the context of alcohol consumption, especially when shaped by the socially embedded nature of these platforms.

Implications

These findings suggest that the persuasive power of alcohol advertising in SNS environments depends less on the *amount* of attention a message receives and more on *what kind of message* that attention is directed toward. Textual engagement with socially framed appeals emerged as particularly risky: by mirroring the interactive and peer-oriented nature of SNS, such messages appear to reinforce drinking behavior when deeply processed. This underscores the importance of focusing regulatory and public health efforts on message–platform alignment rather than assuming uniform effects of exposure or attention.

At the same time, the results point to the protective potential of certain message types. Sustained engagement with sensory appeals was associated with *reduced* drinking behavior, possibly because such appeals feel less congruent with SNS communication norms, making their persuasive intent more transparent. This highlights that not all emotionally framed messages function in the same way online and suggests that message–medium mismatch can diminish persuasive influence.

Finally, the strong predictive roles of drinking identity and perceived social norms reinforce that advertising effects are magnified by individual vulnerability factors. Interventions aimed at reducing digital alcohol influence may therefore benefit from integrating identity-based approaches (e.g., challenging alcohol-related self-concepts) and norm-corrective strategies (e.g., campaigns that address misperceptions of peer drinking).

Together, these insights move beyond media-agnostic models of persuasion to emphasize platform–message fit and individual susceptibility as dual mechanisms shaping the effectiveness of alcohol marketing in digital environments.

Limitations

While this study provides novel evidence of medium–message compatibility effects in SNS alcohol advertising, several limitations should be acknowledged. First, the cross-sectional design limits the ability to draw causal conclusions. Although the study identifies significant associations between attention, message type, and drinking behavior, longitudinal or experimental designs would be necessary to establish temporal order and track behavioral change over time, which is an important step for informing regulatory policy.

Second, although the stimulus design reflected realistic SNS advertising by pairing text and image elements, this approach prevented a clean separation of textual and visual effects. Future research employing fully crossed factorial designs that systematically vary both message type and modality would allow for clearer identification of the independent and interactive contributions of each channel.

In addition, the study sample consisted of Korean university students, a population highly relevant to SNS alcohol marketing but not representative of the general Korean population or other cultural contexts. Replication across more diverse demographic, cultural, and regulatory settings will be fruitful to assess the generalizability of these findings.

Finally, the controlled laboratory setting facilitated precise measurement of attention via

eye-tracking but does not fully replicate real-world SNS use, where users rapidly scroll through feeds amid competing content. Complementary field studies using methods such as mobile eye-tracking or digital trace analytics could better capture attention and persuasion processes in naturalistic environments.

Conclusions

This study provides empirical evidence that emotionally framed alcohol messages on social networking sites (SNS) influence drinking behavior through distinct cognitive pathways. By combining eye-tracking methods with a typology of emotional message appeals, the findings show that the persuasive effects of SNS advertising hinge not simply on attention, but on how attention interacts with the framing of textual content. The use of realistic SNS stimuli enhances ecological validity and situates the results firmly within today's digital media environment.

Notably, socially themed textual appeals amplified drinking behavior when processed more deeply, underscoring that persuasive impact depends on the alignment between message framing and the platform's social affordances. In contrast, sensory appeals reduced drinking when attended to, suggesting that message–platform mismatch can diminish persuasive influence. These patterns highlight that emotional message framing interacts with platform context in ways that traditional media-agnostic models cannot fully capture.

The findings also point to heightened risks for vulnerable individuals, such as those with strong drinking identities or normative beliefs about alcohol use. Current regulatory approaches, which primarily target visual content, may therefore underestimate the influence of emotionally charged text that mimics peer communication and conceals commercial intent. Attention-based measures, such as those employed in this study, offer promising tools for identifying high-risk content and tailoring interventions.

Taken together, this study advances theoretical understanding of medium–message compatibility, demonstrates the utility of eye-tracking in uncovering mechanisms of digital persuasion, and underscores the need for policy strategies that address not only imagery but also the persuasive power of text. Expanding public health regulation to include emotionally framed textual appeals will be critical for keeping pace with evolving alcohol marketing practices on social media.



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N.A.

Data Availability

The data generated and analyzed during this study are not publicly available due to participant confidentiality and restrictions imposed by the Institutional Review Board overseeing research in South Korea. De-identified data may be made available upon reasonable request, subject to institutional approval and completion of a data use agreement.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Abbreviations

SNS: Social Networking Sites

TFD: Total Fixation Duration

Supplementary Files