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Exploring the dynamics of consumer engagement in social media influencer marketing: from the self-determination theory perspective

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Influencer advertising has emerged as an integral part of social media marketing. Within this realm, consumer engagement is a critical indicator for gauging the impact of influencer advertisements, as it encompasses the proactive involvement of consumers in spreading advertisements and creating value. Therefore, investigating the mechanisms behind consumer engagement holds significant relevance for formulating effective influencer advertising strategies. The current study, grounded in self-determination theory and employing a stimulus-organism-response framework, constructs a general model to assess the impact of influencer factors, advertisement information, and social factors on consumer engagement. Analyzing data from 522 samples using structural equation modeling, the findings reveal: (1) Social media influencers are effective at generating initial online traffic but have limited influence on deeper levels of consumer engagement, cautioning advertisers against overestimating their impact; (2) The essence of higher-level engagement lies in the ad information factor, affirming that in the new media era, content remains 'king'; (3) Interpersonal factors should also be given importance, as influencing the surrounding social groups of consumers is one of the effective ways to enhance the impact of advertising. Theoretically, current research broadens the scope of both social media and advertising effectiveness studies, forming a bridge between influencer marketing and consumer engagement. Practically, the findings offer macro-level strategic insights for influencer marketing.

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Introduction

Recent studies have highlighted an escalating aversion among audiences towards traditional online ads, leading to a diminishing effectiveness of traditional online advertising methods (Lou et al., 2019). In an effort to overcome these challenges, an increasing number of brands are turning to influencers as their spokespersons for advertising. Utilizing influencers not only capitalizes on their significant influence over their fan base but also allows for the dissemination of advertising messages in a more native and organic manner. Consequently, influencer-endorsed advertising has become a pivotal component and a growing trend in social media advertising (Gräve & Bartsch, 2022). Although the topic of influencer-endorsed advertising has garnered increasing attention from scholars, the field is still in its infancy, offering ample opportunities for in-depth research and exploration (Barta et al., 2023).

Presently, social media influencers—individuals with substantial follower bases—have emerged as the new vanguard in advertising (Hudders & Lou, 2023). Their tweets and videos possess the remarkable potential to sway the purchasing decisions of thousands if not millions. This influence largely hinges on consumer engagement behaviors, implying that the impact of advertising can proliferate throughout a consumer's entire social network (Abbasi et al., 2023). Consequently, exploring ways to enhance consumer engagement is of paramount theoretical and practical significance for advertising effectiveness research (Xiao et al., 2023). This necessitates researchers to delve deeper into the exploration of the stimulating factors and psychological mechanisms influencing consumer engagement behaviors (Vander Schee et al., 2020), which is the gap this study seeks to address.

The Stimulus-Organism-Response (S-O-R) framework has been extensively applied in the study of consumer engagement behaviors (Tak & Gupta, 2021) and has been shown to integrate effectively with self-determination theory (Yang et al., 2019). Therefore, employing the S-O-R framework to investigate consumer engagement behaviors in the context of influencer advertising is considered a rational approach. The current study embarks on an in-depth analysis of the transformation process from three distinct dimensions. In the Stimulus (S) phase, we focus on how influencer factors, advertising message factors, and social influence factors act as external stimuli. This phase scrutinizes the external environment's role in triggering consumer reactions. During the Organism (O) phase, the research explores the intrinsic psychological motivations affecting individual behavior as posited in self-determination theory. This includes the willingness for self-disclosure, the desire for innovation, and trust in advertising messages. The investigation in this phase aims to understand how these internal motivations shape consumer attitudes and perceptions in the context of influencer marketing. Finally, in the Response (R) phase, the study examines how these psychological factors influence consumer engagement behavior. This part of the research seeks to understand the transition from internal psychological states to actual consumer behavior, particularly how these states drive the consumers' deep integration and interaction with the influencer content.

Despite the inherent limitations of cross-sectional analysis in capturing the full temporal dynamics of consumer engagement, this study seeks to unveil the dynamic interplay between consumers' psychological needs—autonomy, competence, and relatedness—and their varying engagement levels in social media influencer marketing, grounded in self-determination theory. Through this lens, by analyzing factors related to influencers, content, and social context, we aim to infer potential dynamic shifts in engagement behaviors as psychological needs evolve. This approach allows us to offer a snapshot of the complex,

multi-dimensional nature of consumer engagement dynamics, providing valuable insights for both theoretical exploration and practical application in the constantly evolving domain of social media marketing. Moreover, the current study underscores the significance of adapting to the dynamic digital environment and highlights the evolving nature of consumer engagement in the realm of digital marketing.

Literature review

Stimulus-Organism-Response (S-O-R) model. The Stimulus-Response (S-R) model, originating from behaviorist psychology and introduced by psychologist Watson (1917), posits that individual behaviors are directly induced by external environmental stimuli. However, this model overlooks internal personal factors, complicating the explanation of psychological states. Mehrabian and Russell (1974) expanded this by incorporating the individual's cognitive component (organism) into the model, creating the Stimulus-Organism-Response (S-O-R) framework. This model has become a crucial theoretical framework in consumer psychology as it interprets internal psychological cognitions as mediators between stimuli and responses. Integrating with psychological theories, the S-O-R model effectively analyzes and explains the significant impact of internal psychological factors on behavior (Koay et al., 2020; Zhang et al., 2021), and is extensively applied in investigating user behavior on social media platforms (Hewei & Youngsook, 2022). This study combines the S-O-R framework with self-determination theory to examine consumer engagement behaviors in the context of social media influencer advertising, a logic also supported by some studies (Yang et al., 2021).

Self-determination theory. Self-determination theory, proposed by Richard and Edward (2000), is a theoretical framework exploring human behavioral motivation and personality. The theory emphasizes motivational processes, positing that individual behaviors are developed based on factors satisfying their psychological needs. It suggests that individual behavioral tendencies are influenced by the needs for competence, relatedness, and autonomy. Furthermore, self-determination theory, along with organic integration theory, indicates that individual behavioral tendencies are also affected by internal psychological motivations and external situational factors.

Self-determination theory has been validated by scholars in the study of online user behaviors. For example, Sweet applied the theory to the investigation of community building in online networks, analyzing knowledge-sharing behaviors among online community members (Sweet et al., 2020). Further literature review reveals the applicability of self-determination theory to consumer engagement behaviors, particularly in the context of influencer marketing advertisements. Firstly, self-determination theory is widely applied in studying the psychological motivations behind online behaviors, suggesting that the internal and external motivations outlined within the theory might also apply to exploring consumer behaviors in influencer marketing scenarios (Itani et al., 2022). Secondly, although research on consumer engagement in the social media influencer advertising context is still in its early stages, some studies have utilized SDT to explore behaviors such as information sharing and electronic word-of-mouth dissemination (Astuti & Hariyawan, 2021). These behaviors, which are part of the content contribution and creation dimensions of consumer engagement, may share similarities in the underlying psychological motivational mechanisms. Thus, this study will build upon these foundations to construct the Organism (O) component of the S-O-R model,

integrating insights from SDT to further understand consumer engagement in influencer marketing.

Consumer engagement. Although scholars generally agree at a macro level to define consumer engagement as the creation of additional value by consumers or customers beyond purchasing products, the specific categorization of consumer engagement varies in different studies. For instance, Simon and Tossan interpret consumer engagement as a psychological willingness to interact with influencers (Simon & Tossan, 2018). However, such a broad definition lacks precision in describing various levels of engagement. Other scholars directly use tangible metrics on social media platforms, such as likes, saves, comments, and shares, to represent consumer engagement (Lee et al., 2018). While this quantitative approach is not flawed and can be highly effective in practical applications, it overlooks the content aspect of engagement, contradicting the “content is king” principle of advertising and marketing. We advocate for combining consumer engagement with the content aspect, as content engagement not only generates more traces of consumer online behavior (Oestreicher-Singer & Zalmanson, 2013) but, more importantly, content contribution and creation are central to social media advertising and marketing, going beyond mere content consumption (Qiu & Kumar, 2017). Meanwhile, we also need to emphasize that engagement is not a fixed state but a fluctuating process influenced by ongoing interactions between consumers and influencers, mediated by the evolving nature of social media platforms and the shifting sands of consumer preferences (Pradhan et al., 2023). Consumer engagement in digital environments undergoes continuous change, reflecting a journey rather than a destination (Viswanathan et al., 2017).

The current study adopts a widely accepted definition of consumer engagement from existing research, offering operational feasibility and aligning well with the research objectives of this paper. Consumer engagement behaviors in the context of this study encompass three dimensions: content consumption, content contribution, and content creation (Muntinga et al., 2011). These dimensions reflect a spectrum of digital engagement behaviors ranging from low to high levels (Schivinski et al., 2016). Specifically, content consumption on social media platforms represents a lower level of engagement, where consumers merely click and read the information but do not actively contribute or create user-generated content. Some studies consider this level of engagement as less significant for in-depth exploration because content consumption, compared to other forms, generates fewer visible traces of consumer behavior (Brodie et al., 2013). Even in a study by Qiu and Kumar, it was noted that the conversion rate of content consumption is low, contributing minimally to the success of social media marketing (Qiu & Kumar, 2017).

On the other hand, content contribution, especially content creation, is central to social media marketing. When consumers comment on influencer content or share information with their network nodes, it is termed content contribution, representing a medium level of online consumer engagement (Piehler et al., 2019). Furthermore, when consumers actively upload and post brand-related content on social media, this higher level of behavior is referred to as content creation. Content creation represents the highest level of consumer engagement (Cheung et al., 2021). Although medium and high levels of consumer engagement are more valuable for social media advertising and marketing, this exploratory study still retains the content consumption dimension of consumer engagement behaviors.

Theoretical framework

Internal organism factors: self-disclosure willingness, innovativeness, and information trust. In existing research based on self-

determination theory that focuses on online behavior, competence, relatedness, and autonomy are commonly considered as internal factors influencing users' online behaviors. However, this approach sometimes strays from the context of online consumption. Therefore, in studies related to online consumption, scholars often use self-disclosure willingness as an overt representation of autonomy, innovativeness as a representation of competence, and trust as a representation of relatedness (Mahmood et al., 2019).

The use of these overt variables can be logically explained as follows: According to self-determination theory, individuals with a higher level of self-determination are more likely to adopt compensatory mechanisms to facilitate behavior compared to those with lower self-determination (Wehmeyer, 1999). Self-disclosure, a voluntary act of sharing personal information with others, is considered a key behavior in the development of interpersonal relationships. In social environments, self-disclosure can effectively alleviate stress and build social connections, while also seeking societal validation of personal ideas (Altman & Taylor, 1973). Social networks, as para-social entities, possess the interactive attributes of real societies and are likely to exhibit similar mechanisms. In consumer contexts, personal disclosures can include voluntary sharing of product interests, consumption experiences, and future purchase intentions (Robertshaw & Marr, 2006). While material incentives can prompt personal information disclosure, many consumers disclose personal information online voluntarily, which can be traced back to an intrinsic need for autonomy (Stutzman et al., 2011). Thus, in this study, we consider the self-disclosure willingness as a representation of high autonomy.

Innovativeness refers to an individual's internal level of seeking novelty and represents their personality and tendency for novelty (Okazaki, 2009). Often used in consumer research, innovative consumers are inclined to try new technologies and possess an intrinsic motivation to use new products. Previous studies have shown that consumers with high innovativeness are more likely to search for information on new products and share their experiences and expertise with others, reflecting a recognition of their own competence (Kaushik & Rahman, 2014). Therefore, in consumer contexts, innovativeness is often regarded as the competence dimension within the intrinsic factors of self-determination (Wang et al., 2016), with external motivations like information novelty enhancing this intrinsic motivation (Lee et al., 2015).

Trust refers to an individual's willingness to rely on the opinions of others they believe in. From a social psychological perspective, trust indicates the willingness to assume the risk of being harmed by another party (McAllister, 1995). Widely applied in social media contexts for relational marketing, information trust has been proven to positively influence the exchange and dissemination of consumer information, representing a close and advanced relationship between consumers and businesses, brands, or advertising endorsers (Steinhoff et al., 2019). Consumers who trust brands or social media influencers are more willing to share information without fear of exploitation (Pop et al., 2022), making trust a commonly used representation of the relatedness dimension in self-determination within consumer contexts.

Construction of the path from organism to response: self-determination internal factors and consumer engagement behavior. Following the logic outlined above, the current study represents the internal factors of self-determination theory through three variables: self-disclosure willingness, innovativeness, and information trust. Next, the study explores the association between these self-determination internal factors and

consumer engagement behavior, thereby constructing the link between Organism (O) and Response (R).

Self-disclosure willingness and consumer engagement behavior: In the realm of social sciences, the concept of self-disclosure willingness has been thoroughly examined from diverse disciplinary perspectives, encompassing communication studies, sociology, and psychology. Viewing from the lens of social interaction dynamics, self-disclosure is acknowledged as a fundamental precondition for the initiation and development of online social relationships and interactive engagements (Luo & Hancock, 2020). It constitutes an indispensable component within the spectrum of interactive behaviors and the evolution of interpersonal connections. Voluntary self-disclosure is characterized by individuals divulging information about themselves, which typically remains unknown to others and is inaccessible through alternative sources. This concept aligns with the tenets of uncertainty reduction theory, which argues that during interpersonal engagements, individuals seek information about their counterparts as a means to mitigate uncertainties inherent in social interactions (Lee et al., 2008). Self-disclosure allows others to gain more personal information, thereby helping to reduce the uncertainty in interpersonal relationships. Such disclosure is voluntary rather than coerced, and this sharing of information can facilitate the development of relationships between individuals (Towner et al., 2022). Furthermore, individuals who actively engage in social media interactions (such as liking, sharing, and commenting on others' content) often exhibit higher levels of self-disclosure (Chu et al., 2023); additional research indicates a positive correlation between self-disclosure and online engagement behaviors (Lee et al., 2023). Taking the context of the current study, the autonomous self-disclosure willingness can incline social media users to read advertising content more attentively and share information with others, and even create evaluative content. Therefore, this paper proposes the following research hypothesis:

H1a: The self-disclosure willingness is positively correlated with content consumption in consumer engagement behavior.

H1b: The self-disclosure willingness is positively correlated with content contribution in consumer engagement behavior.

H1c: The self-disclosure willingness is positively correlated with content creation in consumer engagement behavior.

Innovativeness and consumer engagement behavior: Innovativeness represents an individual's propensity to favor new technologies and the motivation to use new products, associated with the cognitive perception of one's self-competence. Individuals with a need for self-competence recognition often exhibit higher innovativeness (Kelley & Alden, 2016). Existing research indicates that users with higher levels of innovativeness are more inclined to accept new product information and share their experiences and discoveries with others in their social networks (Yusuf & Busalim, 2018). Similarly, in the context of this study, individuals, as followers of influencers, signify an endorsement of the influencer. Driven by innovativeness, they may be more eager to actively receive information from influencers. If they find the information valuable, they are likely to share it and even engage in active content re-creation to meet their expectations of self-image. Therefore, this paper proposes the following research hypotheses:

H2a: The innovativeness of social media users is positively correlated with content consumption in consumer engagement behavior.

H2b: The innovativeness of social media users is positively correlated with content contribution in consumer engagement behavior.

H2c: The innovativeness of social media users is positively correlated with content creation in consumer engagement behavior.

Information trust and consumer engagement: Trust refers to an individual's willingness to rely on the statements and opinions of a target object (Moorman et al., 1993). Extensive research indicates that trust positively impacts information dissemination and content sharing in interpersonal communication environments (Majerczak & Strzelecki, 2022); when trust is established, individuals are more willing to share their resources and less suspicious of being exploited. Trust has also been shown to influence consumers' participation in community building and content sharing on social media, demonstrating cross-cultural universality (Anaya-Sánchez et al., 2020).

Trust in influencer advertising information is also a key predictor of consumers' information exchange online. With many social media users now operating under real-name policies, there is an increased inclination to trust information shared on social media over that posted by corporate accounts or anonymously. Additionally, as users' social networks partially overlap with their real-life interpersonal networks, extensive research shows that more consumers increasingly rely on information posted and shared on social networks when making purchase decisions (Wang et al., 2016). This aligns with the effectiveness goals of influencer marketing advertisements and the characteristics of consumer engagement. Trust in the content posted by influencers is considered a manifestation of a strong relationship between fans and influencers, central to relationship marketing (Kim & Kim, 2021). Based on trust in the influencer, which then extends to trust in their content, people are more inclined to browse information posted by influencers, share this information with others, and even create their own content without fear of exploitation or negative consequences. Therefore, this paper proposes the following research hypotheses:

H3a: Information trust is positively correlated with content consumption in consumer engagement behavior.

H3b: Information trust is positively correlated with content contribution in consumer engagement behavior.

H3c: Information trust is positively correlated with content creation in consumer engagement behavior.

Construction of the path from stimulus to organism: influencer factors, advertising information factors, social factors, and self-determination internal factors. Having established the logical connection from Organism (O) to Response (R), we further construct the influence path from Stimulus (S) to Organism (O). Revisiting the definition of influencer advertising in social media, companies, and brands leverage influencers on social media platforms to disseminate advertising content, utilizing the influencers' relationships and influence over consumers for marketing purposes. In addition to consumer's internal factors, elements such as companies, brands, influencers, and the advertisements themselves also impact consumer behavior. Although factors like the brand image perception of companies may influence consumer behavior, considering that in influencer marketing, companies and brands do not directly interact with consumers, this study prioritizes the dimensions of influencers and advertisements. Furthermore, the impact of social factors on individual cognition and behavior is significant, thus, the current study integrates influencers, advertisements, and social dimensions as the Stimulus (S) component.

Influencer factors: parasocial identification. Self-determination theory posits that relationships are one of the key motivators influencing individual behavior. In the context of social media research, users anticipate establishing a parasocial relationship with influencers, resembling real-life relationships. Hence, we consider the parasocial identification arising from users' parasocial interactions with influencers as the relational motivator.

Parasocial interaction refers to the one-sided personal relationship that individuals develop with media characters (Donald & Richard, 1956). During this process, individuals believe that the media character is directly communicating with them, creating a sense of positive intimacy (Giles, 2002). Over time, through repeated unilateral interactions with media characters, individuals develop a parasocial relationship, leading to parasocial identification. However, parasocial identification should not be directly equated with the concept of social identification in social identity theory. Social identification occurs when individuals psychologically de-individualize themselves, perceiving the characteristics of their social group as their own, upon identifying themselves as part of that group. In contrast, parasocial identification refers to the one-sided interactional identification with media characters (such as celebrities or influencers) over time (Chen et al., 2021). Particularly when individuals' needs for interpersonal interaction are not met in their daily lives, they turn to parasocial interactions to fulfill these needs (Shan et al., 2020). Especially on social media, which is characterized by its high visibility and interactivity, users can easily develop a strong parasocial identification with the influencers they follow (Wei et al., 2022).

Parasocial identification and self-disclosure willingness: Theories like uncertainty reduction, personal construct, and social exchange are often applied to explain the emergence of parasocial identification. Social media, with its convenient and interactive modes of information dissemination, enables consumers to easily follow influencers on media platforms. They can perceive the personality of influencers through their online content, viewing them as familiar individuals or even friends. Once parasocial identification develops, this pleasurable experience can significantly influence consumers' cognitions and thus their behavioral responses. Research has explored the impact of parasocial identification on consumer behavior. For instance, Bond et al. found that on Twitter, the intensity of users' parasocial identification with influencers positively correlates with their continuous monitoring of these influencers' activities (Bond, 2016). Analogous to real life, where we tend to pay more attention to our friends in our social networks, a similar phenomenon occurs in the relationship between consumers and brands. This type of parasocial identification not only makes consumers willing to follow brand pages but also more inclined to voluntarily provide personal information (Chen et al., 2021). Based on this logic, we speculate that a similar relationship may exist between social media influencers and their fans. Fans develop parasocial identification with influencers through social media interactions, making them more willing to disclose their information, opinions, and views in the comment sections of the influencers they follow, engaging in more frequent social interactions (Chung & Cho, 2017), even if the content at times may be brand or company-embedded marketing advertisements. In other words, in the presence of influencers with whom they have established parasocial relationships, they are more inclined to disclose personal information, thereby promoting consumer engagement behavior. Therefore, we propose the following research hypotheses:

H4: Parasocial identification is positively correlated with consumer self-disclosure willingness.

H4a: Self-disclosure willingness mediates the impact of parasocial identification on content consumption in consumer engagement behavior.

H4b: Self-disclosure willingness mediates the impact of parasocial identification on content contribution in consumer engagement behavior.

H4c: Self-disclosure willingness mediates the impact of parasocial identification on content creation in consumer engagement behavior.

Parasocial identification and information trust: Information Trust refers to consumers' willingness to trust the information contained in advertisements and to place themselves at risk. These risks include purchasing products inconsistent with the advertised information and the negative social consequences of erroneously spreading this information to others, leading to unpleasant consumption experiences (Minton, 2015). In advertising marketing, gaining consumers' trust in advertising information is crucial. In the context of influencer marketing on social media, companies, and brands leverage the social connection between influencers and their fans. According to cognitive empathy theory, consumers project their trust in influencers onto the products endorsed, explaining the phenomenon of 'loving the house for the crow on its roof.' Research indicates that parasocial identification with influencers is a necessary condition for trust development. Consumers engage in parasocial interactions with influencers on social media, leading to parasocial identification (Jin et al., 2021). Consumers tend to reduce their cognitive load and simplify their decision-making processes, thus naturally adopting a positive attitude and trust towards advertising information disseminated by influencers with whom they have established parasocial identification. This forms the core logic behind the success of influencer marketing advertisements (Breves et al., 2021); furthermore, as mentioned earlier, because consumers trust these advertisements, they are also willing to share this information with friends and family and even engage in content re-creation. Therefore, we propose the following research hypotheses:

H5: Parasocial identification is positively correlated with information trust.

H5a: Information trust mediates the impact of parasocial identification on content consumption in consumer engagement behavior.

H5b: Information trust mediates the impact of parasocial identification on content contribution in consumer engagement behavior.

H5c: Information trust mediates the impact of parasocial identification on content creation in consumer engagement behavior.

Influencer factors: source credibility. Source credibility refers to the degree of trust consumers place in the influencer as a source, based on the influencer's reliability and expertise. Numerous studies have validated the effectiveness of the endorsement effect in advertising (Schouten et al., 2021). The Source Credibility Model, proposed by the renowned American communication scholar Hovland and the "Yale School," posits that in the process of information dissemination, the credibility of the source can influence the audience's decision to accept the information. The credibility of the information is determined by two aspects of the source: reliability and expertise. Reliability refers to the audience's trust in the "communicator's objective and honest approach to providing information," while expertise refers to the audience's trust in the "communicator being perceived as an effective source of information" (Hovland et al., 1953). Hovland's definitions reveal that the interpretation of source credibility is not about the inherent traits of the source itself but rather the audience's perception of the source (Jang et al., 2021). This differs from trust and serves as a precursor to the development of trust. Specifically, reliability and expertise are based on the audience's perception; thus, this aligns closely with the audience's perception of

influencers (Kim & Kim, 2021). This credibility is a cognitive statement about the source of information.

Source credibility and self-disclosure willingness: Some studies have confirmed the positive impact of an influencer's self-disclosure on their credibility as a source (Leite & Baptista, 2022). However, few have explored the impact of an influencer's credibility, as a source, on consumers' self-disclosure willingness. Undoubtedly, an impact exists; self-disclosure is considered a method to attempt to increase intimacy with others (Leite et al., 2022). According to social exchange theory, people promote relationships through the exchange of information in interpersonal communication to gain benefits (Cropanzano & Mitchell, 2005). Credibility, deriving from an influencer's expertise and reliability, means that a highly credible influencer may provide more valuable information to consumers. Therefore, based on the social exchange theory's logic of reciprocal benefits, consumers might be more willing to disclose their information to trustworthy influencers, potentially even expanding social interactions through further consumer engagement behaviors. Thus, we propose the following research hypotheses:

H6: Source credibility is positively correlated with self-disclosure willingness.

H6a: Self-disclosure willingness mediates the impact of Source credibility on content consumption in consumer engagement behavior.

H6b: Self-disclosure willingness mediates the impact of Source credibility on content contribution in consumer engagement behavior.

H6c: Self-disclosure willingness mediates the impact of Source credibility on content creation in consumer engagement behavior.

Source credibility and information trust: Based on the Source Credibility Model, the credibility of an endorser as an information source can significantly influence consumers' acceptance of the information (Shan et al., 2020). Existing research has demonstrated the positive impact of source credibility on consumers. Djafarova, in a study based on Instagram, noted through in-depth interviews with 18 users that an influencer's credibility significantly affects respondents' trust in the information they post. This credibility is composed of expertise and relevance to consumers, and influencers on social media are considered more trustworthy than traditional celebrities (Djafarova & Rushworth, 2017). Subsequently, Bao and colleagues validated in the Chinese consumer context, based on the ELM model and commitment-trust theory, that the credibility of brand pages on Weibo effectively fosters consumer trust in the brand, encouraging participation in marketing activities (Bao & Wang, 2021). Moreover, Hsieh et al. found that in e-commerce contexts, the credibility of the source is a significant factor influencing consumers' trust in advertising information (Hsieh & Li, 2020). In summary, existing research has proven that the credibility of the source can promote consumer trust. Influencer credibility is a significant antecedent affecting consumers' trust in the advertised content they publish. In brand communities, trust can foster consumer engagement behaviors (Habibi et al., 2014). Specifically, consumers are more likely to trust the advertising content published by influencers with higher credibility (more expertise and reliability), and as previously mentioned, consumer engagement behavior is more likely to occur. Based on this, the study proposes the following research hypotheses:

H7: Source credibility is positively correlated with information trust.

H7a: Information trust mediates the impact of source credibility on content consumption in consumer engagement behavior.

H7b: Information trust mediates the impact of source credibility on content contribution in consumer engagement behavior.

H7c: Information trust mediates the impact of source credibility on content creation in consumer engagement behavior.

Advertising information factors: informative value. Advertising value refers to "the relative utility value of advertising information to consumers and is a subjective evaluation by consumers." In his research, Ducoffe pointed out that in the context of online advertising, the informative value of advertising is a significant component of advertising value (Ducoffe, 1995). Subsequent studies have proven that consumers' perception of advertising value can effectively promote their behavioral response to advertisements (Van-Tien Dao et al., 2014). Informative value of advertising refers to "the information about products needed by consumers provided by the advertisement and its ability to enhance consumer purchase satisfaction." From the perspective of information dissemination, valuable advertising information should help consumers make better purchasing decisions and reduce the effort spent searching for product information. The informational aspect of advertising has been proven to effectively influence consumers' cognition and, in turn, their behavior (Haida & Rahim, 2015).

Informative value and innovativeness: As previously discussed, consumers' innovativeness refers to their psychological trait of favoring new things. Studies have shown that consumers with high innovativeness prefer novel and valuable product information, as it satisfies their need for newness and information about new products, making it an important factor in social media advertising engagement (Shi, 2018). This paper also hypothesizes that advertisements with high informative value can activate consumers' innovativeness, as the novelty of information is one of the measures of informative value (León et al., 2009). Acquiring valuable information can make individuals feel good about themselves and fulfill their perception of a "novel image." According to social exchange theory, consumers can gain social capital in interpersonal interactions (such as social recognition) by sharing information about these new products they perceive as valuable. Therefore, the current study proposes the following research hypothesis:

H8: Informative value is positively correlated with innovativeness.

H8a: Innovativeness mediates the impact of informative value on content consumption in consumer engagement behavior.

H8b: Innovativeness mediates the impact of informative value on content contribution in consumer engagement behavior.

H8c: Innovativeness mediates the impact of informative value on content creation in consumer engagement behavior.

Informative value and information trust: Trust is a multi-layered concept explored across various disciplines, including communication, marketing, sociology, and psychology. For the purposes of this paper, a deep analysis of different levels of trust is not undertaken. Here, trust specifically refers to the trust in influencer advertising information within the context of social media marketing, denoting consumers' belief in and reliance on the advertising information endorsed by influencers. Racherla et al. investigated the factors influencing consumers' trust in online reviews, suggesting that information quality and value contribute to increasing trust (Racherla et al., 2012). Similarly, Luo and Yuan, in a study based on social media marketing, also confirmed that the value of advertising information posted on brand pages can foster consumer trust in the content (Lou & Yuan, 2019). Therefore, by analogy, this paper posits that the informative value

of influencer-endorsed advertising can also promote consumer trust in that advertising information. The relationship between trust in advertising information and consumer engagement behavior has been discussed earlier. Thus, the current study proposes the following research hypotheses:

H9: Informative value is positively correlated with information trust.

H9a: Information trust mediates the impact of informative value on content consumption in consumer engagement behavior.

H9b: Information trust mediates the impact of informative value on content contribution in consumer engagement behavior.

H9c: Information trust mediates the impact of informative value on content creation in consumer engagement behavior.

Advertising information factors: ad targeting accuracy. Ad targeting accuracy refers to the degree of match between the substantive information contained in advertising content and consumer needs. Advertisements containing precise information often yield good advertising outcomes. In marketing practice, advertisers frequently use information technology to analyze the characteristics of different consumer groups in the target market and then target their advertisements accordingly to achieve precise dissemination and, consequently, effective advertising results. The utility of ad targeting accuracy has been confirmed by many studies. For instance, in the research by Qiu and Chen, using a modified UTAUT model, it was demonstrated that the accuracy of advertising effectively promotes consumer acceptance of advertisements in WeChat Moments (Qiu & Chen, 2018). Although some studies on targeted advertising also indicate that overly precise ads may raise concerns about personal privacy (Zhang et al., 2019), overall, the accuracy of advertising information is effective in enhancing advertising outcomes and is a key element in the success of targeted advertising.

Ad targeting accuracy and information trust: In influencer marketing advertisements, due to the special relationship recognition between consumers and influencers, the privacy concerns associated with ad targeting accuracy are alleviated (Vrontis et al., 2021). Meanwhile, the informative value brought by targeting accuracy is highlighted. More precise advertising content implies higher informative value and also signifies that the advertising content is more worthy of consumer trust (Della Vigna, Gentzkow, 2010). As previously discussed, people are more inclined to read and engage with advertising content they trust and recognize. Therefore, the current study proposes the following research hypotheses:

H10: Ad targeting accuracy is positively correlated with information trust.

H10a: Information trust mediates the impact of ad targeting accuracy on content consumption in consumer engagement behavior.

H10b: Information trust mediates the impact of ad targeting accuracy on content contribution in consumer engagement behavior.

H10c: Information trust mediates the impact of ad targeting accuracy on content creation in consumer engagement behavior.

Social factors: subjective norm. The Theory of Planned Behavior, proposed by Ajzen (1991), suggests that individuals' actions are preceded by conscious choices and are underlain by plans. TPB has been widely used by scholars in studying personal online behaviors, these studies collectively validate the applicability of TPB in the context of social media for researching online behaviors (Huang, 2023). Additionally, the self-determination theory, which underpins this chapter's research, also supports the notion

that individuals' behavioral decisions are based on internal cognitions, aligning with TPB's assertions. Therefore, this paper intends to select subjective norms from TPB as a factor of social influence. Subjective norm refers to an individual's perception of the expectations of significant others in their social relationships regarding their behavior. Empirical research in the consumption field has demonstrated the significant impact of subjective norms on individual psychological cognition (Yang & Jolly, 2009). A meta-analysis by Hagger, Chatzisarantis (2009) even highlighted the statistically significant association between subjective norms and self-determination factors. Consequently, this study further explores its application in the context of influencer marketing advertisements on social media.

Subjective norm and self-disclosure willingness: In numerous studies on social media privacy, subjective norms significantly influence an individual's self-disclosure willingness. Wirth et al. (2019) based on the privacy calculus theory, surveyed 1,466 participants and found that personal self-disclosure on social media is influenced by the behavioral expectations of other significant reference groups around them. Their research confirmed that subjective norms positively influence self-disclosure of information and highlighted that individuals' cognitions and behaviors cannot ignore social and environmental factors. Heirman et al. (2013) in an experiment with Instagram users, also noted that subjective norms could promote positive consumer behavioral responses. Specifically, when important family members and friends highly regard social media influencers as trustworthy, we may also be more inclined to disclose our information to influencers and share this information with our surrounding family and friends without fear of disapproval. In our subjective norms, this is considered a positive and valuable interactive behavior, leading us to exhibit engagement behaviors. Based on this logic, we propose the following research hypotheses:

H11: Subjective norms are positively correlated with self-disclosure willingness.

H11a: Self-disclosure willingness mediates the impact of subjective norms on content consumption in consumer engagement behavior.

H11b: Self-disclosure willingness mediates the impact of subjective norms on content contribution in consumer engagement behavior.

H11c: Self-disclosure willingness mediates the impact of subjective norms on content creation in consumer engagement behavior.

Subjective norm and information trust: Numerous studies have indicated that subjective norms significantly influence trust (Roh et al., 2022). This can be explained by reference group theory, suggesting people tend to minimize the effort expended in decision-making processes, often looking to the behaviors or attitudes of others as a point of reference; for instance, subjective norms can foster acceptance of technology by enhancing trust (Gupta et al., 2021). Analogously, if a consumer's social network generally holds positive attitudes toward influencer advertising, they are also more likely to trust the endorsed advertisement information, as it conserves the extensive effort required in gathering product information (Chetioui et al., 2020). Therefore, this paper proposes the following research hypotheses:

H12: Subjective norms are positively correlated with information trust.

H12a: Information trust mediates the impact of subjective norms on content consumption in consumer engagement behavior.

H12b: Information trust mediates the impact of subjective norms on content contribution in consumer engagement behavior.

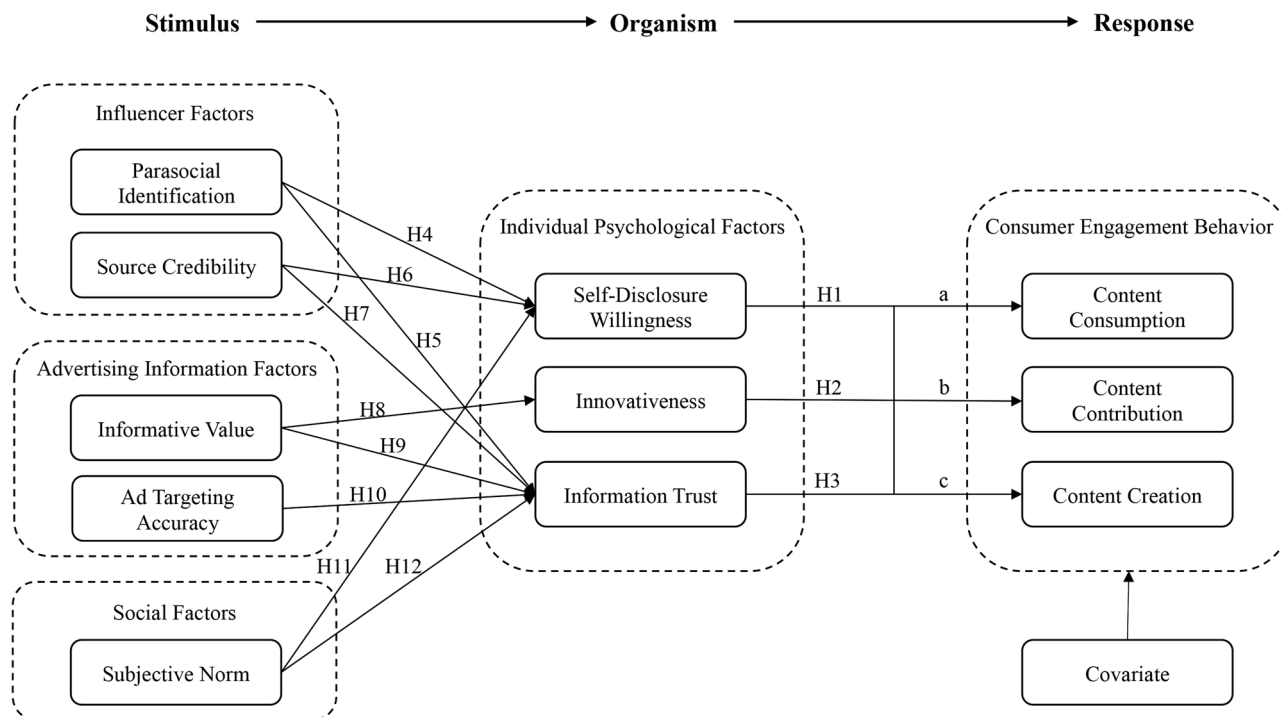


Fig. 1 Conceptual model. Consumer engagement behavior impact model based on SOR framework.

H12c: Information trust mediates the impact of subjective norms on content creation in consumer engagement behavior.

Conceptual model. In summary, based on the Stimulus (S)-Organism (O)-Response (R) framework, this study constructs the external stimulus factors (S) from three dimensions: influencer factors (parasocial identification, source credibility), advertising information factors (informative value, Ad targeting accuracy), and social influence factors (subjective norms). This is grounded in social capital theory and the theory of planned behavior. drawing on self-determination theory, the current study constructs the individual psychological factors (O) using self-disclosure willingness, innovativeness, and information trust. Finally, the behavioral response (R) is constructed using consumer engagement, which includes content consumption, content contribution, and content creation, as illustrated in Fig. 1.

Materials and methods

Participants and procedures. The current study conducted a survey through the Wenjuanxing platform to collect data. Participants were recruited through social media platforms such as WeChat, Douyin, Weibo et al., as samples drawn from social media users better align with the research purpose of our research and ensure the validity of the sample. Before the survey commenced, all participants were explicitly informed about the purpose of this study, and it was made clear that volunteers could withdraw from the survey at any time. Initially, 600 questionnaires were collected, with 78 invalid responses excluded. The criteria for valid questionnaires were as follows: (1) Respondents must have answered “Yes” to the question, “Do you follow any influencers (internet celebrities) on social media platforms?” as samples not using social media or not following influencers do not meet the study’s objective, making this question a prerequisite for continuing the survey; (2) Respondents had to correctly answer two hidden screening questions within the questionnaire to ensure that they did not randomly select scores; (3) The total time taken to complete the questionnaire had to exceed one

Table 1 Statistical table of basic information of effective samples.

Statistical items	Specific content	Frequency	Percentage
Gender	Male	188	36.0%
	Female	334	64.0%
Age	18-30	292	56.0%
	31-40	196	37.5%
	41-50	32	6.1%
	Over 51	2	0.4%
Educational background	High school	18	3.4%
	Undergraduate	438	83.9%
	Master and doctor	66	12.6%
Monthly income level	Below 3000 ¥	70	13.4%
	3001-7000 ¥	146	28.0%
	7001-12,000 ¥	162	31.0%
	12,001-15,000 ¥	66	12.6%
	15,001-20,000 ¥	38	7.3%
	Over 20,001 ¥	40	7.7%

minute, ensuring that respondents had sufficient time to understand and thoughtfully answer each question; (4) Respondents were not allowed to choose the same score for eight consecutive questions. Ultimately, 522 valid questionnaires were obtained, with an effective rate of 87.00%, meeting the basic sample size requirements for research models (Gefen et al., 2011). Detailed demographic information of the study participants is presented in Table 1.

Measurements. To ensure the validity and reliability of the data analysis results in this study, the measurement tools and scales used in this chapter were designed with reference to existing established research. The main variables in the survey questionnaire include parasocial identification, source credibility, informative value, ad targeting accuracy, subjective norms, self-disclosure willingness, innovativeness, information trust, content

consumption, content contribution, and content creation. The measurement scale for parasocial identification was adapted from the research of Schramm and Hartmann, comprising 6 items (Schramm & Hartmann, 2008). The source credibility scale was combined from the studies of Cheung et al. and Luo & Yuan's research in the context of social media influencer marketing, including 4 items (Cheung et al., 2009; Lou & Yuan, 2019). The scale for informative value was modified based on Voss et al.'s research, consisting of 4 items (Voss et al., 2003). The ad targeting accuracy scale was derived from the research by Qiu Aimei et al., (2018) including 3 items. The subjective norm scale was adapted from Ajzen's original scale, comprising 3 items (Ajzen, 2002). The self-disclosure willingness scale was developed based on Chu and Kim's research, including 3 items (Chu & Kim, 2011). The innovativeness scale was formulated following the study by Sun et al., comprising 4 items (Sun et al., 2006). The information trust scale was created in reference to Chu and Choi's research, including 3 items (Chu & Choi, 2011). The scales for the three components of social media consumer engagement—content consumption, content contribution, and content creation—were sourced from the research by Buzeta et al., encompassing 8 items in total (Buzeta et al., 2020).

All scales were appropriately revised for the context of social media influencer marketing. To avoid issues with scoring neutral attitudes, a uniform Likert seven-point scale was used for each measurement item (ranging from 1 to 7, representing a spectrum from 'strongly disagree' to 'strongly agree'). After the overall design of the questionnaire was completed, a pre-test was conducted with 30 social media users to ensure that potential respondents could clearly understand the meaning of each question and that there were no obstacles to answering. This pre-test aimed to prevent any difficulties or misunderstandings in the questionnaire items. The final version of the questionnaire is presented in Table 2.

Data analysis. Since the model framework of the current study is derived from theoretical deductions of existing research and, while logically constructed, does not originate from an existing research model, this study still falls under the category of exploratory research. According to the analysis suggestions of Hair and other scholars, in cases of exploratory research model frameworks, it is more appropriate to choose Smart PLS for Partial Least Squares Path Analysis (PLS) to conduct data analysis and testing of the research model (Hair et al., 2012).

Results

Measurement of model. In this study, careful data collection and management resulted in no missing values in the dataset. This ensured the integrity and reliability of the subsequent data analysis. As shown in Table 3, after deleting measurement items with factor loadings below 0.5, the final factor loadings of the measurement items in this study range from 0.730 to 0.964. This indicates that all measurement items meet the retention criteria. Additionally, the Cronbach's α values of the latent variables range from 0.805 to 0.924, and all latent variables have Composite Reliability (CR) values greater than the acceptable value of 0.7, demonstrating that the scales of this study have passed the reliability test requirements (Hair et al., 2019). All latent variables in this study have Average Variance Extracted (AVE) values greater than the standard acceptance value of 0.5, indicating that the convergent validity of the variables also meets the standard (Fornell & Larcker, 1981). Furthermore, the results show that the Variance Inflation Factor (VIF) values for each factor are below 10, indicating that there are no multicollinearity issues with the scales in this study (Hair, 2009).

The current study then further verified the discriminant validity of the variables, with specific results shown in Table 4. The square roots of the average variance extracted (AVE) values for all variables (bolded on the diagonal) are greater than the Pearson correlation coefficients between the variables, indicating that the discriminant validity of the scales in this study meets the required standards (Fornell & Larcker, 1981). Additionally, a single-factor test method was employed to examine common method bias in the data. The first unrotated factor accounted for 29.71% of the variance, which is less than the critical threshold of 40%. Therefore, the study passed the test and did not exhibit serious common method bias (Podsakoff et al., 2003).

To ensure the robustness and appropriateness of our structural equation model, we also conducted a thorough evaluation of the model fit. Initially, through PLS Algorithm calculations, the R^2 values of each variable were greater than the standard acceptance value of 0.1, indicating good predictive accuracy of the model. Subsequently, Blindfolding calculations were performed, and the results showed that the Stone-Geisser Q^2 values of each variable were greater than 0, demonstrating that the model of this study effectively predicts the relationships between variables (Dijkstra & Henseler, 2015). In addition, through CFA, we also obtained some indicator values, specifically, $\chi^2/df = 2.528 < 0.3$, RMSEA = 0.059 < 0.06, SRMR = 0.055 < 0.08. Given its sensitivity to sample size, we primarily focused on the CFI, TLI, and NFI values, CFI = 0.953 > 0.9, TLI = 0.942 > 0.9, and NFI = 0.923 > 0.9 indicating a good fit. Additionally, RMSEA values below 0.06 and SRMR values below 0.08 were considered indicative of a good model fit. These indices collectively suggested that our model demonstrates a satisfactory fit with the data, thereby reinforcing the validity of our findings.

Research hypothesis testing. The current study employed a Bootstrapping test with a sample size of 5000 on the collected raw data to explore the coefficients and significance of the paths in the research model. The final test data results of this study's model are presented in Table 5.

Discussion

The current study employs S-O-R model as the framework, grounded in theories such as self-determination theory and theory of planned behavior, to construct an influence model of consumer engagement behavior in the context of social media influencer marketing. It examines how influencer factors, advertisement information factors, and social influence factors affect consumer engagement behavior by impacting consumers' psychological cognitions. Using structural equation modeling to analyze collected data ($N = 522$), it was found that self-disclosure willingness, innovativeness, and information trust positively influence consumer engagement behavior, with innovativeness having the largest impact on higher levels of engagement. Influencer factors, advertisement information factors, and social factors serve as effective external stimuli, influencing psychological motivators and, consequently, consumer engagement behavior. The specific research results are illustrated in Fig. 2.

The impact of psychological motivators on different levels of consumer engagement: self-disclosure willingness, innovativeness, and information trust. The research analysis indicates that self-disclosure willingness and information trust are key drivers for content consumption (H1a, H2a validated). This aligns with previous findings that individuals with a higher willingness to disclose themselves show greater levels of engagement behavior (Chu et al., 2023); likewise, individuals who trust advertisement information are more inclined to engage with advertisement

Table 2 Scales used in the study.

Scale	Measurement items
Parasocial Identification	I pay great attention to his/her actions. I understand him/her in various aspects. Sometimes I really like his/her actions and behaviors. My emotions fluctuate with his/her emotional changes. I imitate him/her in certain respects. My views align with his/hers on many issues.
Source credibility	He/She is trustworthy. The content posted by him/her is reliable. The content posted by him/her is impartial. The content posted by him/her is created with diligence.
Informative value	The advertising information he/she posts is effective. The advertising information he/she posts is helpful to me. The advertising information he/she posts is practical. The advertising information he/she posts is valuable to me.
Ad targeting accuracy	The advertising content he/she posts provides the information I need. The price of the products advertised by him/her is affordable for me. The products advertised by him/her often meet my needs.
Subjective norm	People around me generally approve of products endorsed by influencers. People around me generally believe that advertisements endorsed by influencers are credible. People around me do not oppose my purchasing products endorsed by influencers.
Self-disclosure willingness	I am willing to disclose my information in the comment section of the influencer's posts. I am willing to express my emotions in the comment section of the influencer's posts. I am willing to express my thoughts in the comment section of the influencer's posts.
Innovativeness	I am willing to be the first to purchase new products recommended by him/her. I want to be the first to experience new products he/she recommends. Even if I haven't used them before, I am willing to purchase new products recommended by him/her. I want to purchase new products he/she recommends before others do.
Information trust	I trust the advertising content he/she posts. I believe the information content he/she posts is credible. I am confident in the authenticity of the advertising information he/she posts.
Content consumption	I will browse the advertising content he/she posts. I will look at the advertising images endorsed by him/her. I will watch the advertising videos endorsed by him/her.
Content contribution	I will like the advertising posts endorsed by him/her on social media. I will comment on the advertising posts endorsed by him/her on social media. I will share the advertising posts endorsed by him/her on social media.
Content creation	I will post about the advertising posts endorsed by him/her on social media. I will upload the advertising images endorsed by him/her on social media platforms.

Before the start of our study, a situational activation was conducted. Participants were required to write down the name of a social media influencer and recall their interactive experiences with him/her.

content (Kim, Kim, 2021). Moreover, our study finds that information trust has a stronger impact on content consumption, underscoring the importance of trust in the dissemination of advertisement information. However, no significant association was found between individual innovativeness and content consumption (H3a not validated).

Regarding the dimension of content contribution in consumer engagement, self-disclosure willingness, information trust, and innovativeness all positively impact it (H1b, H2b, and H3b all validated). This is consistent with earlier research findings that individuals with higher self-disclosure willingness are more likely to like, comment on, or share content posted by influencers on social media platforms (Towner et al., 2022); the conclusions of this paper also support that innovativeness is an important psychological driver for active participation in social media interactions (Kamboj & Sharma, 2023). However, at the level of consumer engagement in content contribution, while information trust also exerts a positive effect, its impact is the weakest, although information trust has the strongest impact on content consumption.

In social media advertising, the ideal outcome is the highest level of consumer engagement, i.e., content creation, meaning consumers actively join in brand content creation, seeing themselves as co-creators with the brand (Nadeem et al., 2021).

Our findings reveal that self-disclosure willingness, innovativeness, and information trust all positively influence content creation (H1c, H2c, and H3c all validated). The analysis found that similar to the impact on content contribution, innovativeness has the most significant effect on encouraging individual content creation, followed by self-disclosure willingness, with information trust having the least impact.

In summary, while some previous studies have shown that self-disclosure willingness, innovativeness, and information trust are important factors in promoting consumer engagement (Chu et al., 2023; Nadeem et al., 2021; Geng et al., 2021), this study goes further by integrating and comparing all three within the same research framework. It was found that to trigger higher levels of consumer engagement behavior, trust is not the most crucial psychological motivator; rather, the most effective method is to stimulate consumers' innovativeness, thus complementing previous research. Subsequently, this study further explores the impact of different stimulus factors on various psychological motivators.

The influence of external stimulus factors on psychological motivators: influencer factors, advertisement information factors, and social factors. The current findings indicate that

Table 3 Reliability and convergent validity analysis.

Latent variable	Items	Factor loadings	VIF	Cronbach's α	CR	AVE
Parasocial identification	PI 1	0.743	1.834	0.872	0.904	0.611
	PI 2	0.833	2.292			
	PI 3	0.790	1.937			
	PI 4	0.812	2.070			
	PI 5	0.730	1.785			
Source credibility	PI 6	0.776	1.809	0.853	0.900	0.693
	SC 1	0.753	2.044			
	SC 2	0.859	2.331			
	SC 3	0.873	2.057			
Informative value	SC 4	0.840	1.648	0.896	0.928	0.764
	IV 1	0.823	1.994			
	IV 2	0.891	2.744			
	IV 3	0.879	2.666			
Ad targeting accuracy	IV 4	0.900	3.010	0.805	0.885	0.721
	ATA 1	0.855	1.928			
	ATA 2	0.780	1.533			
Subjective norm	ATA 3	0.907	2.285	0.830	0.899	0.748
	SN 1	0.910	2.574			
	SN 2	0.887	2.316			
Self-disclosure willingness	SN 3	0.792	1.571	0.807	0.886	0.721
	SW 1	0.830	1.544			
	SW 2	0.862	2.030			
Innovativeness	SW 3	0.855	1.907	0.924	0.946	0.814
	IN 1	0.908	3.248			
	IN 2	0.900	3.116			
	IN 3	0.895	2.968			
Information trust	IN 4	0.907	3.296	0.917	0.948	0.857
	IT 1	0.923	2.920			
	IT 2	0.941	3.285			
Content consumption	IT 3	0.913	3.932	0.885	0.929	0.813
	CCS 1	0.918	2.705			
	CCS 2	0.884	2.343			
Content contribution	CCS 3	0.902	2.569	0.871	0.921	0.794
	CCT 1	0.857	2.067			
	CCT 2	0.909	2.507			
Content creation	CCT 3	0.907	2.491	0.922	0.963	0.928
	CCR 1	0.963	3.743			
	CCR 2	0.964	3.734			

Table 4 Discriminant validity analysis.

	1	2	3	4	5	6	7	8	9	10	11
1	0.865										
2	0.595	0.874									
3	0.561	0.615	0.963								
4	0.580	0.667	0.601	0.902							
5	0.621	0.631	0.856	0.718	0.891						
6	0.542	0.616	0.680	0.627	0.711	0.781					
7	0.685	0.727	0.773	0.627	0.778	0.730	0.902				
8	0.658	0.779	0.706	0.728	0.715	0.668	0.781	0.926			
9	0.531	0.665	0.542	0.620	0.572	0.706	0.615	0.718	0.833		
10	0.537	0.831	0.580	0.654	0.620	0.586	0.687	0.753	0.602	0.849	
11	0.545	0.541	0.672	0.569	0.743	0.656	0.669	0.641	0.496	0.527	0.849

1 = subjective norms, 2 = informative value, 3 = content creation, 4 = content consumption, 5 = content contribution, 6 = parasocial identification, 7 = innovativeness, 8 = information trust, 9 = source credibility, 10 = ad targeting accuracy, 11 = self-disclosure willingness. The bolded numbers represent the square roots of the average variance extracted (AVE).

influencer factors, such as parasocial identification and source credibility, effectively enhance consumer engagement by influencing self-disclosure willingness and information trust. This aligns with prior research highlighting the significance of parasocial identification (Shan et al., 2020). Studies suggest parasocial identification positively impacts consumer engagement by boosting self-disclosure willingness and

information trust (validated H4a, H4b, H4c, and H5a), but not content contribution or creation through information trust (H5b, H5c not validated). Source credibility's influence on self-disclosure willingness was not significant (H6 not validated), thus negating the mediating effect of self-disclosure willingness (H6a, H6b, H6c not validated). Influencer credibility mainly affects engagement through information trust

Table 5 Hypothesis testing results.

Direct effect	β	T	p		Result
H1a: SW→CCS	0.148	2.974	0.003**		Valid
H1b: SW→CCT	0.366	9.045	0.000***		Valid
H1c: SW→CCR	0.239	5.261	0.000***		Valid
H2a: IN→CCS	0.079	1.314	0.189		Invalid
H2b: IN→CCT	0.398	7.077	0.000***		Valid
H2c: IN→CCR	0.462	7.286	0.000***		Valid
H3a: IT→CCS	0.565	9.538	0.000***		Valid
H3b: IT→CCT	0.165	3.238	0.001**		Valid
H3c: IT→CCR	0.192	3.567	0.000***		Valid
H4: PI→SW	0.521	10.862	0.000***		Valid
H5: PI→IT	0.105	2.669	0.008**		Valid
H6: SC→SW	-0.017	-0.349	0.727		Invalid
H7: SC→IT	0.230	6.143	0.000***		Valid
H8: IV→IN	0.727	28.679	0.000***		Valid
H9: IV→IT	0.227	4.634	0.000***		Valid
H10: ATA→IT	0.253	5.519	0.000***		Valid
H11: SN→SW	0.272	6.380	0.000***		Valid
H12: SN→IT	0.208	5.296	0.000***		Valid
Mediating effect	β	T	95% Boot CI	p	Result
H4a: PI→SW→CCS	0.077	2.799	[0.026, 0.136]	0.005**	Valid
H4b: PI→SW→CCT	0.190	6.589	[0.137, 0.250]	0.000***	Valid
H4c: PI→SW→CCR	0.124	4.371	[0.070, 0.184]	0.000***	Valid
H5a: PI→IT→CCS	0.059	2.517	[0.015, 0.108]	0.012*	Valid
H5b: PI→IT→CCT	-0.007	-1.916	[-0.003, 0.038]	0.055	Invalid
H5c: PI→IT→CCR	0.020	1.952	[-0.004, 0.044]	0.051	Invalid
H6a: SC→SW→CCS	-0.003	-0.337	[-0.018, 0.013]	0.736	Invalid
H6b: SC→SW→CCT	-0.006	-0.349	[-0.041, 0.029]	0.727	Invalid
H6c: SC→SW→CCR	-0.004	-0.339	[-0.029, 0.018]	0.735	Invalid
H7a: SC→IT→CCS	0.130	5.402	[0.085, 0.178]	0.000***	Valid
H7b: SC→IT→CCT	0.038	2.970	[0.015, 0.064]	0.003**	Valid
H7c: SC→IT→CCR	0.044	3.212	[0.019, 0.073]	0.001**	Valid
H8a: IV→IN→CCS	0.057	1.306	[-0.030, 0.143]	0.192	Invalid
H8b: IV→IN→CCT	0.289	6.812	[0.204, 0.370]	0.000***	Valid
H8c: IV→IN→CCR	0.336	6.917	[0.239, 0.430]	0.000***	Valid
H9a: IV→IT→CCS	0.128	4.244	[0.072, 0.190]	0.000***	Valid
H9b: IV→IT→CCT	0.037	2.682	[0.013, 0.067]	0.007**	Valid
H9c: IV→IT→CCR	0.044	2.890	[0.017, 0.076]	0.004**	Valid
H10a: ATA→IT→CCS	0.143	4.449	[0.083, 0.208]	0.000***	Valid
H10b: ATA→IT→CCT	0.042	2.597	[0.014, 0.077]	0.009**	Valid
H10c: ATA→IT→CCR	0.048	2.849	[0.020, 0.085]	0.004**	Valid
H11a: SN→SW→CCS	0.040	2.657	[0.013, 0.073]	0.008**	Valid
H11b: SN→SW→CCT	0.100	5.256	[0.066, 0.139]	0.000***	Valid
H11c: SN→SW→CCR	0.065	4.226	[0.038, 0.098]	0.000***	Valid
H12a: SN→IT→CCS	0.117	4.664	[0.071, 0.171]	0.000***	Valid
H12b: SN→IT→CCT	0.034	2.819	[0.013, 0.060]	0.005**	Valid
H12c: SN→IT→CCR	0.040	3.013	[0.017, 0.068]	0.003**	Valid

SN subjective norms, IV informative value, CCR content creation, CCS content consumption, CCT content contribution, PI parasocial identification, IN innovativeness, IT information trust, SC source credibility, ATA ad targeting accuracy, SW self-disclosure willingness. *p < 0.05; **p < 0.01; ***p < 0.001.

(H7a, H7b, H7c validated), supporting previous findings (Shan et al., 2020).

Advertisement factors (informative value and ad targeting accuracy) promote engagement through innovativeness and information trust. Informative value significantly impacts higher-level content contribution and creation through innovativeness (H8b, H8c validated), while ad targeting accuracy influences consumer engagement at all levels mainly through information trust (H10a, H10b, H10c validated).

Social factors (subjective norms) enhance self-disclosure willingness and information trust, consistent with previous research (Wirth et al., 2019; Gupta et al., 2021), and further promote consumer engagement across all levels (H11a, H11b, H11c, H12a, H12b, and H12c all validated).

In summary, influencer, advertisement, and social factors impact consumer engagement behavior by influencing

psychological motivators, with influencer factors having the greatest effect on content consumption, advertisement content factors significantly raising higher-level consumer engagement through innovativeness, and social factors also influencing engagement through self-disclosure willingness and information trust.

Implication. From a theoretical perspective, current research presents a comprehensive model of consumer engagement within the context of influencer advertising on social media. This model not only expands the research horizon in the fields of social media influencer advertising and consumer engagement but also serves as a bridge between two crucial themes in new media advertising studies. Influencer advertising has become an integral part of social media advertising, and the construction of a macro model

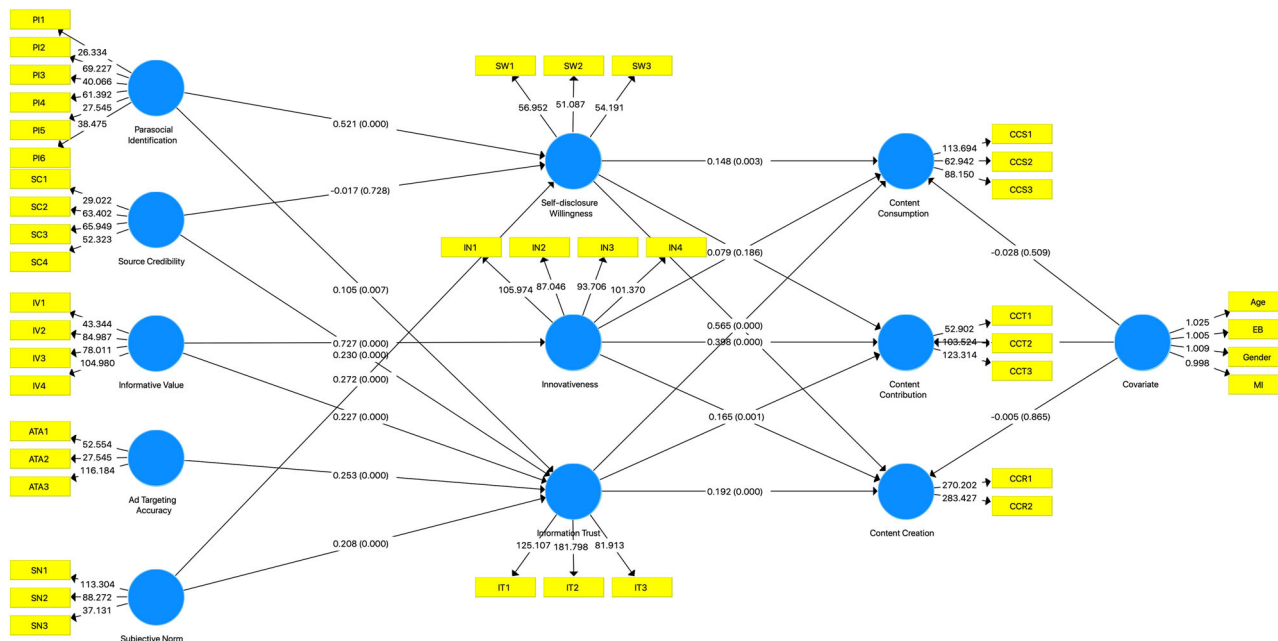


Fig. 2 The result model. Tested structural model of consumer engagement behavior.

aids researchers in understanding consumer psychological processes and behavioral patterns. It also assists advertisers in formulating more effective strategies. Consumer engagement, focusing on the active role of consumers in disseminating information and the long-term impact on advertising effectiveness, aligns more closely with the advertising effectiveness measures in the new media context than traditional advertising metrics. However, the intersection of these two vital themes lacks comprehensive research and a universal model. This study constructs a model that elucidates the effects of various stimuli on consumer psychology and engagement behaviors, exploring the connections and mechanisms through different mediating pathways. By differentiating levels of engagement, the study offers more nuanced conclusions for diverse advertising objectives. Furthermore, this research validates the applicability of self-determination theory in the context of influencer advertising effectiveness. While this psychological theory has been utilized in communication behavior research, its effectiveness in the field of advertising requires further exploration. The current study introduces self-determination theory into the realm of influencer advertising and consumer engagement, thereby expanding its application in the field of advertising communication. It also responds to the call from the advertising and marketing academic community to incorporate more psychological theories to explain the ‘black box’ of consumer psychology. The inclusion of this theory re-emphasizes the people-centric approach of this research and highlights the primary role of individuals in advertising communication studies.

From a practical perspective, this study provides significant insights for adapting marketing strategies to the evolving media landscape and the empowered role of audiences. Firstly, in the face of changes in the communication environment and the empowerment of audience communication capabilities, traditional marketing approaches are becoming inadequate for new media advertising needs. Traditional advertising focuses on direct, point-to-point effects, whereas social media advertising aims for broader, point-to-mass communication, leveraging audience proactivity to facilitate the viral spread of content across online social networks. Secondly, for brands, the general influence model proposed in this study offers guidance for

influencer advertising strategy. If the goal is to maximize reach and brand recognition with a substantial advertising budget, partnering with top influencers who have a large following can be an effective strategy. However, if the objective is to maximize cost-effectiveness with a limited budget by leveraging consumer initiative for secondary spread, the focus should be on designing advertising content that stimulates consumer creativity and willingness to innovate. Thirdly, influencers are advised to remain true to their followers. In influencer marketing, influencers attract advertisers through their influence over followers, converting this influence into commercial gain. This influence stems from the trust followers place in the influencer, thus influencers should maintain professional integrity and prioritize the quality of information they share, even when presented with advertising opportunities. Lastly, influencers should assert more control over their relationships with advertisers. In traditional advertising, companies and brands often exert significant control over the content. However, in the social media era, influencers should negotiate more creative freedom in their advertising partnerships, asserting a more equal relationship with advertisers. This approach ensures that content quality remains high, maintaining the trust influencers have built with their followers.

Limitations and future directions. while this study offers valuable insights into the dynamics of influencer marketing and consumer engagement on social media, several limitations should be acknowledged: Firstly, constrained by the research objectives and scope, this study’s proposed general impact model covers three dimensions: influencers, advertisement information, and social factors. However, these dimensions are not limited to the five variables discussed in this paper. Therefore, we call for future research to supplement and explore more crucial factors. Secondly, in the actual communication environment, there may be differences in the impact of communication effectiveness across various social media platforms. Thus, future research could also involve comparative studies and explorations between different social media platforms. Thirdly, the current study primarily examines the direct effects of various factors on consumer engagement. However, the potential interaction effects between

these variables (e.g., how influencers' credibility might interact with advertisement information quality) are not extensively explored. Future research could investigate these complex inter-relationships for a more holistic understanding. Lastly, our study, being cross-sectional, offers preliminary insights into the complex and dynamic nature of engagement between social media influencers and consumers, yet it does not incorporate the temporal dimension. The diverse impacts of psychological needs on engagement behaviors hint at an underlying dynamism that merits further investigation. Future research should consider employing longitudinal designs to directly observe how these dynamics evolve over time.

Conclusion

The findings of the current study not only theoretically validate the applicability of self-determination theory in the field of social media influencer marketing advertising research but also broaden the scope of advertising effectiveness research from the perspective of consumer engagement. Moreover, the research framework offers strategic guidance and reference for influencer marketing strategies. The main conclusions of this study can be summarized as follows.

Innovativeness is the key factor in high-level consumer engagement behavior. Content contribution represents a higher level of consumer engagement compared to content consumption, as it not only requires consumers to dedicate attention to viewing advertising content but also to share this information across adjacent nodes within their social networks. This dissemination of information is a pivotal factor in the success of influencer marketing advertisements. Hence, companies and brands prioritize consumers' content contribution over mere viewing of advertising content (Qiu & Kumar, 2017). Compared to content consumption and contribution, content creation is considered the highest level of consumer engagement, where consumers actively create and upload brand-related content, and it represents the most advanced outcome sought by enterprises and brands in advertising campaigns (Cheung et al., 2021). The current study posits that to pursue better outcomes in social media influencer advertising marketing, enhancing consumers' willingness for self-disclosure, innovativeness, and trust in advertising information are effective strategies. However, the crux lies in leveraging the consumer's subjective initiative, particularly in boosting their innovativeness. If the goal is simply to achieve content consumption rather than higher levels of consumer engagement, the focus should be on fostering trust in advertising information. There is no hierarchy in the efficacy of different strategies; they should align with varying marketing contexts and advertising objectives.

The greatest role of social media influencers lies in attracting online traffic. information trust is the core element driving content consumption, and influencer factors mainly affect consumer engagement behaviors through information trust. Therefore, this study suggests that the primary role of influencers in social media advertising is to attract online traffic, i.e., increase consumer behavior regarding ad content consumption (reducing avoidance of ad content), and help brands achieve the initial goal of making consumers "see and complete ads." However, their impact on further high-level consumer engagement behaviors is limited. This mechanism serves as a reminder to advertisers not to overestimate the effects of influencers in marketing. Currently, top influencers command a significant portion of the ad budget, which could squeeze the budget for other aspects of advertising, potentially affecting the overall effectiveness of the campaign. Businesses and brands should consider deeper strategic implications when planning their advertising campaigns.

Valuing Advertising Information Factors, Content Remains King. Our study posits that in the social media influencer marketing context, the key to enhancing consumer contribution and

creation of advertising content lies primarily in the advertising information factors. In other words, while content consumption is important, advertisers should objectively assess the role influencers play in advertising. In the era of social media, content remains 'king' in advertising. This view indirectly echoes the points made in the previous paragraph: influencers effectively perform initial 'online traffic generation' tasks in social media, but this role should not be overly romanticized or exaggerated. Whether it's companies, brands, or influencers, providing consumers with advertisements rich in informational value is crucial to achieving better advertising outcomes and potentially converting consumers into stakeholders.

Subjective norm is an unignorable social influence factor. Social media is characterized by its network structure of information dissemination, where a node's information is visible to adjacent nodes. For instance, if user A likes a piece of content C from influencer I, A's follower B, who may not follow influencer I, can still see content C via user A's page. The aim of marketing in the social media era is to influence a node and then spread the information to adjacent nodes, either secondarily or multiple times (Kumar & Panda, 2020). According to the Theory of Planned Behavior, an individual's actions are influenced by significant others in their lives, such as family and friends. Previous studies have proven the effectiveness of the Theory of Planned Behavior in influencing attitudes toward social media advertising (Ranjbarian et al., 2012). Current research further confirms that subjective norms also influence consumer engagement behaviors in influencer marketing on social media. Therefore, in advertising practice, brands should not only focus on individual consumers but also invest efforts in groups that can influence consumer decisions. Changing consumer behavior in the era of social media marketing doesn't solely rely on the company's efforts.

As communication technology advances, media platforms will further empower individual communicative capabilities, moving beyond the era of the "magic bullet" theory. The distinction between being a recipient and a transmitter of information is increasingly blurred. In an era where everyone is both an audience and an influencer, research confined to the role of the 'recipient' falls short of addressing the dynamics of 'transmission'. Future research in marketing and advertising should thus focus more on the power of individual transmission. Furthermore, as Marshall McLuhan famously said, "the medium is the extension of man." The evolution of media technology remains human-centric. Accordingly, future marketing research, while paying heed to media transformations, should emphasize the centrality of the 'human' element.

Data availability

The datasets generated and/or analyzed during the current study are not publicly available due to privacy issues. Making the full data set publicly available could potentially breach the privacy that was promised to participants when they agreed to take part, and may breach the ethics approval for the study. The data are available from the corresponding author on reasonable request.

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Author contributions

Conceptualization: CG; methodology: CG and QD; software: CG and QD; validation: CG; formal analysis: CG and QD; investigation: CG and QD; resources: CG; data curation: CG and QD; writing—original draft preparation: CG; writing—review and editing: CG; visualization: CG; project administration: CG. All authors have read and agreed to the published version of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical approval

The questionnaire and methodology for this study were approved by the School of Journalism and Communication, Minjiang University, Committee on Ethical Research (No. MJUCER20230621). The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Informed consent

Informed consent was obtained from all participants and/or their legal guardians.

Additional information

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