

Understanding Social Media Information Sharing in Individuals with Depression: Insights from the Elaboration Likelihood Model and Schema Activation Theory

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Purpose: How individuals engage with social media can significantly impact their psychological well-being. This study examines the impact of social media interactions on mental health, grounded in the frameworks of the Elaboration Likelihood Model and Schema Activation Theory. It aims to uncover behavioral differences in information sharing between the general population and individuals with depression, while also elucidating the psychological mechanisms underlying these disparities.

Methods: A pre-experiment (N=30) and three experiments (Experiment 1a N=200, Experiment 1b N=180, Experiment 2 N=128) were executed online. These experiments investigated the joint effects of information quality, content valence, self-referential processing, and depression level on the intention to share information. The research design incorporated within-subject and between-subject methods, utilizing SPSS and SPSS Process to conduct independent sample t-tests, two-factor ANOVA analyses, mediation analyses, and moderated mediation analyses to test our hypotheses.

Results: Information quality and content valence significantly influence sharing intention. In scenarios involving low-quality information, individuals with depression are more inclined to share negative emotional content compared to the general population, and this tendency intensifies with the severity of depression. Moreover, self-referential processing acts as a mediator between emotional content and intention to share, yet this mediation effect weakens as the severity of depression rises.

Conclusion: Our study highlights the importance of promoting viewpoint diversity and breaking the echo chamber effect in social media to improve the mental health of individuals with depression. To achieve this goal, tailoring emotional content on social media could be a practical starting point for practice.

Keywords: depression, information-sharing behavior, cognitive schema, self-referential processing, information quality, content valence, social media

Introduction

Social media has become crucial for disseminating information and facilitating social interactions in the digital age. These platforms have transformed how individuals acquire and disseminate information and their cognitive perceptions.¹ A significant observation is the propensity of social media users to engage with information that aligns with their pre-existing beliefs, resulting in the phenomenon known as the “echo chamber effect”.²⁻⁴ This phenomenon creates a closed loop of information exchange, where the lack of diverse perspectives reinforces users’ pre-existing beliefs, potentially giving rise to cognitive biases.^{5,6} Within these echo chamber environments, individuals with depression demonstrate heightened sensitivity to this effect.⁷ Depression, a widespread mental health issue impacting global health, is primarily

characterized by persistent sadness and a loss of interest.⁸ The specific psychological state of individuals with depression could heighten their likelihood of encountering and sharing negative emotional content on social media.⁹ These information-sharing behaviors (ISB) may propagate negative emotions across their social networks, potentially exacerbating their depressive symptoms.¹⁰ Therefore, gaining a thorough understanding of the ISB of individuals with depression on social media is essential for devising effective mental health interventions and refining the policies of social media platforms.

The exchange of information is fundamental to human social interaction, and the emergence of social media has significantly amplified the frequency and breadth of information sharing. Typically, the decision to share information on social media is shaped by various cognitive processes, which include attention and the capacity to process information.^{11–14} This behavior presents distinctive characteristics in individuals with depression. Comparative analyses of the content shared by depressed individuals and general users on social media show notable distinctions in their interaction patterns. Specifically, individuals with depression tend to exhibit cognitive distortions, which manifest as heightened expressions of negative emotions and a predominance of pessimistic views.^{15,16} These behavioral differences suggest a cognitive bias in individuals with depression, predisposing them to pessimistic and erroneous interpretations of personal and social information.¹⁷ This tendency can modify their information processing mechanisms, impacting attention, interpretative abilities, and other cognitive functions, increasing their likelihood of sharing negative content.^{18,19} Consequently, we propose that social media content may activate specific cognitive processes in individuals with depression, thus influencing their patterns of information sharing. Numerous studies have delved into the association between the frequency and duration of social media use and the symptoms of depression,^{20–22} as well as examining the impact of different types of user engagement, such as active and passive use, on mental health.^{23–25} Additionally, substantial research has focused on analyzing the linguistic characteristics of content shared by individuals with depression on social platforms.^{26,27} Efforts have also been made to identify and predict depressive symptoms using technologies like natural language processing.^{28–30} Moreover, a substantial amount of research has been conducted to explore how personality traits of individuals with depression influence their behavior on social media.^{31,32} Despite extensive research, a comprehensive analysis of the ISB of individuals with depression on social media, particularly from a cognitive perspective, is an area that has received relatively less attention. To bridge this gap, our study aims to address two fundamental questions: What distinctive characteristics are evident in the ISB of individuals with depression on social media? Furthermore, how are these characteristics connected to the psychological state and cognitive processing of these individuals?

This study comprehensively integrates the Elaboration Likelihood Model (ELM) and Schema Activation Theory to address the research questions above. The ELM provides a framework explaining that individual attitude changes can occur through two distinct pathways: the central and the peripheral.³³ The central route involves an in-depth examination of the content, encompassing the assessment of information quality and the scrutiny of arguments presented. In contrast, the peripheral route is centered on the influence of external cues such as content valence. In this study, we apply these routes to evaluate how different characteristics of social media content, precisely information quality and content valence, influence the intention to share (IS) of individuals with depression. On the other hand, Schema Activation Theory highlights how individuals understand and interpret information through their cognitive frameworks, known as schemas. More specifically, the self-schema, a cognitive framework related to an individual's self-perception, is a pivotal aspect of these schemas. In the case of individuals with depression, there is an inclination to select and disseminate information that resonates with their negative self-schemas. This propensity becomes more pronounced as the severity of depression increases.^{34,35} Accordingly, this study focuses on exploring how these self-schemas affect the processes of information assimilation and dissemination among individuals with depression in the context of social media.

At present, there are diverse methods available for studying the social media behaviors of individuals with depression. One such method is content analysis, which applies text mining and natural language processing technologies to examine the posts made by depressed individuals on social media. This approach aims to quantify emotional tendencies and other behavioral characteristics, effectively identifying emotional and psychosocial difficulties.^{36–38} However, the reliability of content analysis can be affected by the quality of the social media data it relies on. Moreover, while this method effectively uncovers patterns in user behavior, it does not delve deeply into the underlying psychological motivations or emotional states that drive these behaviors. Other frequently used methods such as network analysis,³⁹ case studies,⁴⁰ and

surveys,⁴¹ are also prevalent in research. However, these approaches often do not concentrate specifically on the unique cognitive dimensions pertinent to this study. Considering the limitations of the above methods, our research has adopted experimental approaches as the primary methodology. We conducted three distinct experiments to rigorously examine the hypotheses related to the ISB of individuals with depression. These experiments involved the distribution of carefully designed experimental materials to participants by random assignment, ensuring effective control over the variables and conditions within the social media experimental setting. This methodological choice significantly reduces the influence of confounding variables and facilitates a more profound examination of the underlying psychological motivations and emotional states.

This study holds significant theoretical and practical implications. Firstly, our study synthesizes theories from various domains, including the cognitive mechanisms of individuals with depression and social media information behavior. This integration provides a multifaceted, multidisciplinary perspective on how individuals with depression process and share information on social media. Our study mainly sheds light on their vulnerability to and reinforcement of an information cocoon characterized by a limited and reinforcing information environment. Secondly, this research marks a pioneering effort in merging the study of cognitive mechanisms in individuals with depression with their social media ISB. This study significantly contributes to revealing the psychological foundations of their social media interactions, offering a unique perspective on the information-sharing behaviors of individuals with depression. Finally, comprehensively understanding these ISB patterns is crucial for grasping the behaviors and needs of individuals with depression in social media contexts. This insight is invaluable for developing tailored psychological interventions and support mechanisms to address the specific challenges faced by this demographic on digital platforms.

Theoretical Background and Research Hypotheses

The Elaboration Likelihood Model

ISB is the outcome of interactions between individuals and their informational environment, fundamentally rooted in information adoption and conceptualized as a consequence of information processing.⁴² A fundamental theory in individual information processing is the dual processing theory, which posits that humans have two modes of information processing, and the interaction between automatic thinking and controlled processing determines behaviors.⁴³ The elaboration likelihood model (ELM), a fundamental perspective within Dual-Process Theory, offers a theoretical framework to comprehend how individuals process information and how this information influences attitudes. According to the ELM, central and peripheral pathways may impact individuals' ISB. The central route involves critically assessing arguments pertinent to the subject, leading to judgment formation regarding the target behavior. In contrast, the peripheral route is dependent on non-content factors like emotional stimuli and source credibility for judgment formation. The ability and motivation to engage in in-depth thinking are two crucial determinants influencing the choice of information processing route.⁴⁴ This theoretical framework is commonly used in decision-making processes involving information, such as adopting online reviews,⁴⁵ intention to donate to medical crowdfunding,⁴⁶ and information system usage.⁴⁷ ELM clarifies the influence of information processing on an individual's decision-making process. Accordingly, this study investigates the disparities in the IS on social media between individuals with depression and the general population, considering information quality as the central cue and content valence as the peripheral cue.

Schema Theory in Depression

The concept of schemas is grounded in cognitive structures, distinguished by their unique content and organization, and developed through an individual's experiences.⁴⁸ Schemas shape an individual's comprehension and response to complex situations, frequently leading to consistent reactions to analogous events. Self-schemas are especially critical in this framework as they encompass individuals' cognitive perceptions of themselves. These self-schemas, cognitive generalizations based on personal experiences, play a vital role in the encoding, storing, and retrieving of information. Self-schemas significantly influence how individuals interpret and recall self-related information, reflecting an individual's self-cognition level.⁴⁹ Furthermore, established schemas can prompt individuals to selectively attend to information that aligns with their existing beliefs or is self-relevant.⁵⁰ This tendency is especially pronounced during the stages of

information processing, such as in the search and evaluation of information.⁵¹ Thus, we propose that an individual's self-schema impacts their information acquisition and processing, affecting their ISB.

Schema Activation Theory posits that a combination of early adverse experiences, genetic factors, and personality traits play a crucial role in shaping the self-schemas in individuals with depression.^{52,53} The theory further asserts that the intensity of negative biases within an individual's schema is directly proportional to the severity of their depressive disorder. When stressors activate dysfunctional schemas, individuals with depression experience specific negative cognitions, leading to biases in attention, processing, and memory that are negative. These patterns include tendencies like overgeneralization, selective abstraction, and dichotomous thinking. Consequently, these biases lead to a persistent negative interpretation of experiences, increasing the tendency of individuals with depression to focus solely on stimuli resonating with negative emotions and to overlook positive information.³⁴ Schema activation operates continuously throughout a depressive episode, including its onset, remission, and potential relapse phases. The activation of cognitive distortions amplifies the perceived significance of events, thus creating a feedback loop that further strengthens these negative schemas.⁵⁴ This cycle promotes negative automatic thoughts, which cultivate pessimistic perceptions of oneself, the world, and the future.⁵⁵ In summary, individuals with depression demonstrate distinct cognitive processing characteristics in comparison to the general population, characteristics that likely have a significant impact on their behavior regarding information sharing.

Research Hypotheses

Information Quality and Content Valence

In social media ISB, information quality and content valence are crucial elements significantly influencing ISB.

Information quality (IQ) pertains to aspects such as clarity, conciseness, depth, breadth, and completeness of information, which enhance the information's understandability and processability.⁵⁶ Due to social media's casual and self-disclosing nature, IQ demonstrates notable variability across diverse content, posing user challenges in appraising information.⁵⁷ In the evaluation process, the user's perception of the authenticity of information is a critical initial step, triggering shifts in cognitive, emotional, or behavioral responses.⁵⁸ Studies have shown that in online environments, the IQ of content is positively linked to changes in attitudes, with content presenting strong arguments being more convincing. In other words, the higher IQ correlates with a stronger inclination to share.^{59,60} Consequently, this study posits that IQ will positively influence ISB.

Another important factor influencing the IS on social media is the Content valence (CV).⁶¹ CV refers to the emotional tone embodied in the information and plays an integral role in the decision-making process of information sharing.⁶² Not only does CV shape the way individuals search for and process information, but it also influences their propensity to disseminate it. Studies have shown that emotional arousal can enhance social transmission, with emotionally charged words and content provoking more intense emotional responses. Previous research heightened emotional engagement captures user attention and influences feedback, participation, and sharing behaviors.^{63–65} However, academic consensus is lacking on whether the positive or negative CV substantially affects the IS. Some studies suggest that content with negative emotions is more likely to be shared, is more viral, and is perceived as more credible on social media.^{66,67} On the other hand, other studies indicate that positive emotions are more prevalent on social media and positively influence ISB.^{68,69} Consequently, this study posits that CV could impact ISB.

Self-Referential Processing as a Mediator

Self-Referential Processing (SR) is a psychological processing mechanism, uniquely reflecting an individual's self-schema, which involves linking the information being processed to one's personal experiences, thoughts, values, and other internal factors.⁷⁰ In this study, SR refers to how individuals relate different types of emotional information to themselves or their personal experiences. The study investigates whether SR could act as a mediating factor between CV and IS.

Firstly, a significant correlation exists between CV and SR. When processing information on social media, users initiate a series of cognitive processes, comparing new information with existing self-relevant experiences and schemas, enhancing their understanding of the information.⁷¹ SR is instrumental in this process, facilitating cognitive encoding that links new external information to an individual's self schema. The positive or negative attributes of the CV can intensify

the association of this information with an individual's self-concept, affecting both the initial encoding and subsequent recall of the information. Studies indicate that people generally possess a positive self-image, leading to a faster response to positive stimuli than negative ones.⁷²⁻⁷⁴

Secondly, SR can serve as an influential persuasion strategy. This principle is grounded in the idea that individuals are more readily swayed by information resonating with their experiences, beliefs, or identities. Self-relevant information is not only easier to comprehend but also processed more swiftly. In the field of consumer behavior, extensive research has indicated that tailoring advertising content, such as brand and product information, to align with consumers' SR notably increases brand satisfaction and purchase intentions.⁷⁵⁻⁷⁸ This alignment significantly enhances the persuasive power of advertising messages. Moreover, within the framework of the ELM, SR is viewed as a motivational state. The more self-relevant the social media information is, the higher the motivation for an individual to engage in profound contemplation about the content, encouraging further exploration, learning, and sharing activities.^{79,80} Therefore, this study hypothesizes that SR acts as a mediator in the relationship between CV and IS.

Depression as a Moderator

The severity of depression may impact how individuals react to stimuli or situations, thereby influencing their ISB on social media. This study investigated whether the depression level (DL) could act as a moderating factor in the mediation and direct pathways between CV and IS.

Firstly, as DL increases, cognitive biases towards negative emotional information become more pronounced in individuals with depression. Schema Activation Theory posits that individuals with depression tend to focus on negative information while disregarding positive information selectively. This inclination becomes more pronounced as the severity of their symptoms increases, leading to dysfunctional attitude activation and negative interpretations of ambiguous information.^{34,81} These individuals often demonstrate a negative processing bias, making them more inclined to process information in a way that aligns with their negative mood. This tendency is a critical element of the cognitive vulnerability characteristic of depression, encompassing selective attention, memory bias, and interpretive bias.⁸²⁻⁸⁴ For instance, individuals with depression may neglect or minimally engage with positive or neutral information, and once they fixate on negative information, disengaging becomes challenging. Therefore, this study posits that DL moderates the direct relationship between negative CV and IS.

Secondly, depression detrimentally impacts decision-making flexibility. Individuals with depression are often challenged by cognitive function impairments, notably in cognitive control and working memory.⁸⁵ This impact is evident in clinical observations, self-reported depressive symptoms, and during the depression recovery process, presenting as limitations in information processing capabilities.⁸⁶ Cognitive control involves goal-oriented abilities like planning, problem-solving, and decision-making. Working memory is a limited-capacity system that temporarily stores and processes information required for complex cognitive tasks.⁸⁷ Owing to these compromised cognitive functions, individuals with depression may struggle with task execution, characterized by sluggish and rigid decision-making, which can adversely affect their daily task performance and, subsequently, their overall quality of life.⁸⁸⁻⁹⁰ In the process of SR, individuals with depression may distort the assessment of the relevance of external stimuli to themselves, tending to overly associate negative information with themselves while overlooking positive information.⁹¹ This distortion in self-relevance can lead to inappropriate information processing, affecting the objectivity and accuracy of decision-making.⁹² Furthermore, existing research suggests that cognitively taxing tasks deplete working memory capacity, and processing information thoughtfully demands substantial cognitive resources.⁹³ For individuals with depression, who often face impairments in working memory, the heightened demand for cognitive effort can exacerbate stress during decision-making processes, ultimately leading to a reduction in the quality of their decisions.⁶⁰ Thus, this research posits that DL moderates the second path of the indirect relationship between SR and IS.

Overview of This Study

Based on prior research and theoretical models, this study seeks to explore the interconnections between IQ and CV on IS, emphasizing the mediating role of SR and the moderating influence of DL (Figure 1). The study puts forward the following hypotheses:

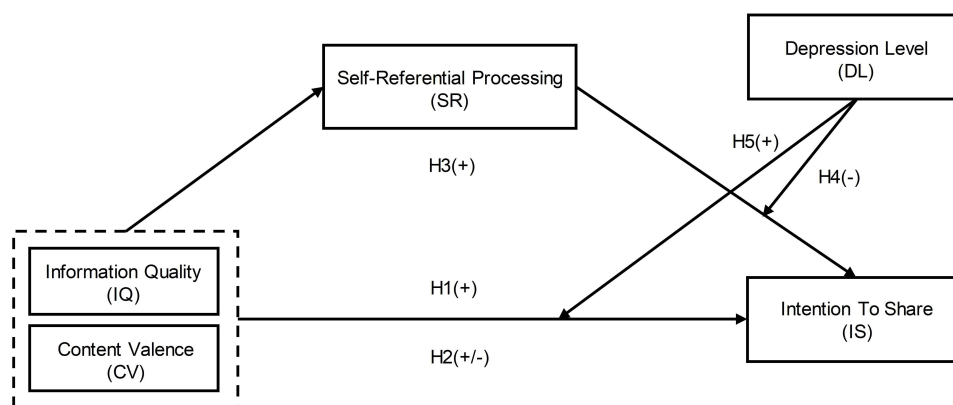


Figure 1 Moderated mediation model.

H1: IQ would positively predict IS.

H2: CV would affect IS.

H3: SR would positively mediate the relationship between CV and IS.

H4: DL would positively moderate the direct relationship between negative CV and IS

H5: DL would adversely moderate the second path of the indirect relationship between SR and IS.

In this study, we implemented a pre-experiment and three experiments to explore the differences in social media IS between individuals with depression and the general population. The pre-experiment focused on designing and validating the manipulative efficacy of the social media experimental materials, laying a robust foundation for the ensuing experiments. Experiment 1a, directed at the general population, examined the principal effects of social media characteristics (IQ, CV) on the IS (H1, H2), seeking to comprehend how these information traits influence the sharing decisions of average users. Building upon Experiment 1a's insights and striving for closer congruence with the actual social media context, Experiment 1b concentrated on content with low IQ. This phase involved an expanded sample size to investigate further the primary effect of CV on IS (H2) and the mediating role of SR (H3), thereby enhancing the study's robustness and external validity. Experiment 2 introduced DL as a moderating variable, dividing participants into non-depressed and moderately-to-severely depressed groups to assess H4 and H5. This step aimed to delve deeper into the impact of depression severity on social media ISB. To enhance the accuracy and applicability of the findings, Experiment 2 employed low IQ materials and varied the theme of the experimental content to mitigate potential topic-related biases on the experimental results. By adopting this series of experimental methods, our goal is to gain deeper insights into the differences in social media IS between individuals with depression and the general population.

Pre-Experiment

The objective of the pre-experiment was to meticulously design experimental materials tailored to meet the specific requirements of this research. We conducted a within-subject experiment using an online survey platform to ascertain the efficacy of manipulating IQ and CV. The pre-experiment involved the implementation of manipulation check procedures and criteria. These procedures were essential to ensure that the modifications to these variables strictly adhered to the pre-defined research criteria.

Materials

Experimental Stimulus Design

In this research, we selected content from WeChat, a widely-used social media platform, to serve as the experimental stimuli, ensuring relevance and effectiveness. WeChat, notable for its extensive user base covering a broad spectrum of user demographics, integrates features such as social networking, instant messaging, and diverse commercial functions.⁹⁴ These attributes make WeChat an ideal platform for gathering diverse and rich data content, rendering it an excellent choice for investigating social media ISB. The criteria for selecting experimental material encompassed: (1) Selected content should demonstrate substantial viewership to ensure its broad influence. (2) The material should originate from

notable public accounts within the field, enhancing the practical applicability of the research findings. (3) The articles should have been recently published within the last two years to guarantee the contemporaneity and relevance of the information. Researchers screened and adapted portions of the original articles to formulate materials aligned with the experimental objectives.

To manipulate IQ, we employed various techniques: abbreviating materials to lessen information volume, altering causal logic to reduce logical coherence, incorporating errors and irrelevant details to amplify confusion, employing inaccurate content to misguide readers, and diminishing the clarity of the information structure. The adoption and execution of these methods were grounded in prior research, aiming to replicate low-quality information traits prevalent on social media.^{95,96} For CV, the selection was based on the nature and intensity of emotional language, ensuring uniformity and potency in emotional influence. In curating experimental materials, we avoided potentially confounding information channels and stringently controlled the word count and format. This strategy was adopted to guarantee comparability across various experimental conditions and reduce extraneous factors' potential influence on the results. Finally, twelve rigorously designed and controlled experimental materials were created.

Manipulation Check

To verify the manipulations of IQ and CV, we utilized validated psychological scales. For accurately measuring IQ, we adapted from previous research,⁹⁷ including three items: "The article's content is accurate", "The article's content is complete", and "The article's content is reliable". A small-scale preliminary test was carried out to confirm their reliability and validity. Regarding the measurement of CV, we employed the Positive and Negative Affect Scale.⁹⁸ Four items were selected for the assessment: "inspired" and "happy" to measure positive emotions, with their combined scores producing a positive emotion score, and "anxious" and "sad" to evaluate negative emotions, with their cumulative scores generating a negative emotion score. These indicators, representing fundamental emotional experiences, have been previously validated in social media information behavior research.⁹⁹

The measurement of IQ and CV employed a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with three acting as the neutral midpoint, marking the division between agreement and disagreement. This delineation was strategically set to differentiate between high and low-quality information and effectively identify positive and negative emotions within our sample. The criteria for manipulation checks were as follows: the above three signified high-quality information, while a score below 3 indicated low-quality information. For CV, scenarios where the positive emotion score was higher than the negative emotion score were classified as positive, and vice versa for negative. These standards were established based on empirical data from previous research.¹⁰⁰

Procedure

Before initiating the formal pre-experiment, a preliminary evaluation of the experimental materials was conducted. For this purpose, four graduate students with specializations in information behavior and information management were recruited for an initial assessment. These students, equipped with academic knowledge and a nuanced understanding of social media content quality, conducted an extensive review of the materials to ascertain their appropriateness for the experiment. Based on their feedback, precise revisions were implemented. Four materials were excluded due to their non-conformity with pre-defined standards or inferior quality. The rest of the materials were adjusted according to the recommendations, enhancing their suitability for experimental purposes.

Subsequently, during the pre-experiment phase, 30 participants were enlisted through the Credemo platform, a premier online resource for conducting behavioral experimental surveys. Credemo is acclaimed for its rigorously controlled and standardized experimental environment, which not only bolsters the efficacy of the experiments conducted but also guarantees the reliability of the collected data. The platform's extensive adoption by numerous scholars for the publication of professional research papers is a testament to its substantial academic utility and value.^{101–103} In our experimental approach, a within-subject design was utilized, wherein each participant engaged with eight different types of experimental stimuli and subsequently responded to the IQ and CV scale items pertinent to each stimulus. To mitigate any potential biases arising from the sequence of material presentation, a randomization strategy was applied in

presenting the experimental materials. Finally, each material's average scores for IQ and CV items were calculated. These scores were then evaluated to determine whether they met the pre-defined criteria set for the manipulation checks.

Results

The participants' demographic information in the pre-experiment consisted of 14 males and 16 females, with a mean age of 34 (SD=10). The six experimental materials were validated through the manipulation check, and [Table 1](#) shows the results. The following experiments used these materials. For specific details of the materials, refer to [Table S1](#).

Experiment I

Experiment 1a

Experiment 1a is designed to investigate the effects of social media characteristics, specifically IQ and CV, on IS. By focusing on the general population, this experiment aims to gain a deeper understanding of how these specific information traits impact the sharing decisions of typical users and to assess H1 and H2. The experiment adopted a 2 (IQ: High vs Low) x 2 (CV: Positive vs Negative) between-subjects design to explore these hypotheses effectively.

Method

Participants

This study determined the sample size using a priori power analysis by the statistical software G*Power 3.1.¹⁰⁴ The selected research method was ANOVA, set with an alpha (α) level of 0.05, a power ($1-\beta$) of 0.8, and an effect size (f) of 0.25. Based on these parameters, the calculation suggested recruiting approximately 179 participants. The experiment was executed on Credemo. A total of 204 questionnaires were distributed, resulting in 200 responses, corresponding to an effective response rate of 98%. Experiment 1a successfully engaged 200 participants, comprising 73 males, with an average age of 31.1 years (SD=6.2 years). Participants were evenly distributed into four distinct conditions, each encompassing 50 participants: low-quality positive, low-quality negative, high-quality positive, and high-quality negative groups. This balanced distribution was crucial for enhancing the accuracy of the data analysis. Finally, participants received a reward after the completion of the experiment.

Materials

Experiment 1a crafted four distinct experimental stimuli, each centered on a specific theme to minimize the topic's potential impact on participants' IS. The items used to measure IS were adapted from prior research on information sharing.^{105,106} This included three statements: "I intend to share this information on social media" "I plan to share this information with others on social media" and "Overall, I would like to share this information with others on social media." These items aimed to gauge participants' IS. A 5-point Likert scale was employed for the responses (1=strongly disagree, 5=strongly agree), with higher scores indicating a stronger propensity to share. In Experiment 1a, Cronbach's alpha for the IS scale was 0.94, reflecting its high reliability.

Procedure

Before the start of the experiment, all participants were required to acknowledge that they had comprehensively read and

Table 1 Results of Manipulation Test of Experimental Materials (N=30)

Material Number	IQ	Positive CV	Negative CV	Material Classification
1	4.33	3.90	1.60	High IQ, Positive
2	4.33	1.65	4.02	High IQ, Negative
3	2.68	2.87	2.15	Low IQ, Positive
4	2.20	1.63	3.57	Low IQ, Negative
5	2.51	3.32	2.13	Low IQ, Positive
6	2.37	1.57	3.95	Low IQ, Negative

Abbreviations: IQ, Information Quality; CV, Content Valence.

understood the informed consent form, confirm their eligibility based on age criteria, and express their agreement to partake in the study. Subsequently, they were asked to provide details regarding their social media usage and demographic information, including age, gender, and educational background. This information was vital for addressing and controlling potential confounding variables, enhancing the research findings' accuracy and validity. To enhance the realism and relevance of the experiment, participants were asked to specify the social media channels they primarily use for acquiring and sharing information. This step was intended to mimic the participants' real-life social media usage patterns, ensuring that the experimental conditions closely mirrored actual scenarios of social media engagement.

Following the random assignment of participants to one of the four experimental groups, an attention check focusing on the content was conducted. This step was crucial for assessing participants' comprehension of the experimental materials and ensuring the quality of the data collected.¹⁰⁷ The attention check consisted of brief queries, such as "Please summarize the experimental material using at least three keywords", to verify that participants had thoroughly engaged with the materials. Subsequently, we evaluated the participants' IS responses to the experimental stimuli presented. To comprehensively analyze the gathered data, SPSS 25.0 was utilized for a two-factor analysis of variance (ANOVA), facilitating the testing of the proposed hypotheses.

Results and Discussion

The descriptive statistics for Experiment 1a are presented in Table 2. Experiment 1a examines the relationship between CV and IQ as independent variables and IS as the dependent variable. Control variables in this experiment consisted of age, gender, education level, and social media usage experience. The two-way ANOVA showed significant effects of both IQ on IS ($F(1196) = 41.9$, $p < 0.001$, $\eta_p^2 = 0.18$) and CV on IS ($F(1196) = 4.42$, $p < 0.05$, $\eta_p^2 = 0.022$), providing support for H1 and H2. As illustrated in Figure 2, significant differences were found between the low IQ group on IS ($M=2.97$, $SD=1.35$) and the high IQ group on IS ($M=4.02$, $SD=0.90$), suggesting that participants had a preference for sharing high-quality information. Meanwhile, a disparity was observed between the negative group on IS ($M=3.34$, $SD=1.33$) and the positive group on IS ($M=3.65$, $SD=1.17$), as participants conveyed an intention to share information characterized by positive valence.

Experiment 1a investigates how different types of CV and IQ influence participants' IS. A notable variance in IS was observed in low IQ scenarios, with participants more likely to share positive emotional information. However, several issues warrant further exploration in Experiment 1a: (1) The sample size in Experiment 1a is relatively small. Would the experimental results be robust if replicated with more participants in each group? (2) From a practical standpoint, the era of social media is characterized by widespread false and misleading information, with the harmful effects of low-quality content being particularly pronounced for individuals. How does SR influence the impact of CV on IS in low-information -quality contexts?

Table 2 Descriptive Statistics and Correlation Analysis in Experiment 1a (N=200)

	Mean	SD	1	2	3	4	5	6
1. Gender	0.64	0.48						
2. Age	30.92	6.60	-0.08					
3. EL	3.11	0.57	-0.02	-0.08				
4. SMUE	3.30	0.75	-0.08	0.17*	0.05			
5. CV	0.50	0.50	0.03	-0.05	0.11	0.01		
6. IQ	0.50	0.50	0.09	0.04	0.04	0.00	0.00	
7. IS	3.50	1.26	0.05	0.05	-0.04	-0.08	0.12	0.42**

Notes: For Gender: 0 = Male, 1 = Female; For EL: 1 = High school and below, 2 = Associate degree, 3 = Bachelor's degree, 4 = Master's degree, and 5 = Doctorate; For SMUE: 1 = Less than 1 year, 2 = 2 to 4 years, 3 = 5 to 7 years, and 4 = More than 8 years. For CV: 0 = Negative, 1 = Positive. For IQ: 0 = Low, 1 = High. ** $p < 0.01$, * $p < 0.05$.

Abbreviations: EL, Education level; SMUE, Social Media Usage Experience; CV, Content Valence; IQ, Information Quality; IS, Intention to Share.

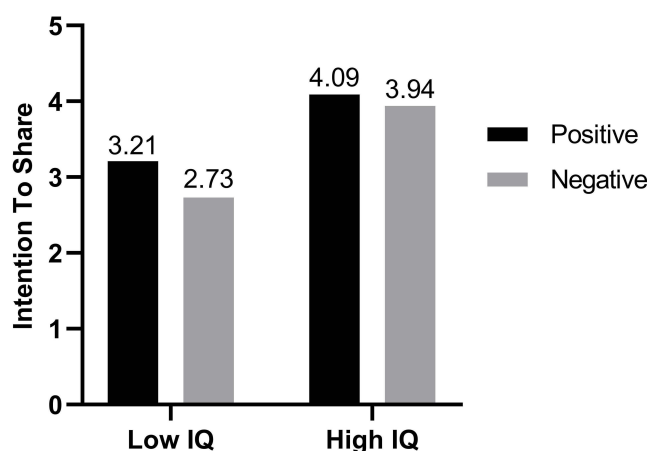


Figure 2 Experiment 1a results.
Abbreviation: IQ, Information Quality.

Experiment 1b

Experiment 1b was designed to investigate the impact of CV on IS within a context of low-quality information and to assess the mediating influence of SR, thus examining H2 and H3. This experiment utilized a single-factor (Positive vs Negative) between-subjects design. The choice of a low-quality information environment was deliberate, aiming to reflect the diverse IQ typically encountered on social media. By removing the variable of IQ, the experiment could concentrate on the effect of CV on IS. Additionally, this setup was crucial for investigating the underlying mechanisms of how CV impacts IS among the general population, particularly emphasizing the mediating effect of SR in this dynamic.

Method

Participants

The participant count for Experiment 1b was precalculated using G*Power 3.1,¹⁰⁴ employing an independent samples *t*-test, with an alpha level (α) of 0.05, power ($1-\beta$) of 0.8, and an effect size (*d*) of 0.5. This analysis suggested the necessity of 102 participants. The experiment was conducted online using the Credemo, with 196 questionnaires initially disseminated. To ensure the integrity of the data, an attention check was implemented, consisting of crucial questions (such as “What is the content of this material?”) to verify that participants had thoroughly engaged with the experimental materials. Based on the results of the attention check, 16 questionnaires were excluded, resulting in 180 valid responses and an effective response rate of 91.84%. Experiment 1b recruited 180 participants (76 males, average age 31.1 years, *SD*=8.7 years). They were randomly allocated to one of two groups comprising 90 individuals representing negative or positive content conditions. Participants received a reward after completing the experiment.

Materials

The experimental stimuli for Experiment 1b were sourced from the low IQ group of Experiment 1a, particularly utilizing materials numbered 3 and 4. Similar to Experiment 1a, measurement items from previous IS research were used, encompassing three statements and employing a 5-point Likert scale. In Experiment 1b, the Cronbach’s alpha for IS was 0.93.

To evaluate SR, we adapted scales from research in consumer behavior and advertising persuasion effects.^{108,109} Adaptations to the measurement items for this experiment entailed minor language modifications to enhance relevance, such as replacing the word “product” with “article” in the original scale items. Participants responded to statements like “This article is closely related to my life”, “This article is significant to me”, “This article reminds me of my life experiences”, “This article seems to be written for me”, “This article is important to me”, and “This article reminds me of myself”. Responses were recorded on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores on this scale indicated a higher degree of SR. The Cronbach’s alpha for SR in Experiment 1b was 0.89. Additionally, at the

end of the experiment, participants evaluated the IQ of the stimuli using the same items as in the pre-experiment. The Cronbach's alpha for IQ in Experiment 1b was 0.85, affirming the reliability of these measurements.

Procedure

In Experiment 1b, we followed the same procedure as in Experiment 1a. Participants engaged with two meticulously crafted low-quality information materials. To ensure parity in perceived IQ across both groups, participants were requested to evaluate the IQ of the reviewed materials. Following the reading, we assessed participants' SR and IS. Finally, to analyze the collected data and test Hypothesis H3, we employed SPSS 25.0 and Process Macro 4.1, specifically using model 4, to conduct the mediation analysis.

Results and Discussion

The descriptive statistics for Experiment 1b are presented in Table 3. An independent sample *t*-test was conducted to examine the difference in perceived IQ. The results ($M_{\text{negative}} = 3.37$, $M_{\text{positive}} = 3.61$, $t(178) = -1.73$, $p > 0.05$, Cohen's $d = 0.26$) indicate the absence of statistically significant differences between the two groups, thereby ruling out the interference of IQ. Furthermore, the researchers reassessed the main effect of CV on IS. An independent sample *t*-test was performed, revealing significant differences in IS between the two groups on IS ($M_{\text{negative}} = 3.43$, $M_{\text{positive}} = 3.80$, $t(178) = -2.18$, $p < 0.05$, Cohen's $d = 0.32$), thus supporting support for H2 once again. Therefore, in a context with limited IQ, CV significantly influenced the participants' IS, indicating a preference for sharing positive information, consistent with the findings from Experiment 1a.

To investigate the mediating role of SR, the analysis of mediation effects utilized 5000 bootstrap samples with control for age and gender as covariates. The results indicate that CV significantly predicted SR ($b = 0.58$, $SE = 0.18$, 95% CI = [0.22, 0.94]), and SR significantly predicted IS ($b = 0.78$, $SE = 0.04$, 95% CI = [0.71, 0.86]). In contexts of low IQ, positive emotional cues were associated with a higher level of SR, which positively influences participants' IS. The mediating effect is statistically significant, as the confidence interval ($b = 0.45$, $SE = 0.15$, 95% CI = [0.16, 0.74]) does not include 0 (Table 4). This result indicates a significant indirect effect of SR on CV and IS, thereby providing evidence supporting H3. The findings of the experiment can be viewed in Figure 3.

Experiment 1b investigates the impact of CV on IS, replicating the main effects observed with a larger sample size. This experiment effectively tests H2 and examines the mediating role of SR (H3). In the positive group, participants

Table 3 Descriptive Statistics and Correlation Analysis in Experiment 1b(N=180)

	Mean	SD	1	2	3	4
1. Gender	0.58	0.50				
2. Age	31.14	8.71	0.00			
3. CV	0.50	0.50	-0.02	-0.03		
4. SR	4.71	1.26	0.00	0.20**	0.22**	
5. IS	3.61	1.15	-0.01	0.23**	0.16*	0.86**

Notes: For Gender: 0 = Male, 1 = Female; For CV: 0 = Negative, 1 = Positive.
** $p < 0.01$, * $p < 0.05$.

Abbreviations: CV, Content Valence; IS, Intention to Share; SR, Self-Referential Processing.

Table 4 Bootstrap Analysis Results in Experiment 1b (N=180)

	Effect	BootSE	BootLLCI	BootULCI
Total	0.39	0.17	0.06	0.72
Direct	-0.06	0.09	-0.24	0.12
Indirect	0.45	0.15	0.16	0.74

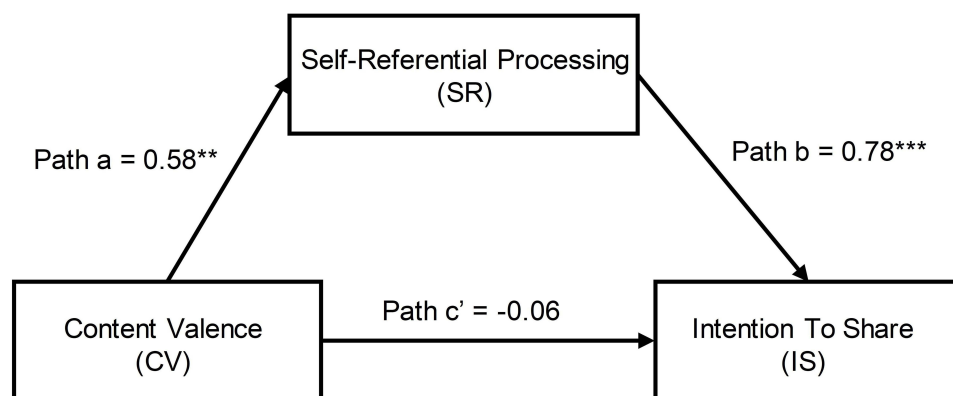


Figure 3 The results of mediation analysis for Experiment 1b.

Notes: *** $p < 0.001$; ** $p < 0.01$.

exhibited a heightened level of SR, which enhanced their tendency to share positive content. However, Experiment 1b raises two questions for further exploration: (1) Are the experimental results robust when varying the theme and content from Experiment 1b? (2) How does DL affect the relationship between CV and IS and between SR and IS?

Experiment 2

Experiment 2 was designed to investigate the influence of DL on the IS and to evaluate H4 and H5. Employing a single-factor (CV: Negative vs Positive) between-subjects design, this experiment aimed to compare participants' IS directly with varying levels of DL when encountering different types of emotional content. Additionally, Experiment 2 examined how the DL might moderate the relationship between the SR and the IS.

For assessing participants' DL, we used a self-report depression assessment tool, which enabled the categorization of participants into non-depressed and moderate-to-severe depression groups. Experiment 2, similar to Experiment 1b, exclusively employed materials characterized by low IQ to maintain a controlled experimental setting. Furthermore, to eliminate any potential bias from the topic of the materials, we altered the theme of the experimental content, thereby enhancing the study's generalizability and validity.

Method

Participants

For Experiment 2, participant selection was based on their self-reported mental health status, utilizing the Beck Depression Inventory-Short Form (BDI-SF) for accurate classification. The BDI-SF was chosen due to its widespread acceptance in both clinical and research contexts, enabling effective differentiation among participants with various depression levels.¹¹⁰ The necessary sample size for Experiment 2 was determined using G*Power 3.1 for a priori linear multiple regression analysis ($\alpha = 0.05$, $1 - \beta = 0.8$, $f^2 = 0.15$), which suggested a minimum of 68 participants.

Considering the unpredictability of online participant distribution, especially among individuals with depression, we disseminated 244 questionnaires via the Credemo platform to encompass a broader demographic. An attention check was implemented to ensure response quality and validity, focusing on consistent responses to specific questionnaire items. This procedure resulted in 185 valid responses, equating to an effective response rate of 75.8%. The employment of this screening criterion was critical in enhancing the accuracy and dependability of the data collected.

Materials

In Experiment 2, the experimental stimuli consisted of two news articles from a single social media platform, explicitly identified as materials 5 and 6. The preliminary study offered comprehensive guidelines on manipulating these materials and verifying their effectiveness.

The Beck Depression Inventory (BDI) is a widely-recognized self-report instrument for evaluating depression symptoms. BDI comprises two subscales: the cognitive-affective subscale (items 1 to 13), focusing on emotional states

and self-evaluation, and the somatic performance subscale (items 14 to 21), which addresses physical symptoms of depression.¹¹¹ The participants' mental health in the study was assessed utilizing the Cognitive-Affective subscale (BDI-SF). The BDI-SF was selected for its efficiency and accuracy in assessing the severity of depressive symptoms among participants. The BDI-SF scoring system categorizes the severity of depression, with 0–4 representing minimal symptoms and scores of 8 or higher indicating moderate-to-severe depression.^{110,112} In Experiment 2, the Cronbach's alpha for BDI-SF was 0.94, demonstrating the scale's high internal consistency in this study. Moreover, the Cronbach's alpha for IS and SR were 0.95 and 0.89, respectively, signifying strong reliability.

Procedure

The experimental procedure for Experiment 2 was tailored from established research protocols to align with this study's specific aims.¹⁰⁵ The specific details of the experimental process are described in detail in Figure 4. Before the start of the experiment, crucial demographic information, including age and gender, was collected along with participants' DL. Based on the BDI-SF scores, participants were categorized into two distinct groups: a non-depressed group (scores 0–4, N=81) and a moderate-to-severe depression group (scores ≥ 8 , N=64). To enhance the significance of the moderating effect, participants with scores between 5 and 7 were excluded. To ensure comparability, we randomly selected an equal number of participants for both the non-depressed group and the moderate-to-severe depression group, leading to a balanced final sample size of 64 participants in each group.

In the experiment, participants from each group were randomly assigned to engage with experimental stimuli featuring either negative or positive CV. This approach was adopted to examine how different emotional tones influence the IS of individuals with varying depression levels. For example, half of the participants (N=32) were allocated a positively valenced article in the non-depressed group, while the other half (N=32) received a negatively valenced one. The same distribution strategy was applied to the moderate-to-severe depression group, ensuring that both groups were exposed to identical stimuli. After reading the articles, participants' SR and IS responses to the stimuli were evaluated using specific scale items. For the data analysis, SPSS 25.0, in conjunction with Process Macro 4.1, employing Model 4 for mediation analysis and Model 15 for moderated mediation analysis, was utilized to scrutinize the hypotheses.

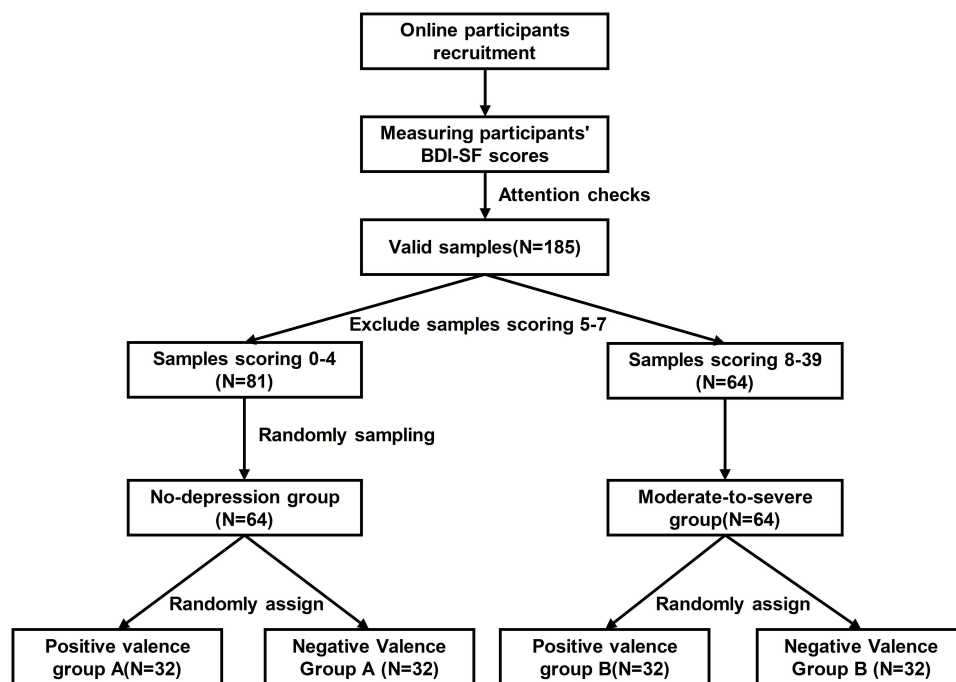


Figure 4 Experiment 2 procedure.

Results and Discussion

The descriptive statistics for Experiment 2 are presented in Table 5. Initially, the study re-examined the mediating role of SR level while controlling for age and gender as covariates. The results demonstrated a significant direct effect of CV on IS ($b=0.59$, $SE=0.25$, 95% CI = [0.10,1.08]). Additionally, CV significantly predicted SR ($b=0.78$, $SE=0.28$, 95% CI = [0.22,1.33]), indicating that the level of SR was higher for negative content than positive content. Moreover, SR significantly predicted IS ($b=0.72$, $SE=0.08$, 95% CI = [0.57,0.87]). The mediating effect of SR was found to be significant ($b=0.56$, $SE=0.21$, 95% CI = [0.17,0.98]), accounting for 49% of the total effect, thus indicating the robustness of the results and providing further support for H3.

Subsequently, Process Macro model 15 was employed to examine the moderating effect of DL, incorporating gender and age as control variables (Table 6). The interaction between DL and CV significantly predicts IS ($b = 0.08$, $t = 2.12$, $p < 0.05$). This finding indicates that as DL increases, participants exhibit a significantly increased intention to share information related to negative emotional content, thereby supporting H4. The interaction between DL and SR significantly predicts IS ($b = -0.03$, $t = -2.70$, $p < 0.05$). The results show that as DL increases, the predictive power of SR on IS diminishes, thereby supporting H5.

Experiment 2 aims to eliminate interference from the theme of experimental materials and reaffirm the main effects of CV on IS in a low-information-quality context. It also examines the mediating role of SR within the relationship between CV and IS. Concurrently, the DL was integrated into the model to investigate how it influences participants' intention to share information. In contrast to the findings of Experiment 1b, individuals with depression showed a heightened sensitivity to the CV of information, and this preference for negative information intensified as DL increased (Figure 5). This finding contrasts with the results of Experiments 1a and 1b involving the healthy population. Furthermore, the moderation analysis of DL within

Table 5 Descriptive Statistics and Correlation Analysis in Experiment 2(N=128)

	Mean	SD	1	2	3	4	5
1. Gender	0.64	0.48					
2. Age	28.77	7.19	-0.01				
3. CV	0.50	0.50	-0.10	0.24**			
4. SR	3.90	1.59	0.11	0.12	0.25**		
5. DL	7.67	7.26	0.13	-0.13	0.08	-0.03	
6. IS	4.54	1.79	0.07	0.03	0.30**	0.67**	0.03

Notes: For Gender: 0 = Male, 1 = Female; For CV: 0 = Positive, 1 = Negative. ** $p < 0.01$.

Abbreviations: CV, Content Valence; SR, Self-Referential Processing; DL, Depression Level; IS, Intention to Share.

Table 6 Moderated Mediation Effect Results in Experiment 2 (N=128)

Independent Variable	Self-Referential Processing		Intention to Share	
	b	t	b	t
Gender	0.45	1.59	-0.05	-0.20
Age	0.01	0.68	-0.01	-0.76
CV	0.78	2.77**	0.59	2.42*
SR			0.69	9.06***
DL			0.01	0.37
CV × DL			0.08	2.12*
SR × DL			-0.03	-2.70**
R ²	0.08		0.51	
F	3.77*		18.08***	

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Abbreviations: CV, Content Valence; SR, Self-Referential Processing; DL, Depression Level.

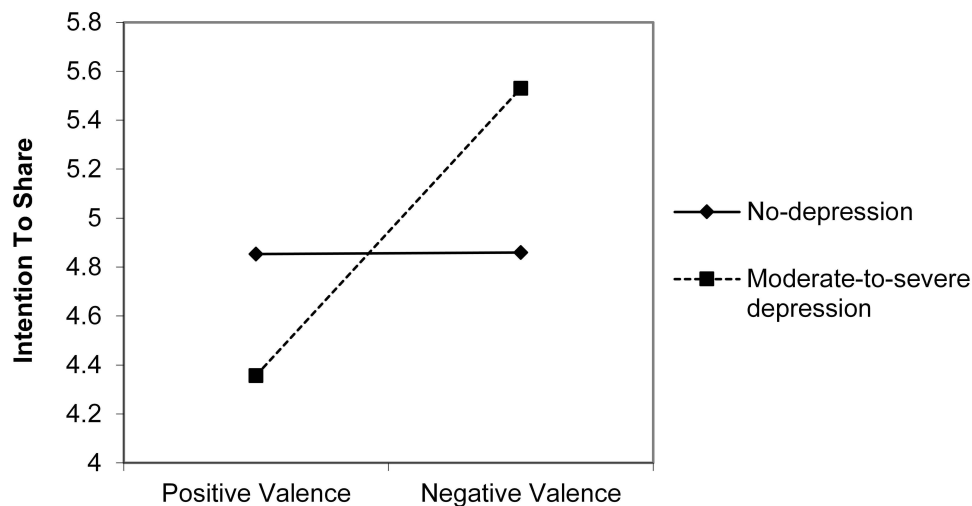


Figure 5 Mediating effects of depression levels in the relationship between content valence and intention to share.

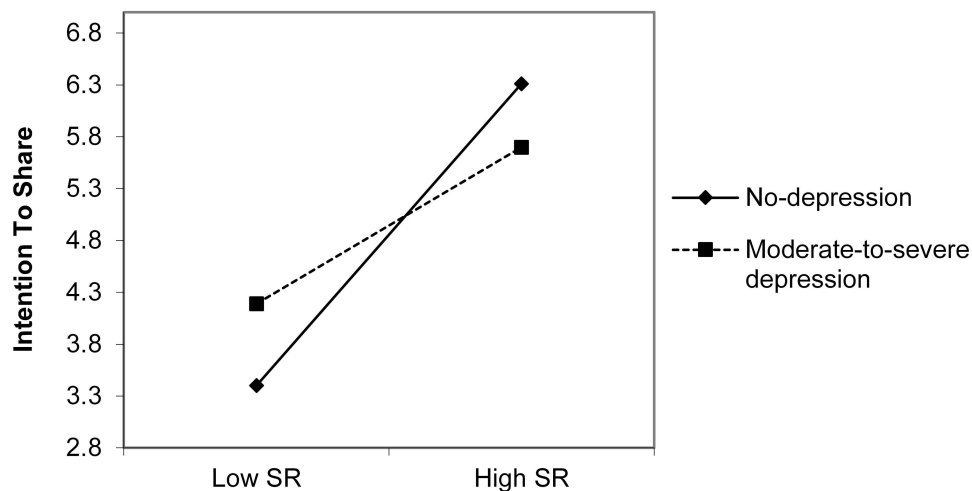


Figure 6 Mediating effects of depression levels in the relationship between self-referential processing and intention to share.
Abbreviation: SR, Self-Referential Processing.

the secondary path of the indirect relationship between SR and IS was significant. The influence of SR on the IS of emotional information decreased with an increase in DL, as illustrated in Figure 6.

General Discussion

In our current digitally-dominated and interconnected society, exploring the link between social media use and mental health issues is increasingly crucial. However, there is a significant gap in research on the information-sharing behavior of individuals with depression, especially considering their distinct cognitive processing styles. This study endeavors to bridge this gap by examining the information behavior of individuals with depression from a cognitive processing standpoint. Our findings indicate that: (1) individuals with depression are more inclined to share negative emotional content, a tendency that becomes more pronounced as depression severity increases; (2) the level of self-referential processing towards negative emotional content on social media is heightened in the depressive cohort, and as depression intensifies, the mediating effect of self-referential processing on content valence and the intention to share diminishes.

Overall, our findings indicate that individuals with depression exhibit distinct information-sharing behaviors compared to those without depression. Specifically, individuals with depression demonstrate a heightened sensitivity to

negative emotional content, often preferring to share such content on social media. This inclination is amplified as the severity of depression increases, leading to a more pronounced focus on and reaction to negative information. This observation aligns with the established literature regarding cognitive processing biases associated with depression.^{113–115} Our study corroborates the critical insight that individuals with depression tend to selectively engage with and disseminate negative emotional information on social media platforms. Existing research posits that sharing negative emotional content may serve as a form of self-emotional regulation for individuals with depression. This act of sharing can benefit the sharers emotionally and foster interpersonal connections through social media, potentially offering avenues for emotional support.^{116,117} For those with depression who struggle with traditional social interactions, the anonymity afforded by social media platforms can provide a conducive environment for self-expression. However, it is crucial to recognize that sharing negative emotional content can reverberate through social networks, potentially influencing other users, especially those in vulnerable psychological states, in adverse ways.^{118–120}

A significant aspect of our study is examining the mediating role of self-referential processing between content valence and the intention to share information. Our findings reveal that self-referential processing serves as a pivotal mediator in this relationship, with its influence diminishing as depression severity increases. This pattern was substantiated through two distinct experiments. In Experiment 1b, it was observed that participants were more likely to associate positive content with themselves. However, Experiment 2 revealed that individuals with depression tended to link negative content more closely to themselves, consistent with existing studies on the tendency of depressive populations towards negative self-referencing.^{121,122} Our research uniquely investigates how depression levels modulate the effect of self-referential processing on sharing intentions. We discovered that with escalating depression levels, the impact of self-referential processing on sharing intentions diminishes. This finding suggests a shift in cognitive strategies in individuals with higher depression levels, potentially leading to more emotion-driven decision-making influenced by peripheral cues and a propensity to share negative emotional content. The implications of information-sharing behaviors on an individual's psychological state are profound. Sharing positive life events does not merely communicate the events themselves; it can amplify positive emotions, increase happiness, enhance life satisfaction, and mitigate loneliness.¹²³ In contrast, sharing negative experiences can perpetuate rumination, reactivating distressing memories and focusing attention, trapping individuals in a cycle of passive contemplation on painful memories, their potential causes, and consequences.^{124,125} Particularly for those with depression, in line with rumination response style theory, such individuals are prone to engage in passive, negative, and abstract repetitive thinking aimed at reconciling the gap between expectations and reality. These maladaptive coping strategies can further aggravate depression symptoms.^{126,127}

Our study contributes to the understanding of the intricate patterns of social media usage among individuals with depression. This area has been extensively studied, particularly concerning social media addiction and its links to depression.^{128–132} Furthermore, our study acknowledges that certain negative personality traits, including neuroticism, the tendency for social downward comparison, and low self-esteem, are significant contributors to the behavior of individuals with depression on social media platforms.^{133,134} Diverging from these previously mentioned perspectives, our research focuses on the aspect of information usage, revealing a concerning pattern: individuals with depression on social media platforms tend to exhibit a bias towards acquiring negative information. Previous research has highlighted the significant role that selective acquisition and biased processing of negative information play in both the development and maintenance of depression.¹³⁵ In today's digital era, we suggest that the echo chamber effect, commonly observed on social media, may exacerbate this tendency towards negative information bias. Three fundamental characteristics define the echo chamber effect: it involves a group of users sharing similar viewpoints, encourages more frequent interaction among these users, and strengthens their existing beliefs.¹³⁶ In the case of individuals with depression, their negative cognitive bias makes them more prone to interact with and share negative content. As a result, algorithm-driven recommendation systems on social media, which react to such user behaviors, are likely to present these individuals with content that resonates with their negative emotional states, perpetuating their exposure to similar types of information. This phenomenon can potentially create an isolated information bubble, further amplifying the echo chamber effect. This type of environment may serve to not only reinforce the existing beliefs of individuals with depression but also contribute to the polarization of their self-schema, thereby aggravating their mental health challenges.^{137,138}

Breaking free from the echo chamber effect of social media and fostering a range of perspectives is critical for improving the mental health of individuals with depression. Cognitive Behavioral Therapy, which focuses on correcting cognitive biases and dysfunctional thoughts, is well-recognized as an effective intervention for depression.^{139–141} In recent years, psychological interventions have broadened to encompass digital methods, utilizing the internet, mobile devices, and wearable technology.^{142,143} The Transtheoretical Model suggests that behavior change is a dynamic, multi-stage process requiring sustained effort.¹⁴⁴ Social media platforms, serving as conduits for health information, play a supportive role and encourage active engagement in these dynamic, long-term digital health interventions. Tailoring information and customizing content or strategies to suit individual traits identified through assessment is pivotal in digital health interventions. Research indicates that adapting emotional content on social media to suit the emotional states of individuals with depression could be a valuable initial step in intervention strategies. Personalizing content to meet the emotional needs of these individuals can disrupt the echo chamber effect, potentially fostering more positive perceptions of oneself, the world, and the future.

Implications

Our study embarks on a multidisciplinary exploration of the cognitive mechanisms of individuals with depression and their information-sharing behaviors on social media. It provides an in-depth analysis of how individuals with depression utilize social media for disseminating information. Significantly, this research represents a pioneering effort to integrate the cognitive processing characteristics of individuals with depression into their social media information-sharing activities. By utilizing theoretical frameworks such as the Elaboration Likelihood Model and Schema Activation Theory, the study not only broadens our understanding of the influence of cognitive traits associated with depression on social media interactions but also offers a new theoretical perspective for analyzing the dynamics of social media information sharing.

The insights derived from this research are precious for various stakeholders. Mental health professionals, for instance, can achieve a better understanding of the digital behaviors exhibited by individuals with depression, which can inform the creation of more precise intervention strategies. For designers of social media platforms, these findings offer directives for creating more empathetic and supportive features, enabling individuals with depression to escape their informational echo chambers and encounter a broader, more positive spectrum of content. Additionally, policymakers can leverage these findings to shape and improve mental health-related policies, ultimately enhancing the accessibility and effectiveness of mental health services.

Limitations and Future Research

Our study recognizes several limitations. First, the categorization of information quality and content valence into high and low groups lacked specific detail about the intensity of these stimuli. This lack of specificity might impede a deeper exploration of information-sharing behavior under various intensities of the same valence. Future studies could benefit from employing more detailed measures of stimulus intensity to enrich the understanding of the effects of information quality and content valence on sharing intentions. Furthermore, the identification of individuals with depression in this study was primarily based on self-reported depression scales. This method may not fully encapsulate the complex and multifaceted nature of clinical depression, potentially leading to inaccuracies in the classification of depressed individuals and an incomplete understanding of their cognitive processing and information-sharing behavior. Future studies should consider including participants with clinically diagnosed depression to gain a more comprehensive insight into the impact of depression severity on information-sharing behavior.

Building on this study's findings, future research can further explore the impact of different mental health conditions on information processing in social media environments. This field may involve assessing the effectiveness of customized intervention strategies tailored to the nuances of social media usage. Additionally, future studies should develop methods that enhance individuals' skills in evaluating information and expanding their range of information sources. Such research would be pivotal in improving the management of information acquisition processes, contributing significantly to mental health enhancement. Engaging in these varied lines of inquiry promises to offer more individualized and comprehensive support for those with depression while also introducing innovative methods and perspectives for mental health care in today's digital landscape.

Conclusion

The main contribution of this study lies in its in-depth exploration of the unique information-sharing behaviors of individuals with depression on social media, providing a fresh cognitive perspective. Our findings indicate that individuals with depression tend to favor sharing negative emotional content, a tendency that intensifies with the severity of their depression. This observation supports the theory of a negative cognitive processing mechanism operating in individuals with depression, particularly within the context of social media. Additionally, our research highlights the mediating role of self-referential processing in the relationship between content valence and information sharing. We found that as depression deepens, the influence of self-referential processing on sharing behavior lessens, suggesting that the information-sharing decisions of individuals with depression are shaped by their impaired cognitive functions and a reliance on the peripheral cues of content valence. These insights provide a new perspective on how individuals with depression process information and make decisions, adding a novel dimension to the understanding of cognitive mechanisms in the context of mental health.

In the social media environment, individuals with depression are particularly susceptible to the echo chamber effect, tending to engage with and share information that confirms their existing negative beliefs. This consistency in the type of information they encounter and disseminate can amplify their negative emotions and worsen psychological symptoms, limiting their exposure to diverse and more positive perspectives. Thus, our study's findings highlight the importance of providing a broader range of content to individuals with depression, a practice that holds significant potential for enhancing their mental health and emotional self-regulation. This research contributes significantly to the theoretical understanding of cognitive processing and social media usage in the context of depression. It provides a solid empirical foundation for the development of interventions that aim to improve the information-processing approaches and social media interactions of individuals with depression. By highlighting the potential benefits of diversifying the content presented to these individuals, the study offers valuable insights for practitioners and researchers seeking to improve mental health outcomes in digital environments.

Ethics Statement

This study obtained approval(number: 2023 [S090]) from the Medical Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology. Before the experiments, informed consent was obtained from all participants, and the study strictly adhered to the principles delineated in the Helsinki Declaration and its subsequent revisions, as well as equivalent ethical standards.

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Disclosure

The authors of this paper assert that no financial conflicts of interest, personal relationships, or academic competition exist that might potentially influence the results of this study.

References

1. Pennycook G, Rand DG. The Psychology of Fake News. *Trends Cognitive Sci.* 2021;25(5):388–402. doi:10.1016/j.tics.2021.02.007
2. Cinelli M, De Francisci Morales G, Galeazzi A, Quattrociochi W, Starnini M. The echo chamber effect on social media. *Proc Natl Acad Sci.* 2021;118(9):e2023301118. doi:10.1073/pnas.2023301118
3. Gao Y, Liu F, Gao L. Echo chamber effects on short video platforms. *Sci Rep.* 2023;13(1):6282. doi:10.1038/s41598-023-33370-1
4. Scheibenzuber C, Neagu LM, Ruseti S, et al. Dialog in the echo chamber: fake news framing predicts emotion, argumentation and dialogic social knowledge building in subsequent online discussions. *Computers in Human Behavior.* 2023;140:107587. doi:10.1016/j.chb.2022.107587
5. Baumann F, Lorenz-Spreen P, Sokolov IM, Starnini M. Modeling Echo Chambers and Polarization Dynamics in Social Networks. *Phys Rev Lett.* 2020;124(4):048301. doi:10.1103/PhysRevLett.124.048301
6. Dubois E, Blank G. The echo chamber is overstated: the moderating effect of political interest and diverse media. *Inform Comm Soc.* 2018;21(5):729–745. doi:10.1080/1369118X.2018.1428656

7. De Biasio A, Monaro M, Oneto L, Ballan L, Navarin N. On the problem of recommendation for sensitive users and influential items: simultaneously maintaining interest and diversity. *Knowledge-Based Syst.* **2023**;275:110699. doi:10.1016/j.knosys.2023.110699
8. Vos T, Lim SS, Abbafati C, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet.* **2020**;396(10258):1204–1222. doi:10.1016/S0140-6736(20)30925-9
9. Radovic A, Gmelin T, Stein BD, Miller E. Depressed adolescents' positive and negative use of social media. *Journal of Adolescence.* **2017**;55(1):5–15. doi:10.1016/j.adolescence.2016.12.002
10. Zhu W, Mou J, Benyoucef M, Kim J, Hong T, Chen S. Understanding the relationship between social media use and depression: a review of the literature. *Online Information Rev.* **2023**;47(6):1009–1035. doi:10.1108/OIR-04-2021-0211
11. Khaleel I, Wimmer BC, Peterson GM, et al. Health information overload among health consumers: a scoping review. *Patient Educ Couns.* **2020**;103(1):15–32. doi:10.1016/j.pec.2019.08.008
12. Soroya SH, Farooq A, Mahmood K, Isoaho J, Zara SE. From information seeking to information avoidance: understanding the health information behavior during a global health crisis. *Information Processing and Management.* **2021**;58(2):102440. doi:10.1016/j.ipm.2020.102440
13. Islam AKMN, Laato S, Talukder S, Sutinen E. Misinformation sharing and social media fatigue during COVID-19: an affordance and cognitive load perspective. *Technol Forecasting Social Change.* **2020**;159:120201. doi:10.1016/j.techfore.2020.120201
14. Laato S, Islam AKMN, Islam MN, Whelan E. What drives unverified information sharing and cyberchondria during the COVID-19 pandemic?. *Eur J Inf Syst.* **2020**;29(3):288–305. doi:10.1080/0960085X.2020.1770632
15. Bathina KC, ten Thij M, Lorenzo-Luaces L, Rutter LA, Bollen J. Individuals with depression express more distorted thinking on social media. *Nat Hum Behav.* **2021**;5(4):458–466. doi:10.1038/s41562-021-01050-7
16. Yao X, Yu G, Tian X, Tang J. Patterns and Longitudinal Changes in Negative Emotions of People with Depression on Sina Weibo. *Telemed E-Health.* **2020**;26(6):734–743. doi:10.1089/tmj.2019.0108
17. LeMoult J, Gotlib IH. Depression: a cognitive perspective. *Clinic Psychol Rev.* **2019**;69:51–66. doi:10.1016/j.cpr.2018.06.008
18. Keller AS, Leikauf JE, Holt-Gosselin B, Staveland BR, Williams LM. Paying attention to attention in depression. *Transl Psychiatry.* **2019**;9(1):1–12. doi:10.1038/s41398-019-0616-1
19. Piani MC, Maggioni E, Delvecchio G, Brambilla P. Sustained attention alterations in major depressive disorder: a review of fMRI studies employing Go/No-Go and CPT tasks. *J Affective Disorders.* **2022**;303:98–113. doi:10.1016/j.jad.2022.02.003
20. Yoon S, Kleinman M, Mertz J, Brannick M. Is social network site usage related to depression? A meta-analysis of Facebook–depression relations. *J Affective Disorders.* **2019**;248:65–72. doi:10.1016/j.jad.2019.01.026
21. Kreski N, Platt J, Rutherford C, et al. Social Media Use and Depressive Symptoms Among United States Adolescents. *J Adolesc Health.* **2021**;68(3):572–579. doi:10.1016/j.jadohealth.2020.07.006
22. Boer M, Stevens GWJM, Finkenauer C, de Looze ME, van den Eijnden RJJM. Social media use intensity, social media use problems, and mental health among adolescents: investigating directionality and mediating processes. *Computers in Human Behavior.* **2021**;116:106645. doi:10.1016/j.chb.2020.106645
23. Valkenburg PM, Van Driel II, Beyens I. The associations of active and passive social media use with well-being: a critical scoping review. *New Med Soc.* **2022**;24(2):530–549. doi:10.1177/14614448211065425
24. Aubry R, Quiazade A, Meier LL. Depressive symptoms and upward social comparisons during Instagram use: a vicious circle. *Pers Individ Dif.* **2024**;217:112458. doi:10.1016/j.paid.2023.112458
25. Biglbauer S, Lauri Korajlija A. Do socially anxious and non-anxious individuals differ in their social media use?. *Computers in Human Behavior.* **2023**;149:107970. doi:10.1016/j.chb.2023.107970
26. Kelley SW, Gillan CM. Using language in social media posts to study the network dynamics of depression longitudinally. *Nat Commun.* **2022**;13(1):870. doi:10.1038/s41467-022-28513-3
27. Eichstaedt JC, Smith RJ, Merchant RM, et al. Facebook language predicts depression in medical records. *Proc Natl Acad Sci.* **2018**;115(44):11203–11208. doi:10.1073/pnas.1802331115
28. Yang X, McEwen R, Ong LR, Zihayat M. A big data analytics framework for detecting user-level depression from social networks. *International Journal of Information Management.* **2020**;54:102141. doi:10.1016/j.ijinfomgt.2020.102141
29. Yang K, Zhang T, Ananiadou S. A mental state Knowledge-aware and Contrastive Network for early stress and depression detection on social media. *Information Processing and Management.* **2022**;59(4):102961. doi:10.1016/j.ipm.2022.102961
30. Cacheda F, Fernandez D, Novoa FJ, Carneiro V. Early Detection of Depression: social Network Analysis and Random Forest Techniques. *J Med Internet Res.* **2019**;21(6):e12554. doi:10.2196/12554
31. Gori A, Topino E, Griffiths MD. The associations between attachment, self-esteem, fear of missing out, daily time expenditure, and problematic social media use: a path analysis model. *Addict. Behav.* **2023**;141:107633. doi:10.1016/j.addbeh.2023.107633
32. Matz SC. Personal echo chambers: openness-to-experience is linked to higher levels of psychological interest diversity in large-scale behavioral data. *J Personality Social Psychol.* **2021**;121(6):1284–1300. doi:10.1037/pspp0000324
33. Susmann MW, Xu M, Clark JK, et al. Persuasion amidst a pandemic: insights from the Elaboration Likelihood Model. *Eur Rev Social Psychol.* **2022**;33(2):323–359. doi:10.1080/10463283.2021.1964744
34. Beck AT, Haigh EAP. Advances in Cognitive Theory and Therapy: the Generic Cognitive Model. *Annu Rev Clin Psychol.* **2014**;10(1):1–24. doi:10.1146/annurev-clinpsy-032813-153734
35. Dozois DJA, Beck AT. Cognitive Schemas, Beliefs and Assumptions. In: *Risk Factors in Depression*. Elsevier; **2008**:119–143. doi:10.1016/B978-0-08-045078-0.00006-X
36. Chancellor S, De Choudhury M. Methods in predictive techniques for mental health status on social media: a critical review. *Npj Digit Med.* **2020**;3(1):1–11. doi:10.1038/s41746-020-0233-7
37. Adarsh V, Arun Kumar P, Lavanya V, Gangadharan GR. Fair and Explainable Depression Detection in Social Media. *Information Processing and Management.* **2023**;60(1):103168. doi:10.1016/j.ipm.2022.103168
38. Zhang T, Yang K, Alhuzali H, Liu B, Ananiadou S. PHQ-aware depressive symptoms identification with similarity contrastive learning on social media. *Information Processing and Management.* **2023**;60(5):103417. doi:10.1016/j.ipm.2023.103417

39. Rodriguez M, Aalbers G, McNally RJ. Idiographic Network Models of Social Media Use and Depression Symptoms. *Cogn Ther Res.* 2022;46(1):124–132. doi:10.1007/s10608-021-10236-2
40. Sun L. Social media usage and students' social anxiety, loneliness and well-being: does digital mindfulness-based intervention effectively work?. *BMC Psychology.* 2023;11(1):362. doi:10.1186/s40359-023-01398-7
41. Victor SA, Ibrahim MS, Yusuf S, et al. Social media addiction and depression among adolescents in two Malaysian states. *Int J Adolesc Youth.* 2024;29(1):2292055. doi:10.1080/02673843.2023.2292055
42. Zheng H, Goh DHL, Lee EWJ, Lee CS, Theng YL. Understanding the effects of message cues on COVID-19 information sharing on Twitter. *J Assoc Inf Sci Technol.* 2022;73(6):847–862. doi:10.1002/asi.24587
43. Evans JSBT, Stanovich KE. Dual-Process Theories of Higher Cognition: advancing the Debate. *Perspect Psychol Sci.* 2013;8(3):223–241. doi:10.1177/1745691612460685
44. Shahab MH, Ghazali E, Mohtar M. The role of elaboration likelihood model in consumer behaviour research and its extension to new technologies: a review and future research agenda. *Int J Consum Stud.* 2021;45(4):664–689. doi:10.1111/ijcs.12658
45. Yang S, Zhou C, Chen Y. Do topic consistency and linguistic style similarity affect online review helpfulness? An elaboration likelihood model perspective. *Information Processing and Management.* 2021;58(3):102521. doi:10.1016/j.ipm.2021.102521
46. Ba Z, Zhao Y, Song S, Zhu Q. Does the involvement of charities matter? Exploring the impact of charities' reputation and social capital on medical crowdfunding performance. *Information Processing and Management.* 2022;59(3):102942. doi:10.1016/j.ipm.2022.102942
47. Bhattacharjee S. Influence Processes for Information Technology Acceptance: an Elaboration Likelihood Model. *MIS Quarterly.* 2006;30(4):805. doi:10.2307/25148755
48. Dozois DJA. The importance of social connectedness: from interpersonal schemas in depression to relationship functioning and well-being. *Canadian Psychol.* 2021;62(2):174–180. doi:10.1037/cap0000253
49. Matsumoto N, Katahira K, Kawaguchi J. Cognitive Reactivity Amplifies the Activation and Development of Negative Self-schema: a Revised Mnemic Neglect Paradigm and Computational Modelling. *Cogn Ther Res.* 2023;47(1):38–51. doi:10.1007/s10608-022-10332-x
50. Gilboa A, Marlatte H. Neurobiology of Schemas and Schema-Mediated Memory. *Trends Cognitive Sci.* 2017;21(8):618–631. doi:10.1016/j.tics.2017.04.013
51. Jiwa M, Cooper PS, Chong TTJ, Bode S. Hedonism as a motive for information search: biased information-seeking leads to biased beliefs. *Sci Rep.* 2023;13(1):2086. doi:10.1038/s41598-023-29429-8
52. Auerbach RP, Stanton CH, Proudfit GH, Pizzagalli DA. Self-referential processing in depressed adolescents: a high-density event-related potential study. *J Abnormal Psychol.* 2015;124(2):233–245. doi:10.1037/abn0000023
53. Vieira C, Kuss DJ, Griffiths MD. Early maladaptive schemas and behavioural addictions: a systematic literature review. *Clinic Psychol Rev.* 2023;105:102340. doi:10.1016/j.cpr.2023.102340
54. Beck AT. The evolution of the cognitive model of depression and its neurobiological correlates. *Am J Psychiatry.* 2008;165(8):969–977. doi:10.1176/appi.ajp.2008.08050721
55. Disner SG, Beevers CG, Haigh EAP, Beck AT. Neural mechanisms of the cognitive model of depression. *Nat Rev Neurosci.* 2011;12(8):467–477. doi:10.1038/nrn3027
56. Zhang Y, Li X, Fan W. User Adoption of Physician's Replies in an Online Health Community: an Empirical Study. *Journal of the Association for Information Science and Technology.* 2020;71(10):1179–1191. doi:10.1002/asi.24319
57. Westerman D, Spence PR, Van Der Heide B. Social Media as Information Source: recency of Updates and Credibility of Information*. *J Comput-Mediated Commun.* 2014;19(2):171–183. doi:10.1111/jcc4.12041
58. Lee EJ, Shin SY. Mediated Misinformation: questions Answered, More Questions to Ask. *Am Behav Sci.* 2021;65(2):259–276. doi:10.1177/0002764219869403
59. Srivastava V, Kalro AD. Enhancing the Helpfulness of Online Consumer Reviews: the Role of Latent (Content) Factors. *Journal of Interactive Marketing.* 2019;48:33–50. doi:10.1016/j.intmar.2018.12.003
60. Cyr D, Head M, Lim E, Stibe A. Using the elaboration likelihood model to examine online persuasion through website design. *Inf Manage.* 2018;55(7):807–821. doi:10.1016/j.im.2018.03.009
61. Chen Q, Min C, Zhang W, Wang G, Ma X, Evans R. Unpacking the black box: how to promote citizen engagement through government social media during the COVID-19 crisis. *Computers in Human Behavior.* 2020;110:106380. doi:10.1016/j.chb.2020.106380
62. Lerner JS, Li Y, Valdesolo P, Kassam KS. Emotion and Decision Making. *Annual Review of Psychology.* 2015;66(1):799–823. doi:10.1146/annurev-psych-010213-115043
63. Stieglitz S, Dang-Xuan L. Emotions and Information Diffusion in Social Media—Sentiment of Microblogs and Sharing Behavior. *J Manage Inf Syst.* 2013;29(4):217–248. doi:10.2753/MIS0742-1222290408
64. Goldenberg A, Gross JJ. Digital Emotion Contagion. *Trends Cognitive Sci.* 2020;24(4):316–328. doi:10.1016/j.tics.2020.01.009
65. Brady WJ, Gantman AP, Van Bavel JJ. Attentional capture helps explain why moral and emotional content go viral. *J Exp Psychol Gen.* 2020;149(4):746–756. doi:10.1037/xge0000673
66. Robertson CE, Pröllochs N, Schwarzenegger K, Pärnamets P, Van Bavel JJ, Feuerriegel S. Negativity drives online news consumption. *Nat Hum Behav.* 2023;7(5):812–822. doi:10.1038/s41562-023-01538-4
67. Horner CG, Galletta D, Crawford J, Shirsat A. Emotions: the Unexplored Fuel of Fake News on Social Media. *J Manage Inf Syst.* 2021;38(4):1039–1066. doi:10.1080/07421222.2021.1990610
68. Waterloo SF, Baumgartner SE, Peter J, Valkenburg PM. Norms of online expressions of emotion: comparing Facebook, Twitter, Instagram, and WhatsApp. *New Med Soc.* 2018;20(5):1813–1831. doi:10.1177/1461444817707349
69. Tellis GJ, MacInnis DJ, Tirunillai S, Zhang Y. What Drives Virality (Sharing) of Online Digital Content? The Critical Role of Information, Emotion, and Brand Prominence. *J Marketing.* 2019;83(4):1–20. doi:10.1177/0022242919841034
70. Sui J, Humphreys GW. The Integrative Self: how Self-Reference Integrates Perception and Memory. *Trends Cognitive Sci.* 2015;19(12):719–728. doi:10.1016/j.tics.2015.08.015
71. Xu X, Liu J, Liu JH. The effect of social media environments on online emotional disclosure: tie strength, network size and self-reference. *Online Information Rev.* 2023. doi:10.1108/OIR-04-2022-0245

72. Zhang R, Zhang M, Sima J, Liu F, Zou F, Luo Y. Self-reference processing of fat-face and sick-face in individuals with different disgust sensitivity: evidence from behavioral and neuroelectrophysiology. *Neuropsychologia*. 2022;175:108368. doi:10.1016/j.neuropsychologia.2022.108368
73. Kim K, Banquer AM, Resnik SN, Johnson JD, Fernandez L. Self-reference and cognitive effort: source memory for affectively neutral information is impaired following negative compared to positive self-referential processing. *J Cognitive Psychol*. 2022;34(7):833–845. doi:10.1080/20445911.2022.2067553
74. Constable MD, Becker ML, Oh YI, Knoblich G. Affective compatibility with the self modulates the self-prioritisation effect. *Cognition & Emotion*. 2021;35(2):291–304. doi:10.1080/02699931.2020.1839383
75. Phua J, Kim J. Starring in your own Snapchat advertisement: influence of self-brand congruity, self-referencing and perceived humor on brand attitude and purchase intention of advertised brands. *Telematic Informatic*. 2018;35(5):1524–1533. doi:10.1016/j.tele.2018.03.020
76. Yang J, Jiang M. Demystifying congruence effects in Instagram in-feed native ads: the role of media-based and self-based congruence. *J Res Interactive Marketing*. 2021;15(4):685–708. doi:10.1108/JRIM-03-2020-0048
77. Kim DH, Yoo JJ, Lee WN. The influence of self-concept on ad effectiveness: interaction between self-concept and construal levels on effectiveness of advertising. *J Marketing Commun*. 2018;24(7):734–745. doi:10.1080/13527266.2016.1235601
78. Ma E, Liu J, Li K. Exploring the mechanism of live streaming e-commerce anchors' language appeals on users' purchase intention. *Front Psychol*. 2023;14. doi:10.3389/fpsyg.2023.1109092
79. Dunlop SM, Wakefield M, Kashima Y. Pathways to Persuasion: cognitive and Experiential Responses to Health-Promoting Mass Media Messages. *Commun Res*. 2010;37(1):133–164. doi:10.1177/0093650209351912
80. Ku HH, Chen Y. Naming product colors with an individual's identity and product evaluation: self-referencing as a mediator. *J Product Brand Management*. 2023;32(6):958–971. doi:10.1108/JPBM-12-2021-3791
81. Beck AT, Alford BA. *Depression: Causes and Treatment*. 2nd ed. University of Pennsylvania Press; 2009.
82. Everaert J, Vrijns JN, Martin-Willett R, Van De Kraats L, Joormann J. A meta-analytic review of the relationship between explicit memory bias and depression: depression features an explicit memory bias that persists beyond a depressive episode. *Psychol Bull*. 2022;148(5–6):435–463. doi:10.1037/bul0000367
83. Everaert J, Podina IR, Koster EHW. A comprehensive meta-analysis of interpretation biases in depression. *Clinic Psychol Rev*. 2017;58:33–48. doi:10.1016/j.cpr.2017.09.005
84. Würtz F, Kube T, Woud ML, Margraf J, Blackwell SE. Reduced Belief Updating in the Context of Depressive Symptoms: an Investigation of the Associations with Interpretation Biases and Self-Evaluation. *Cogn Ther Res*. 2024. doi:10.1007/s10608-023-10454-w
85. Chen L, Wang Q, Xu T. Working memory function in patients with major depression disorder: a narrative review. *Clin Psychol Psychother*. 2023;30(2):281–293. doi:10.1002/cpp.2811
86. Grahek I, Everaert J, Krebs RM, Koster EHW. Cognitive Control in Depression: toward Clinical Models Informed by Cognitive Neuroscience. *Clin Psychol Sci*. 2018;6(4):464–480. doi:10.1177/2167702618758969
87. Miller EK, Lundqvist M, Bastos AM. Working Memory 2.0. *Neuron*. 2018;100(2):463–475. doi:10.1016/j.neuron.2018.09.023
88. Gotlib IH, Joormann J. Cognition and depression: current status and future directions. *Annu Rev Clin Psychol*. 2010;6:285–312. doi:10.1146/annurev.clinpsy.121208.131305
89. Malhi GS, Mann JJ. Depression. *Lancet*. 2018;392(10161):2299–2312. doi:10.1016/S0140-6736(18)31948-2
90. Herrman H, Patel V, Kieling C, et al. Time for united action on depression: a *Lancet*–World Psychiatric Association Commission. *Lancet*. 2022;399(10328):957–1022. doi:10.1016/S0140-6736(21)02141-3
91. Zhang D, Xie H, He Z, Wei Z, Gu R. Impaired Working Memory Updating for Emotional Stimuli in Depressed Patients. *Front Behav Neurosci*. 2018;12:65. doi:10.3389/fnbeh.2018.00065
92. Hudson A, Wilson MJG, Green ES, Itier RJ, Henderson HA. Are you as important as me? Self-other discrimination within trait-adjective processing. *Brain Cognition*. 2020;142:105569. doi:10.1016/j.bandc.2020.105569
93. Alashoor T, Keil M, Smith HJ, McConnell AR. Too Tired and in Too Good of a Mood to Worry About Privacy: explaining the Privacy Paradox Through the Lens of Effort Level in Information Processing. *Inf Syst Res*. 2023;34(4):1415–1436. doi:10.1287/isre.2022.1182
94. Pang H, Ruan Y. Determining influences of information irrelevance, information overload and communication overload on WeChat discontinuance intention: the moderating role of exhaustion. *J Retailing Consum Serv*. 2023;72:103289. doi:10.1016/j.jretconser.2023.103289
95. Zhu L, Li H, He W, Hong C. What influences online reviews' perceived information quality? Perspectives on information richness, emotional polarity and product type. *Electronic Library*. 2020;38(2):273–296. doi:10.1108/EL-09-2019-0208
96. Lopes AI, Dens N, De Pelsmacker P, De Keyser F. Which cues influence the perceived usefulness and credibility of an online review? A conjoint analysis. *OIR*. 2020;45(1):1–20. doi:10.1108/OIR-09-2019-0287
97. Westervick A. Effects of Sponsorship, Web Site Design, and Google Ranking on the Credibility of Online Information. *J Comput Mediat Commun*. 2013;18(2):80–97. doi:10.1111/jcc4.12006
98. Laros FJM, Steenkamp JBEM. Emotions in consumer behavior: a hierarchical approach. *Journal of Business Research*. 2005;58(10):1437–1445. doi:10.1016/j.jbusres.2003.09.013
99. Ahn J, Kim HK, Kahlor LA, Atkinson L, Noh GY. The Impact of Emotion and Government Trust on Individuals' Risk Information Seeking and Avoidance during the COVID-19 Pandemic: a Cross-country Comparison. *J Health Commun*. 2021;26(10):728–741. doi:10.1080/10810730.2021.1999348
100. Negrão JG, Bazán PR, De Azevedo Neto RM, Lacerda SS, Ekman E, Kozasa EH. Baseline emotional state influences on the response to animated short films: a randomized online experiment. *Front Psychol*. 2022;13:1009429. doi:10.3389/fpsyg.2022.1009429
101. Zhang K, Zhang J, Yang J. The influence of human elements in photographs on tourists' destination perceptions and intentions. *Tourism Manage*. 2023;95:104684. doi:10.1016/j.tourman.2022.104684
102. Zhang X, Zhang K, Li S, Koenitz D. Effects of store fixture shape at retail checkout: evidence from field and online studies. *Prod Oper Manage*. 2023;32(10):3158–3173. doi:10.1111/poms.14028
103. Chen L, Unsworth K, Zhang L, Zhang ZD. The curvilinear effect of negative affect on voice behavior from the perspective of activation theory. *Curr Psychol*. 2023;42(31):27497–27515. doi:10.1007/s12144-022-03853-x
104. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007;39(2):175–191. doi:10.3758/BF03193146

105. Zhao H, Fu S, Chen X. Promoting users' intention to share online health articles on social media: the role of confirmation bias. *Information Processing and Management*. 2020;57(6):102354. doi:10.1016/j.ipm.2020.102354
106. Chua AYK, Banerjee S. Intentions to trust and share online health rumors: an experiment with medical professionals. *Computers in Human Behavior*. 2018;87:1–9. doi:10.1016/j.chb.2018.05.021
107. Abbey JD, Meloy MG. Attention by design: using attention checks to detect inattentive respondents and improve data quality. *J Oper Manage*. 2017;53-56(1):63–70. doi:10.1016/j.jom.2017.06.001
108. Burnkrant RE, Unnava HR. Effects of Self-Referencing on Persuasion. *J Consum Res*. 1995;22(1):17–26. doi:10.1086/209432
109. Escalas JE. Self-Referencing and Persuasion: narrative Transportation versus Analytical Elaboration. *J Consum Res*. 2007;33(4):421–429. doi:10.1086/510216
110. Furlanetto LM, Mendlowicz MV, Romildo Bueno J. The validity of the Beck Depression Inventory-Short Form as a screening and diagnostic instrument for moderate and severe depression in medical inpatients. *J Affective Disorders*. 2005;86(1):87–91. doi:10.1016/j.jad.2004.12.011
111. Wang YP, Gorenstein C. Psychometric properties of the Beck Depression Inventory-II: a comprehensive review. *Braz J Psychiatry*. 2013;35:416–431. doi:10.1590/1516-4446-2012-1048
112. Sultan S, Luminet O, Hartemann A. Cognitive and anxiety symptoms in screening for clinical depression in diabetes A systematic examination of diagnostic performances of the Hads and BDI-SF. *J Affective Disorders*. 2010;123(1):332–336. doi:10.1016/j.jad.2009.09.022
113. Hammen C. Risk Factors for Depression: an Autobiographical Review. *Ann Rev Clin Psychol*. 2018;14(1):1–28. doi:10.1146/annurev-clinpsy-050817-084811
114. Albert K, Gau V, Taylor WD, Newhouse PA. Attention bias in older women with remitted depression is associated with enhanced amygdala activity and functional connectivity. *J Affective Disorders*. 2017;210:49–56. doi:10.1016/j.jad.2016.12.010
115. Yang W, Zhang JX, Ding Z, Xiao L. Attention Bias Modification Treatment for Adolescents With Major Depression: a Randomized Controlled Trial. *J Am Acad Child Adolesc Psychiatry*. 2016;55(3):208–218.e2. doi:10.1016/j.jaac.2015.12.005
116. Michikyan M. Depression symptoms and negative online disclosure among young adults in college: a mixed-methods approach. *J Ment Health*. 2020;29(4):392–400. doi:10.1080/09638237.2019.1581357
117. Brailovskaia J, Schillack H, Margraf J. Tell me why are you using social media (SM)! Relationship between reasons for use of SM, SM flow, daily stress, depression, anxiety, and addictive SM use – an exploratory investigation of young adults in Germany. *Computers in Human Behavior*. 2020;113:106511. doi:10.1016/j.chb.2020.106511
118. Feldhege J, Moessner M, Bauer S. Who says what? Content and participation characteristics in an online depression community. *J Affective Disorders*. 2020;263:521–527. doi:10.1016/j.jad.2019.11.007
119. Kramer ADI, Guillory JE, Hancock JT. Experimental evidence of massive-scale emotional contagion through social networks. *Proc Natl Acad Sci*. 2014;111(24):8788–8790. doi:10.1073/pnas.1320040111
120. Van Kleef GA, Côté S. The Social Effects of Emotions. *Annual Review of Psychology*. 2022;73(1):629–658. doi:10.1146/annurev-psych-020821-010855
121. LeMoult J, Kircanski K, Prasad G, Gotlib IH. Negative Self-Referential Processing Predicts the Recurrence of Major Depressive Episodes. *Clin Psychol Sci*. 2017;5(1):174–181. doi:10.1177/2167702616654898
122. Renner F, Siep N, Lobbestael J, Arntz A, Peeters FPM, Huibers MJH. Neural correlates of self-referential processing and implicit self-associations in chronic depression. *J Affective Disorders*. 2015;186:40–47. doi:10.1016/j.jad.2015.07.008
123. Verduyn P, Van Mechelen I, Tuerlinckx F. The relation between event processing and the duration of emotional experience. *Emotion*. 2011;11(1):20–28. doi:10.1037/a0021239
124. Curci A, Rimé B. The temporal evolution of social sharing of emotions and its consequences on emotional recovery: a longitudinal study. *Emotion*. 2012;12(6):1404–1414. doi:10.1037/a0028651
125. Watkins ER, Roberts H. Reflecting on rumination: consequences, causes, mechanisms and treatment of rumination. *Behaviour Research and Therapy*. 2020;127:103573. doi:10.1016/j.brat.2020.103573
126. Shaw ZA, Hilt LM, Starr LR. The developmental origins of ruminative response style: an integrative review. *Clinic Psychol Rev*. 2019;74:101780. doi:10.1016/j.cpr.2019.101780
127. Spindel JW, Simonds LM, Avery RE. The Relationship between Co-rumination and Internalizing Problems: a Systematic Review and Meta-analysis. *Clin Psychol Psychother*. 2017;24(2):512–527. doi:10.1002/cpp.2023
128. Bhat IH, Gupta S, Bhat GM. Effect of social media usage on major depressive disorder among generation Z: a study in Indian context. *Information Discovery and Delivery*. 2023. doi:10.1108/IDD-07-2022-0071
129. Huang L, Zhang J, Duan W, He L. Peer relationship increasing the risk of social media addiction among Chinese adolescents who have negative emotions. *Curr Psychol*. 2023;42(9):7673–7681. doi:10.1007/s12144-021-01997-w
130. Lăzăroiu G, Kovacova M, Siekelova A, Vrbka J. Addictive Behavior of Problematic Smartphone Users: the Relationship between Depression, Anxiety, and Stress. *Rev Contemporary Philosophy*. 2020;19:50–56. doi:10.22381/RCP1920204_
131. Kliestik T, Scott J, Musa H, Suler P. Addictive Smartphone Behavior, Anxiety Symptom Severity, and Depressive Stress. *Analysis Metaphysics*. 2020;19:45–51. doi:10.22381/AM1920204
132. Green M, Kovacova M, Valaskova K. Smartphone Addiction Risk, Depression Psychopathology, and Social Anxiety. *Analysis Metaphysics*. 2020;19:52–58. doi:10.22381/AM1920205
133. Bowden-Green T, Hinds J, Joinson A. Understanding neuroticism and social media: a systematic review. *Pers Individ Dif*. 2021;168:110344. doi:10.1016/j.paid.2020.110344
134. Dalvi-Esfahani M, Niknafs A, Alaadini Z, Barati Ahmadabadi H, Kuss DJ, Ramayah T. Social Media Addiction and Empathy: moderating impact of personality traits among high school students. *Telematic Informatic*. 2021;57:101516. doi:10.1016/j.tele.2020.101516
135. Clak DA, Beck AT, Alford BA. *Scientific Foundations of Cognitive Theory and Therapy of Depression*. 1st ed. Wiley; 1999.
136. Mahmoudi A, Jemielniak D, Ciechanowski L. Echo Chambers in Online Social Networks: a Systematic Literature Review. *IEEE Access*. 2024;12:9594–9620. doi:10.1109/ACCESS.2024.3353054
137. Diaz Ruiz C, Nilsson T. Disinformation and Echo Chambers: how Disinformation Circulates on Social Media Through Identity-Driven Controversies. *J Public Policy Marketing*. 2023;42(1):18–35. doi:10.1177/07439156221103852

138. Xing Y, Zhang JZ, Storey VC, Koohang A. Diving into the divide: a systematic review of cognitive bias-based polarization on social media. *J Enterp Inf Manage.* **2024**;37(1):259–287. doi:10.1108/JEIM-09-2023-0459
139. Cuijpers P, Noma H, Karyotaki E, Cipriani A, Furukawa TA. Effectiveness and Acceptability of Cognitive Behavior Therapy Delivery Formats in Adults With Depression: a Network Meta-analysis. *JAMA Psychiatry.* **2019**;76(7):700–707. doi:10.1001/jamapsychiatry.2019.0268
140. Moshe I, Terhorst Y, Philippi P, et al. Digital Interventions for the Treatment of Depression: a Meta-Analytic Review. *Psychol Bull.* **2021**;147(8):749–786. doi:10.1037/bul0000334
141. Furukawa TA, Suganuma A, Ostinelli EG, et al. Dismantling, optimising, and personalising internet cognitive behavioural therapy for depression: a systematic review and component network meta-analysis using individual participant data. *Lancet Psychiatry.* **2021**;8(6):500–511. doi:10.1016/S2215-0366(21)00077-8
142. Nahum-Shani I, Shaw SD, Carpenter SM, Murphy SA, Yoon C. Engagement in digital interventions. *Am Psychologist.* **2022**;77(7):836–852. doi:10.1037/amp0000983
143. Karyotaki E, Efthimiou O, Miguel C, et al. Internet-Based Cognitive Behavioral Therapy for Depression: a Systematic Review and Individual Patient Data Network Meta-analysis. *JAMA Psychiatry.* **2021**;78(4):361–371. doi:10.1001/jamapsychiatry.2020.4364
144. Kreuter MW, Skinner CS. Tailoring: what's in a name?. *Health Educ Res.* **2000**;15(1):1–4. doi:10.1093/her/15.1.1

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