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Social Media Addiction and Implicit Self-Esteem: Evidence from the Implicit Association Test

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Abstract: *The rapid development of the Internet and online media has made social media an important part of people's daily lives and work. It becomes one of the primary channels for individuals to socialize and obtain information. The widespread use of social media has significantly changed individuals' modes of social interaction, cognitive patterns, and psychological development which influences self-construction and self-evaluation. People may evaluate themselves by comparing their lifestyles, achievements, and personal experiences with the content shared by others. Feedback such as likes, comments, and shares may also shape how individuals perceive themselves. Therefore, the relationship between social media and self-esteem has attracted more attention in the field of psychology. This study aims to investigate the relationship between social media use behaviors and implicit self-esteem. A reaction-time experiment was conducted to generate more accurate and quantified results. The present research adopted social media use duration, the total score and subscale scores of the Bergen Social Media Addiction Scale (BSMAS) as independent variables. Implicit self-esteem measured by the Implicit Association Test (IAT) was used as the dependent variable. The results showed that the degree of social media addiction could significantly and positively predict implicit self-esteem. Higher scores on salience and withdrawal symptoms subscales were associated with higher IAT scores and D values for implicit self-esteem. However, social media use duration and age did not significantly predict implicit self-esteem. From the perspective of implicit cognition, this study enriches the empirical evidence of the relationship between social media addiction and self-cognition. It provides a theoretical reference for understanding the implicit self-representations of individuals exhibiting addictive use behaviors. By distinguishing usage duration from psychological dependence, this study also offers a more precise perspective on the relationship between social media use and self-esteem. At the same time, the findings may encourage a more balanced understanding of the psychological effects of social media and provide insights for developing psychological interventions for social media addiction.*

Keywords: *Internet; Social media addiction; Implicit self-esteem; Implicit association test; Withdrawal symptoms*

1. Introduction

With the development of mobile Internet and smart devices, social media has experienced rapid growth over the past two decades and has increasingly permeated all aspects of people's lives[1] . As of 2025, the number of social media users had exceeded 5.2 billion globally, accounting for more than 60% of the world's population. Social media is no longer merely a tool for entertainment. People also rely on social platforms for information exchange, work communication, and many other activities [1]. Though the media platforms bring convenience, sometimes it blurs the boundaries between work and life which intrudes into individuals' personal spaces[2]. Excessive use of social media also causes other problems, among which social media addiction is one of the major concerns. Research indicates that social media addiction, especially among young people, is a common issue across the globe. Related psychological and behavioral problems have gradually caused people's attention[3].

Social media has both functional and social attributes. Social media facilitates individuals' work and everyday social interactions. Meanwhile. it also subtly participates in the process of self-construction and continuously shapes people's patterns of thinking, interpersonal attitudes, and social cognition [4]. A substantial body of empirical research has demonstrated that social media use can influence multiple psychological variables in individuals. Upward social comparison on platforms can alter individuals' tendencies in self-evaluation[5]. Patterns of online interaction and feedback mechanisms can affect individuals' sense of belonging and levels of fear of missing out[6]. Moreover, idealized online self-presentation can also influence individuals' self-concepts[7]. Overall, how social media shapes

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individuals' self-perceptions and affects their self-esteem has become an important research direction. It continues to receive attention in the field of digital psychology[8].

Most existing studies exploring the relationship between social media and self-esteem rely on self-report questionnaires to measure explicit self-esteem. The results indicate that frequent exposure to idealized portrayals of other people's lives can trigger upward social comparison. At the same time, social media addiction and excessive use are significantly negatively correlated with explicit self-esteem[9][10]. However, existing research has several limitations. First, the measurement perspective is relatively narrow. Many studies capture only reportable explicit self-esteem. While, relatively few studies explore implicit self-esteem at the automatic and unconscious level employ. Findings focusing on explicit self-esteem cannot be directly generalized to implicit self-representation[11]. Some studies investigating individuals with Internet addiction suggest that a dissociation between implicit and explicit self-esteem may occur among addicted individuals. It indicates that the direction of the effect of social media addiction on implicit self-esteem may differ from that on explicit self-esteem. However, further empirical evidence is needed to support this argument[12]. In addition, many studies simply include social media use duration as an indicator for addiction. The mere duration of use and psychological dependence or addiction have not been distinguished. Based on these research gaps, the present study aims to investigate the association between social media use behaviors and implicit self-esteem. Social media use duration, scores of the Bergen Social Media Addiction Scale were used as independent variables. Implicit self-esteem was used as the dependent variable which was measured by the Implicit Association Test. It helps explore if different characteristics of social media use could affect implicit self-esteem. This study seeks to clarify the characteristics of the association between social media addiction and implicit self-esteem. The findings could enrich empirical evidence of self-cognition in digital environments. It also further supplements the understanding of the mechanisms of how social media addiction affects the formation of self-concept.

2. Method

2.1 Participants

The experiment was conducted in Shanghai, China. 20 participants (M = 31.30, SD = 10.51) were recruited in total. including 12 females and 8 males. Before the experiment began, the experimental procedure and general purpose were introduced to each participant. All participants agreed to participate in the experiment voluntarily.

2.2 Stimuli

The present study employed the Implicit Association Test (IAT) which was developed using PsychoPy. The experiment aimed to assess participants' implicit self-esteem. The experimental materials consisted of two categories of words: concept words and attribute words. Concept words were divided into “Self” and “Other” categories. “Self” refers to oneself and “Other” refers to other people respectively. The “Self” category included words such as “my” “myself” and “we”. The “Other” category included words such as “his” “they” and “others”. Attribute words were divided into “Positive” and “Negative” categories. Positive words described desirable personal traits, such as cheerfulness, optimism, and kindness. The negative words described undesirable personal traits, such as meanness and introversion.

The study also employed the Chinese version of the Bergen Social Media Addiction Scale (BSMAS) which was developed by Andreassen[13]). The BSMAS was adapted from the Bergen Facebook Addiction Scale (BFAS) to assess addiction to a broader range of social media platforms. Based on the addiction components theory proposed by Brown and Griffiths, the scale assesses social media addiction across six core dimensions[14][15]. It consists of six items rated on a 5-point Likert scale, ranging from 1 (very rarely) to 5 (very often). The range of total scores is from 6 to 30. Higher scores indicate a higher degree of social media addiction. Each item corresponds to one of the six dimensions: salience (Q1), tolerance (Q2), mood modification (Q3), relapse/loss of control (Q4), withdrawal symptoms (Q5), and conflict (Q6).

2.3 Design and Procedure

The present experiment used a within-subject design. Each participant completed both compatible and incompatible tasks. After signing the consent form, participants were guided and seated in front of a

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computer. The experimental instructions were presented on the screen. During the experiment, the participants pressed the A key for positive words and the L key for negative words. Each participant completed five consecutive trials. To minimize potential order and practice effects, the presentation order of the compatible and incompatible tasks was randomized across participants. In the compatible task (Trials 2–3 in Table 1), positive words were paired with Self, and negative words were paired with Other. In the incompatible task (Trials 4–5 in Table 1), positive words were paired with Other, and negative words were paired with Self. Only data from Trials 3 and 5 were included in the primary statistical analyses. The rest trials served as practice trials to familiarize participants with the experimental procedure and help them learn the associations between concepts and attributes. The detailed experimental procedure is shown in Table 1.

After completing the IAT trials, participants completed the six items of the Bergen Social Media Addiction Scale (BSMAS) and reported their daily social media use duration. Upon completion of these tasks, the experiment ended. The entire procedure took approximately ten minutes per participant. Participants who completed the full procedure received a small gift. After data collection was completed, each participant's responses and reaction time data were exported for subsequent statistical analysis.

Table 1: The procedure of IAT trials

Trial	Task	Frequency	Response key	
			A	L
1	Attribute Words Recognition	10	Positive	Negative
2	Concept Words Recognition	10	Self	Other
3	Attribute Words + Concept Words Joint Task	20	Positive + Self	Negative + Other
4	Reverse Concept Words Recognition	10	Other	Self
5	Attribute Words + Reverse Concept Words Joint Task	20	Positive + Other	Negative + Self

2.4 Data Analysis

The experimental data was cleaned before statistical analysis. Incorrect responses and anomalous reaction time which is excessively long or short were excluded. To investigate the effects of social media use on implicit self-esteem, participants were divided into groups based on their total BSMAS scores, individual subscale scores, and daily social media use duration. The groups were defined as follows: QA–QB (high and low total scale scores); Q1A–Q1B, Q2A–Q2B, Q3A–Q3B, Q4A–Q4B, Q5A–Q5B, and Q6A–Q6B (high and low subscale scores, respectively); and TA–TB (high and low daily social media use duration). Based on these grouping criteria, t-tests were conducted to compare the reaction time of the corresponding groups in the compatible and incompatible tasks. IAT scores and D values were then calculated for subsequent statistical analyses. The results are listed in Table 2.

3. Results

3.1 D Value and IAT Reaction Time between QA and QB

In the Implicit Association Test (IAT), participants in Group QA obtained a D value of 1.03 and an IAT score of 0.68. Meanwhile, participants in Group QB obtained a D value of −0.06 and an IAT score of −0.03. An independent-sample t-test of the IAT scores revealed that Group QA ($M = 0.68, SD = 0.80$) had significantly higher IAT scores than Group QB ($M = -0.03, SD = 0.50, p < 0.05$).

3.2 D Value and IAT Reaction Time between Q1A and Q1B

In the IAT paradigm, Group Q1A obtained a D value of 1.24 and an IAT score of 0.87. Group Q1B obtained a D value of 0.05 and an IAT score of 0.27. An independent-sample t-test revealed a statistically significant difference in IAT scores between the two groups. Group Q1A ($M = 0.87$, $SD = 0.84$) had significantly higher IAT scores than Group Q1B ($M = 0.02, SD = 0.24, P<0.05$).

3.3 D Value and IAT Reaction Time between Q5A and Q5B

The IAT results showed that Group Q5A had a D value of 0.91 and an IAT score of 0.51. Group Q5B

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had a D value of −0.03 and an IAT score of −0.02. An independent-sample t-test showed a statistically significant difference in IAT scores between the two groups. Group Q5A (*M = 0.51, SD = 0.73*) had significantly higher IAT scores than Group Q5B (*M = −0.02, SD = 0.69, P<0.05*).

Table 2: The Reaction Time, IAT Score and D Value for Participants

		Consistent Task RT(s)	Inconsistent Task RT(s)	IAT Score	D Value
All		1.47	1.79	0.32	0.53
Q	QA	1.15	1.83	0.68	1.00
	QB	1.79	1.76	(0.03)	(0.06)
Q1	Q1A	1.22	2.10	0.87	1.25
	Q1B	1.60	1.63	0.03	0.05
Q2	Q2A	1.66	1.82	0.55	0.99
	Q2B	1.19	1.75	0.17	0.27
Q3	Q3A	1.40	1.80	0.40	0.80
	Q3B	1.59	1.78	0.18	0.33
Q4	Q4A	1.47	1.81	0.34	0.56
	Q4B	1.47	1.76	0.29	0.49
Q5	Q5A	1.32	1.83	0.51	0.91
	Q5B	1.74	1.72	(0.02)	(0.03)
Q6	Q6A	1.46	1.83	0.37	0.52
	Q6B	1.48	1.75	0.28	0.54
Time	TA	1.34	1.96	0.62	1.02
	TB	1.56	1.68	0.13	0.20

4. Discussion

The purpose of this study was to investigate the relationship between social media use behaviors and implicit self-esteem. Social media use behaviors were assessed based on participants' daily social media use duration and scores of the social media addiction questionnaire. Implicit self-esteem was measured by the Implicit Association Test (IAT). The data analysis revealed that social media addiction could predict implicit self-esteem. Participants who obtained higher total scale scores exhibited significantly higher IAT scores and D values. Participants with higher scores on the salience subscale (Q1) and the withdrawal symptoms subscale (Q5) also showed significantly higher IAT scores and D values. In contrast, daily social media use duration and age did not significantly predict implicit self-esteem.

The results showed that individuals with higher levels of social media addiction exhibited higher IAT scores and D values. These findings suggest that, at the implicit level, these participants had stronger automatic associations between the concept of “Self” and positive attributes. These effects indicate higher implicit self-esteem. I-PACE model of addictive behaviors proposed that addictive behaviors develop through interactions among individual characteristics, affective and cognitive responses, and executive functions[14]. Individuals with higher levels of social media addiction may rely more heavily on online environments to regulate their emotions and obtain self-affirmation. When their sense of self-worth is challenged in daily life, this effect is more significant. Social media platforms could provide intermittent social rewards, such as likes and comments, which may reinforce positive feelings about oneself. Through repeated exposure to such feedbacks, individuals may develop stronger positive self-associations. It could contribute to the stronger IAT effects observed among participants with higher social media addiction scores. Furthermore, the higher implicit self-esteem observed among individuals with higher social media addiction may be attributed to compensatory self-enhancement [16]. Social media allows individuals to manage their self-presentation and selectively share aspects of their lives. By posting content, receiving likes and comments, and accumulating followers, users may construct and maintain a more idealized online self-image. For individuals who rely heavily on social media for self-validation, these experiences may reinforce positive self-perceptions over time. Such repeated experiences could contribute to stronger implicit associations between the self and positive attributes. It potentially explains the higher implicit self-esteem observed in this study. However, the present findings establish an association rather than a causal relationship. Further research is needed to determine whether online social reinforcement and compensatory self-enhancement mediate the relationship between social media addiction and implicit self-esteem.

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Separate analyses of the six BSMAS subscales revealed that only salience and withdrawal symptoms were significantly associated with implicit self-esteem. Item Q1 of the BSMAS measures salience, which refers to the extent to which social media occupies a dominant position in an individual's thoughts and daily life. In the addiction literature, salience is considered a core construct for understanding the development, maintenance, and relapse of addictive behaviors[15][17]. From the perspective of implicit cognition, salience may reflect the accessibility of addiction-related cues in an individual's memory system[18]. Cognitive theories of addiction suggest that persistent addictive behaviors may strengthen automatic associations between addiction-related cues and rewarding experiences[19]. These associations may make relevant cues more likely to capture attention automatically and trigger approach motivation. Hence, it increases their psychological salience. Accordingly, a higher Q1 score may indicate that social-media-related thoughts occupy a more prominent position in an individual's cognitive processes. However, this does not necessarily mean that these thoughts are directly associated with stronger positive self-evaluations. The IAT measures the relative strength of automatic associations between concepts. A higher D value generally indicates a stronger association between “Self” and “Positive” relative to the contrasting association[20]. The significant relationship between salience and implicit self-esteem observed in the present study suggests a possible connection between the cognitive prominence of social media and automatic self-evaluative associations. The underlying mechanism requires further investigation.

Withdrawal symptoms may also be related to the strength of implicit associations[21]. Individuals who rely heavily on social media for emotional regulation and social rewards may experience stronger negative reactions when access to these platforms is interrupted. Such reactions may reflect the motivational significance of social media and the difficulty of regulating emotions without it. This interpretation is consistent with research on substance-related addictions, which has identified associations between implicit attitudes and craving. From a cognitive perspective, withdrawal symptoms may indicate that an individual has become increasingly dependent on social media to satisfy emotional and psychological needs. When access to social media is interrupted, the loss of familiar sources of social interaction and external validation may contribute to anxiety, irritability, and low mood[22]. For some individuals, these reactions may also reflect a disruption in the positive self-evaluations supported by online feedback. In this sense, more significant withdrawal symptoms may be associated with more reliance on social media for maintaining a positive sense of self[11].

Most research suggests that excessive social media use and social media addiction may undermine self-esteem. Studies using self-report measures of explicit self-esteem have frequently found a significant negative association between problematic social media use and self-esteem[[9]. However, the present study revealed a different pattern at the implicit level. Participants with higher social media addiction scores exhibited higher IAT D values and IAT effect scores which indicates stronger automatic associations between the self and positive attributes. This pattern was also observed in the salience and withdrawal symptoms dimensions of the addiction scale. Similar findings have been reported in previous research. Wu Wenli et al.used the IAT to explore adolescents with problematic Internet use[23]. They found that the Internet addiction group exhibited significantly higher implicit self-esteem than the control group. Likewise, Stieger and Burger, leveraging both the IAT and the Rosenberg Self-Esteem Scale, found that individuals with higher Internet addiction scores displayed a pattern of lower explicit self-esteem but higher implicit self-esteem[11]. These findings suggest that problematic Internet use may be associated with different patterns of self-evaluation at the explicit and implicit levels. The results of the present study extend this line of research to social media use. It further highlights the importance of distinguishing between explicit and implicit self-esteem when investigating social media addiction. However, because the present study did not directly measure explicit self-esteem, it cannot establish that participants exhibited a discrepancy between explicit and implicit self-esteem. Future studies could measure both dimensions to explore whether such a discrepancy exists among individuals with higher levels of social media addiction.

The present study has several limitations that should be addressed in future research. First, this study adopted a cross-sectional design and collected data from participants at a single time point. This reflects the static association between social media addiction and implicit self-esteem at a specific point in time. However, it could not capture the dynamic changes in these variables over time. Both social media use behaviors and implicit self-evaluations may change with individuals' experiences and circumstances. Therefore, a single measurement cannot reveal their long-term developmental trajectories or the direction of their relationship. Future research could adopt longitudinal designs and repeatedly measure these variables at multiple time points. It could investigate how social media addiction and implicit self-esteem develop over time and how changes in one variable relate to changes in the other. Second, the present study focused on behavioral characteristics of social media use. Users' motivations for engaging with

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these platforms were not investigated. Individuals may use social media for different purposes, i.e. maintaining social relationships, seeking information, regulating emotions, and obtaining external validation. These motivations may reflect differences in users' cognitive processes and self-related needs. They could potentially influence the relationship between social media addiction and implicit self-esteem. Future research may incorporate measures of social media use motivations and explore whether different motivational patterns moderate the relationship between specific addiction dimensions and implicit self-esteem. This approach could provide a more comprehensive understanding of the psychological mechanisms underlying the association between social media use and implicit self-evaluation.

5. Conclusion

This study aimed to investigate the association between social media use behaviors and implicit self-esteem. Social media use characteristics were assessed based on daily social media use duration and scores on the Bergen Social Media Addiction Scale (BSMAS). Implicit self-esteem was measured by the Implicit Association Test (IAT). The results showed that the total BSMAS score positively predicted implicit self-esteem. Participants who scored higher on the scale exhibiting significantly higher levels of implicit self-esteem. In addition, only the salience and withdrawal symptoms subscale scores were significantly associated with implicit self-esteem. However, social media use duration and age did not significantly predict implicit self-esteem. This study enriches the relationship between social media use and self-esteem. Previous research mainly relied on self-report to measure explicit self-esteem. The results generally found a negative association between social media addiction and self-esteem. By using the IAT to assess implicit self-esteem, the present study found that higher levels of social media addiction were associated with higher implicit self-esteem. These findings may help explain potential differences between implicit and explicit self-esteem and provide insights for self-cognition in digital environments. This also addresses the gap in the existing studies regarding automatic implicit self-representation. Last but not least, the findings may offer practical insights for addiction interventions. It suggests that social media use duration alone cannot predict implicit self-esteem. Instead, psychological dependence, particularly salience and withdrawal symptoms, appears to be a key factor.

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