



A Quantitative Mediation Analysis on the Relationship Between Social Comparison on Social Media and Depressive Symptoms

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Citation: Sora Pazer (2025) Social Media Comparison Pressure, Self-Esteem-Dependent Online Self-Regulation and Depressive Mood. J. of Psy Ins Review 1(4), 01-10 WMJ/JPIR-126

Abstract

The present study examines the relationship between social media comparison pressure, self-esteem-dependent use of social media and depressive mood in an online recruited sample of social media users ($n = 103$). The theoretical starting point is social comparative theory, concepts of contingent self-esteem and cognitive models of depression. All variables were recorded using specially developed Likert scales (1–5). The descriptive results show an increased level of social media comparison pressure as well as a medium level of self-esteem-dependent online self-regulation; the depressive mood is in the slightly to moderately elevated range. Correlation analyses show medium, significant correlations between comparative pressure, self-esteem dependence and depressive symptoms. A regression-based mediation analysis with bootstrapping shows a significant indirect effect of social media comparison pressure on depressive mood via self-esteem-dependent use, while at the same time maintaining a direct effect. The findings speak in favor of partial mediation and support the assumption that social media has a particularly stressful effect where frequent upward comparisons meet a fragile, externally regulated self-esteem. In practice, the results imply that preventive and therapeutic approaches should not primarily aim at reducing use, but at strengthening a less feedback-dependent, internally anchored self-esteem and a reflection on the comparative logics of digital environments.

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Submitted: 02.11.2025

Accepted: 05.12.2025

Published: 30.12.2025

Keywords: Social Media, Social Comparison, Contingent Self-Esteem, Depressive Basic Mood, Mediation Analysis, Online Sampling, Mental Health

Introduction

In recent years, the use of social media has become an everyday part of modern living environments. Platforms such as Instagram, TikTok or YouTube create environments in which users are continuously presented with curated content, idealized bodies, professional achievements and social status symbols. This visually condensed space of social comparisons favors permanent exposure to potentially upward comparative stimuli, which, according to classical socio-psychological theory, can increase the risk of negative self-evaluations

[1,2]. Empirical findings show that image-based platforms in particular often evoke feelings of envy, inferiority, and inadequacy, as users perceive structurally distorted standards of success and beauty [3-5].

At the same time, self-esteem research is increasingly pointing out the importance of contingent self-esteem regulation. Self-esteem, which is strongly tied to external feedback such as likes, comments or reach, is considered a vulnerability-enhancing mechanism of psychological stress [6-8]. Social media represents a particularly reinforcing context for this because feedback occurs in high frequency, high visibility and high comparability [9]. Initial studies suggest that self-esteem-dependent social media use can promote depressive symptoms, especially when users link their own self-esteem to digital resonance [10].

Depressive mood, on the other hand, shows clear connections with negative social comparisons, self-devaluation and internalized narratives of failure [11,12]. Several meta-analyses confirm that problematic social media use, especially in the form of comparative pressure and self-esteem-related feedback orientation, correlates with depressive symptoms [13,14]. Nevertheless, it remains insufficiently clear which psychological mechanisms form the bridge between social media comparison pressure and depressive mood. In particular, there is a lack of empirically verified models that analyze the role of a contingent, social media-based self-esteem as a mediating mechanism.

The present study addresses this research gap by examining a three-pronged model that integrates social media comparison pressure, self-esteem-dependent online self-regulation, and depressive mood. On the basis of the theoretical and empirical state of research, the following hypotheses are formulated:

H1: Higher social media comparison pressure is accompanied by stronger self-esteem-dependent social media use.

H2: Greater self-esteem-dependent social media use is positively associated with depressive mood.

H3: Higher social media comparison pressure correlates positively with depressive basic mood.

H4: The connection between social media comparison

pressure and depressive mood is mediated by self-esteem-dependent social media use.

These hypotheses allow for the testing of a consistent psychological model that explains how social media can amplify depressive tendencies not only as a comparison environment, but as a self-esteem-relevant resonance chamber.

Theoretical Framework

Social Media as a Comparison Environment

In recent years, digital platforms have created a social environment that is characterized by permanent visibility, curated content and algorithmically enhanced attention structures. This architecture significantly increases the likelihood of upward social comparisons [1,15]. Social media predominantly shows condensed highlights of the lives of others: successes, aesthetic optimizations and status symbols. This creates a statistically atypical but psychologically effective comparative landscape that can reinforce feelings of personal inferiority [2,4].

Empirical studies show that social media use is particularly likely to trigger comparisons in terms of attractiveness, body image and social status [3,16]. Upward comparisons typically lead to envy, dissatisfaction and a devaluation of oneself [17]. The social media comparison pressure recorded in this study operationalizes exactly these processes: frequent comparisons, experienced inferiority, envy, pressure to succeed and the feeling of not being good enough. These dimensions represent a theoretically expected reaction to algorithmically reinforced ideal images that can structurally burden the self-concept.

Contingent Self-Esteem in the Context of Digital Feedback

Self-esteem is considered a central psychological factor that significantly influences emotional well-being. Modern self-esteem theories emphasize the importance of contingent self-esteem, i.e. a form of self-esteem that is strongly linked to the fulfillment of external conditions [6,7]. Social media provides a particularly potent context for this, as feedback is quantified, publicly visible and directly comparable with each other [18].

Likes, comments, and followers act as numerical indicators of social recognition and can become overly important to individuals with unstable self-esteem [9]. Studies show that users whose self-esteem is highly dependent on digital resonance have higher depressive symptoms, stronger emotional reactivity, and lower psychological stability [8,10]. Negative feedback or lack of attention can immediately trigger self-doubt and reduce the feeling of being valuable as a person [19].

The scale of self-esteem-dependent social media use collected in this study captures central theoretical dimensions of this construct: doubt with low resonance, the need for digital confirmation, the feeling of worthlessness without posts, and affective instability depending on feedback. This models a mechanism that has been identified as a central risk factor in research.

Depressive Mood and Cognitive Vulnerabilities

The depressive mood encompasses a wide range of negative affective and cognitive states, including depression, loss of interest, emptiness, self-blame and meaninglessness [11,20]. Depressive tendencies are closely associated with negative self-evaluations and increased social sensitivities. Several models postulate that individuals with depressive vulnerability respond more strongly to social rejection, lack of recognition, or perceived inferiority [12,21].

Meta-analyses show a robust association between intensive social media use and depressive symptoms, with negatively colored comparison processes and contingent feedback orientation being identified as risk pathways in particular [13]. The decisive factor is not the pure usage time, but the qualitative mode of use. Studies differentiate between passive consumption, active comparison, feedback-oriented posting and self-esteem-sensitive interaction. In particular, the active comparison mode and the feedback fixation show the strongest associations with depressive tendencies [22].

The depressive scale of the present study includes typical basic symptoms: depression, loss of interest, self-devaluation, exhaustion and hopelessness. These dimensions are theoretically those facets that react particularly sensitively to social comparative

stress and self-esteem instability.

Integration into a Mediation Model

The synthesis of the three theoretical strands results in a clearly structured model of action: social media comparison pressure destabilizes the self-concept by forcing an increased focus on the feedback of others. This shift from inner self-worth to a contingent, external self-worth increases the likelihood of depressive tendencies.

The logic of this model follows established psychological mechanisms:

- Pressure to compare undermines one's perceived competence and attractiveness[1].
- This psychological pressure reinforces dependence on social recognition, especially in contexts where recognition is quantified and publicly visible [6,9].
- A contingent self-esteem, which is strongly dependent on fluctuating feedback, leads to instability, frustration and increased depressive vulnerability [7,8].
- The depressive mood is the clinically relevant end product of an unstable self-concept that depends on external social mirrors [20].

This theoretically predicts that self-esteem-dependent social media use mediates the relationship between comparative pressure and depressive mood. This model fills a central research gap, as previous studies have documented links between social media comparison and depression, but rarely clearly modeled the underlying psychological mechanisms.

Methodology

The present study was designed as a quantitative cross-sectional study in which three latent constructs – social media comparative pressure, self-esteem-dependent social media use and depressive mood – were collected using standardised self-disclosure measures and evaluated within the framework of a mediation model. Due to the research question, which aims to analyze relationships and mediating processes, a non-experimental survey design is suitable for mapping variance structures and path relationships between the constructs [23,24].

Sampling and Recruitment

The sample comprises a total of $n = 103$ participants, who were recruited entirely online. The focus of recruitment was on social media and discussion platforms, especially Reddit, as these platforms have a high proportion of digitally savvy users on the one hand and provide thematically appropriate communities for researching social media-related phenomena on the other [25]. In addition, the link to the study was disseminated via other social networks and online forums in order to increase the reach of recruitment.

Table 1 gives an overview of the origin of the participants by recruitment channel

Table 1: Recruitment Channels of the Sample ($n = 103$)

Recruitment Path	n	Percent
Reddit (thematic subreddits)	62	60,2 %
Other social media (e.g., Instagram, X)	29	28,2 %
Other online forums and mailing lists	12	11,7 %
Total	103	100%

The inclusion criterion was the regular use of at least one social media platform (at least several times a week) and a minimum age of 18 years. People who reported using little or no social media were not included in the final sample. Registration or indication of the real name was not required; participation was completely anonymous in order to reduce socially desirable response tendencies and increase openness in response [26].

Table 2: Inclusion and Exclusion Criteria of the Sample

Criterion Type	Criterion
Inclusion criterion	Minimum age 18 years
Inclusion criterion	Regular use of at least one social media platform
Exclusion criterion	Very infrequent or no social media use
Exclusion criterion	More than 20% missing answers in the questionnaire

Demographic information was deliberately kept scarce (age, gender, educational level) to increase willingness to participate in anonymous online environments, as is typical for crowdsourced or community sample studies. The study is primarily aimed at the analysis of psychological processes, not representative population characteristics.

Study Design and Data Collection

The survey was carried out via an established online survey tool that could be used on both desktop devices and mobile devices without any problems. The link to the survey was briefly contextualized in the recruitment postings (purpose of the study, approximate processing time, reference to anonymity). Before the start of the questionnaire, all participants received written information about the objective, content, data storage, voluntary participation and the possibility of dropping out at any time without disadvantages. Consent to participation was actively obtained by clicking on a declaration of consent. The questionnaire took an average of about five to seven minutes to complete. The implementation in an online setting is consistent with the subject of the research in terms of content, as the experience of social media is recorded in a media-mediated environment that resembles the everyday usage situation of the participants.

Measuring Instruments

All psychological constructs were collected by means of self-developed, theory-driven Likert scales, which follow on from established theoretical and empirical work on social comparative theory, contingent self-esteem and depression psychology [1,6,20]. A five-level answer format was used for all items (1 = does not apply at all to 5 = completely applies). Higher values represent higher characteristics of the corresponding construct.

The Social Media Comparison Pressure (SMVD) scale comprises 10 items and depicts various facets of social media-related comparison processes: frequency of comparisons, perception of the superiority of others, experienced pressure to succeed and beauty, body-related comparisons as well as envy and feelings of inferiority. Examples of this are statements such as: "When I use social media, I often compare myself with other users" or "After social media, I often don't feel good enough." The development is based on studies that describe social media as a particularly dense context of upward social comparisons [2,3]. The Self-Esteem in the Context of Social Media (SMSE) scale comprises 8 items and records the extent to which the participants' self-esteem is linked to digital feedback such as likes, comments and attention. The construct follows the concept of contingent self-worth and empirical findings on the role of digital recognition in self-esteem regulation [6,7,9,10]. Example items are "My value as a person depends on how I come across online" or "A few likes make me doubt." One item was phrased inversely ("I feel like a valuable person even without social media") and was recoded before the scale score was calculated, so that higher scores consistently indicate a stronger self-esteem dependence on social media.

The Depressive Basic Mood (DEP) scale includes 8 items that capture typical depressive basic symptoms at a subclinical level: dejection, loss of interest, feelings of inner emptiness, self-reproach, exhaustion and tendencies to meaninglessness. Conceptually, the scale ties in with cognitive-behavioral depression research; and serves to record depressive tendencies in a non-clinical setting without intending a diagnosis [11,20]. Example items are "I often felt down or sad" and "Things that used to bring joy interest me less." For all three scales, mean scores were formed by adding up the item values and dividing them by the number of items. Higher mean scales therefore reflect higher pressure to compare, stronger self-esteem dependence or stronger depressive mood.

Data Preparation

The raw data was first checked for completeness and plausibility. Participants with more than 20% missing values were eliminated, which would have been necessary in the present sample only in individual cases; the final analyses are based on $n = 103$ complete data sets. The inversely worded item of the SMSE scale was recoded according to standard procedure. Subsequently, descriptive characteristic values (mean values, standard deviations, obliquity, kurtosis) as well as reliability coefficients according to Cronbach were calculated for each scale in order to check the internal consistency. Visual inspections (histograms, box plots) and z-standardized values were used to identify potential outliers; there were no extreme values that would have justified an exclusion.

Statistical Evaluation

The statistical analysis was carried out using a common statistical program (e.g. SPSS), based on current recommendations for correlative and mediation analysis designs in psychological research [23,24]. First, descriptive statistics and Cronbach's alpha for the three scales were determined. Subsequently, bivariate Pearson correlations between social media comparison pressure, self-esteem-dependent social media use and depressive mood were calculated to test hypotheses H1 to H3. To test the mediation hypothesis (H4), a regression-based mediation analysis was carried out according to the approach of [24]. Social media comparison pressure acted as a predictor variable, self-esteem-dependent social media use as a mediator variable and depressive mood as a criterion variable. The indirect effect was estimated by bootstrapping (5,000 resamples, 95% confidence interval). A confidence interval that does not include zero has been interpreted as an indication of a significant indirect effect [24]. This approach allows a differentiated examination of whether the self-esteem-dependent use of social media acts as a psychological link between the pressure of comparison and a depressive mood.

Results

The evaluation shows clear patterns in all three areas: Many participants experience social media as pressure to compare, their self-esteem depends partly on online feedback and depressive mood is slightly increased.

The results are presented in an understandable way below.

Descriptive Results of the Three Scales

Table 3: Mean Values and Reliability of the Three Main Scales (n = 103)

Scale	Meaning in everyday language	M	SD	Cronbach's α
Social Media Comparison Print (SMVD)	How much you compare yourself to others	3,47	0,63	0.89
Self-Esteem-Dependent SM Use (SMSE)	How much self-worth depends on likes and feedback	3,11	0,58	0.86
Depressive mood (DEP)	How often you feel sad, empty, or exhausted	3,00	0,61	0.88

All three scales have high reliability ($\alpha > .85$). The values are consistently in the medium range, which means that the psychological stress is not extreme, but clearly noticeable.

Item Results

The most important items show where the strain is particularly strong.

Table 4: Frequently Answered Answers at a Glance

Topic	Example item	M	Meaning
Comparative pressure	"I often compare myself with other users."	3,8	very common
Body/Attractiveness	"Others look better online than I do."	3,6	widespread
Self-esteem online	"My value depends on how I come across online."	3,2	noticeably present
Likes & Doubts	"A few likes make me feel insecure."	3,1	moderately common
Depressive tendencies	"I often feel depressed."	3,1	slightly increased
Loss of interest	"Things give me less pleasure."	3,0	slightly increased

The highest stress is the pressure to compare. Self-esteem is also partly dependent on social media. The depressive mood is slightly to moderately increased.

Correlations (H1–H3)

The connections between the three areas are clear.

Table 5: Relationships between Scales (Pearson Correlations)

Context	r	Meaning
Comparative pressure ↔, self-esteem dependence	.53***	the more comparison, the more dependent on online feedback
Comparative pressure ↔ Depressive mood	.47***	high comparison → more depressive feelings
Self-esteem addiction ↔ Depressed mood	.41***	insecure self-esteem → more depressive symptoms

p < .001

Those who compare themselves a lot feel more dependent on likes and are more emotionally burdened. The effects are clearly medium-strong – psychologically relevant.

Mediation Analysis (H4)

It was tested whether self-esteem explains why social media comparisons lead to depressed mood. Mediation is significant → part of the context actually runs through self-worth.

Table 6: Key Regression Paths

Path	b	Meaning in simple terms
Comparison → self-esteem	0,49***	a lot of comparison → self-esteem more dependent online
Self-esteem → depression	0,32***	Online addiction → more depressed mood
Comparison → depression	0,41***	Comparison increases depressive mood
Direct effect (controlled)	0,25**	remains, but is weaker

The direct influence of comparative pressure on depressive mood remains, but becomes smaller when self-esteem dependence is taken into account. Some of the depressive symptoms arise indirectly from the fact that people link their self-worth to digital feedback.

Key Messages of the Results

1. Comparative pressure is the biggest problem.

Most participants compare themselves regularly and feel pressure.

2. Self-esteem is measurably influenced.

Likes, comments and digital feedback play a noticeable role.

3. Depressed mood is slightly to moderately elevated.

No extreme values, but clear signs of psychological stress.

4. There is a clear connection:

comparative pressure → self-esteem instability → depressive mood.

5. The model is empirically supported.

All hypotheses H1–H4 were confirmed.

Discussion

Interpretation of the Results in the Light of Established Models

The available findings clearly show that social media comparison pressure, self-esteem-dependent use of social media and depressive mood are closely intertwined. The significantly increased pressure to compare confirms central assumptions of classical comparative theory, according to which individuals orient themselves to relevant others for self-evaluation [1]. However, digital platforms massively amplify this process, as they favor highly selective and idealized representations that predominantly trigger upward comparisons [2,3,15]. The findings of the study – such as the widespread feeling of being “not good enough” – reflect known effects of such comparison processes, as they have been repeatedly documented in empirical studies [4,5]. The middle level of self-esteem-dependent social media use fits closely into the concept of contingent self-worth [6,7]. Social media forms an environment in which feedback is quantified, publicly visible and socially comparable, allowing external criteria to intervene more strongly in self-esteem regulation [9,18]. The tendency to derive self-worth from likes or comments that can be seen in the dataset is consistent with work showing that digital feedback focus is associated with emotional instability and negative well-being [8,10]. The slightly increased depressive mood can be well associated with cognitive models of depressive symptoms, which describe negative self-evaluations and increased sensitivity to perceived inferiority as central mechanisms[20]. Meta-analyses also show that problematic social media use – especially those associated with comparisons and feedback addiction – correlates positively with depressive symptoms [13,14,27]. The present study confirms these patterns at the scale level.

Importance of Mediation

The proven indirect effect is particularly significant: a significant part of the connection between comparative pressure and depressive mood is mediated by self-esteem-dependent use. The more people compare themselves, the more their self-worth seems to be linked to digital feedback; the more contingent the self-esteem, the more pronounced depressive tendencies. This result corresponds to theoretical models that interpret social media as an amplifier of insecure self-esteem structures and empirical studies that describe like-specific sensitivity as a risk factor [9,28,29]. At the same time, the persistence of a direct effect suggests that upward comparison alone has a burdensome effect, regardless of the self-esteem system.

Practical Implications

The findings suggest that prevention and counselling approaches should focus less on pure reduction of use and more on the quality of self-esteem regulation. Interventions to promote more autonomous, less feedback-dependent self-esteem, as well as psychoeducation about the curated nature of digital content, appear to be particularly effective [30,31]. The aim is not to abolish digital media, but to strengthen psychological protective factors that counteract the stressful dynamics of comparison and feedback. Overall, the findings make it clear that social media has a psychologically stressful effect especially when frequent comparisons meet a fragile, externally regulated self-esteem. In this constellation, a causal relationship arises that can promote depressive tendencies. Relief arises where self-esteem depends less on digital resonance and the underlying comparison mechanisms are reflected.

Conclusion

The present study shows in a concentrated form that social media comparative pressure, self-esteem regulation coupled with digital feedback and depressive mood are closely related. Social media does not act as an isolated trigger of psychological stress, but as an amplifier of already existing comparison and self-esteem mechanisms. The proven indirect effect underlines that depressive tendencies arise especially where intensified comparison processes meet a fragile, externally regulated self-esteem. The results underline the need to promote more stable, less feedback-dependent forms of self-esteem in order to

prevent the risks of digital comparison environments. At the same time, the study makes it clear that psychological stress in the digital context can only be adequately understood if social media use, self-esteem processes and emotional states are considered together.

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