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Social Media Addiction and Psychological Distress in Adolescents: The Serial Mediating Roles of Fear of Missing Out and Social Comparison

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A B S T R A C T

Objective: This study aimed to examine the relationship between social media addiction and psychological distress among Canadian adolescents and to test the serial mediating roles of fear of missing out and social comparison in this association.

Methods and Materials: The study employed a cross-sectional correlational design with a serial mediation approach. Participants were 428 Canadian adolescents aged 13–18 years recruited from secondary schools. Data were collected using the Bergen Social Media Addiction Scale, Fear of Missing Out Scale, Iowa-Netherlands Comparison Orientation Measure, and Kessler Psychological Distress Scale. Pearson correlation coefficients were calculated to examine associations among the study variables. Serial mediation analysis was conducted using PROCESS Model 6 with 5,000 bootstrap resamples to estimate direct, indirect, and sequential indirect effects.

Findings: Social media addiction was positively associated with fear of missing out ($r = .56$, $p < .001$), social comparison ($r = .47$, $p < .001$), and psychological distress ($r = .52$, $p < .001$). Fear of missing out was positively associated with social comparison ($r = .61$, $p < .001$) and psychological distress ($r = .57$, $p < .001$), while social comparison was positively related to psychological distress ($r = .59$, $p < .001$). The total effect of social media addiction on psychological distress was significant ($B = .711$, $p < .001$), and the direct effect remained significant after inclusion of the mediators ($B = .313$, $p < .001$). Significant indirect effects were observed through fear of missing out ($B = .180$, 95% CI [.112, .261]), social comparison ($B = .087$, 95% CI [.046, .139]), and the serial pathway through both mediators ($B = .131$, 95% CI [.081, .190]).

Conclusion: Social media addiction was associated with greater psychological distress among adolescents both directly and indirectly through fear of missing out and social comparison, indicating that these two psychological processes may represent important mechanisms linking problematic social media engagement to poorer adolescent mental health.

Keywords: *social media addiction; psychological distress; fear of missing out; social comparison; adolescents; serial mediation*

1. Introduction

The rapid integration of social media into adolescents' everyday lives has fundamentally transformed how young people communicate, construct identities, maintain friendships, seek social validation, access information, and interpret their position within peer networks. Social networking platforms provide adolescents with opportunities for connection, self-expression, entertainment, and participation in broader communities; however, their increasingly intensive and compulsive use has also raised substantial concerns regarding psychological well-being. Adolescence represents a particularly sensitive developmental period because emotional regulation, self-concept, social identity, and interpersonal belonging are still undergoing substantial development, while sensitivity to peer approval and rejection is often heightened. Within this context, persistent engagement with highly interactive and socially evaluative digital environments may increase vulnerability to emotional difficulties. Reviews of contemporary evidence have increasingly linked excessive social media and smartphone engagement with anxiety, depressive symptoms, emotional dysregulation, stress, sleep-related difficulties, loneliness, and broader psychological morbidity among adolescents and young adults (Rathod et al., 2022; Ruckwongpatr et al., 2022). More recent literature similarly suggests that the expansion of social media use has coincided with growing concern regarding adolescent mental health and that the psychological consequences of digital engagement depend not only on the amount of use but also on the mechanisms through which adolescents interact with and interpret online experiences (Burgess, 2025; Pacocha & Gugała, 2024).

Social media addiction, or problematic social media use, refers to a maladaptive pattern of engagement characterized by preoccupation, loss of control, repeated unsuccessful efforts to reduce use, emotional dependence, and continued use despite adverse consequences. Such patterns resemble other behavioral addictions in that social media may become increasingly salient in daily life and may be used compulsively for mood regulation, reassurance seeking, or avoidance of unpleasant emotional states. The adolescent digital environment is particularly conducive to repetitive engagement because notifications, personalized feeds, algorithmic recommendations, social feedback, and rapidly changing content continuously reinforce attention. Studies examining digital-age addictive behaviors suggest that adolescents and youth may be especially vulnerable to problematic engagement because developmental needs for stimulation, affiliation, recognition, and immediate reward interact with highly reinforcing technological features (Lu et al., 2024). Evidence also indicates that excessive use of social networking services can become associated with deteriorating mental well-being when digital engagement interferes with sleep, academic responsibilities, face-to-face interaction, emotion regulation, and adaptive coping (Hu, 2024; Ikbal, 2023). Thus, problematic social media use may represent not merely excessive screen exposure but a psychologically meaningful pattern of dependence that can amplify vulnerabilities already present during adolescence.

Psychological distress is a broad construct encompassing symptoms of anxiety, depressive affect, nervousness, hopelessness, restlessness, and general emotional strain. Rather than representing one specific psychiatric diagnosis, psychological distress reflects the degree to which individuals experience persistent negative emotional states that interfere with everyday functioning. Among adolescents, elevated psychological distress can adversely affect academic performance, interpersonal relationships, self-esteem, sleep, decision-making, and overall developmental adjustment. Growing evidence has linked problematic engagement with smartphones and social networking platforms to a range of internalizing symptoms, suggesting that compulsive digital behavior may contribute to or coexist with emotional difficulties (Ndayambaje & Udohchukwu, 2025). Recent symptom-network research has further indicated that social networking site addiction, fear of missing out, and related digital dependency symptoms are interconnected with mental health difficulties, underscoring the importance of examining the psychological processes linking technology use to distress rather than treating these phenomena as isolated constructs (Yao et al., 2025). Similarly, contemporary adolescent research has shown that problematic social media use may adversely affect socio-emotional functioning partly through internalizing problems and fear of missing out, suggesting that the relationship between digital overuse and psychological maladjustment may operate through multiple interacting pathways (Fu et al., 2026).

One of the most prominent mechanisms proposed to explain the psychological consequences of social media addiction is fear of missing out. Fear of missing out, commonly referred to as FoMO, is characterized by persistent apprehension that other people may be experiencing enjoyable, rewarding, or socially important events in one's absence, accompanied by a strong desire to

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remain continuously connected with what others are doing. Social media platforms may intensify this experience because adolescents are exposed almost continuously to images, messages, activities, social gatherings, achievements, and interactions involving peers. Such exposure can create the impression that meaningful social experiences are constantly occurring elsewhere and that disengagement from social media could result in social exclusion or informational disadvantage. Research has demonstrated that greater frequency and intensity of social media use are associated with higher levels of FoMO among adolescents (Anjani & Widyatama, 2023; Dania et al., 2023). Studies of adolescents have also described FoMO as an important psychological feature of digital social interaction, affecting how young people monitor relationships, interpret peer activities, and respond to perceived exclusion (Meradaputhi et al., 2023). Consequently, social media addiction may strengthen FoMO by encouraging adolescents to monitor online environments continuously and to perceive temporary disconnection as socially threatening.

The reciprocal relationship between FoMO and problematic digital engagement has received substantial empirical support. Adolescents who experience stronger FoMO may repeatedly check social media to reduce uncertainty about what peers are doing, while frequent checking may simultaneously expose them to even more information about social activities and opportunities from which they feel excluded. This cycle can reinforce both compulsive platform use and emotional unease. A meta-analysis examining FoMO and mobile phone addiction found a robust positive association between the two constructs, supporting the broader proposition that FoMO is closely connected with problematic patterns of digital engagement (Zhang, 2023). Similarly, research among vocational high school students has demonstrated a significant relationship between FoMO and internet addiction, indicating that adolescents who experience stronger fears of missing social experiences may be more susceptible to maladaptive online behavior (Setyaningsih et al., 2023). Studies focused specifically on Instagram use among adolescents have likewise described FoMO as an important factor in addictive engagement with visually oriented social media environments (Gumelar, 2023). A recent systematic review and meta-analysis further emphasized the close association between FoMO and compulsive social media use and suggested that demographic characteristics such as age and gender may shape the magnitude of this relationship (Bakshi & Gait, 2026).

FoMO is also relevant because it may contribute directly to psychological distress. Constant concern about being excluded from rewarding social experiences can foster anxiety, dissatisfaction, insecurity, and heightened emotional vigilance. Adolescents with elevated FoMO may interpret ordinary gaps in communication as evidence of exclusion, perceive peers' activities as indications that they are missing something important, and experience difficulty disengaging from digital environments. Research has shown that FoMO can mediate associations between psychological resources and symptoms of depression and anxiety in adolescents, highlighting its role as an emotionally significant mechanism rather than merely a pattern of technology use (Ediati et al., 2024). Findings also suggest that interventions aimed at reducing FoMO may produce beneficial effects on related psychological outcomes. For example, a selective counseling program designed to reduce FoMO among adolescent girls was associated with reductions in social anxiety and problematic gaming-related behavior, supporting the proposition that FoMO is a modifiable psychological factor with implications for emotional well-being (Alassaf et al., 2024). Broader awareness and educational initiatives regarding FoMO have similarly emphasized the importance of recognizing the phenomenon as a contemporary mental health concern within digitally connected populations (Prasetyo et al., 2022).

Another important mechanism potentially linking social media addiction to psychological distress is social comparison. Social comparison refers to the process by which individuals evaluate their own abilities, appearance, achievements, opinions, social status, or life circumstances by comparing themselves with other people. Although comparison with peers is a normal developmental process, social media environments may intensify its frequency and psychological consequences. Unlike many offline interactions, social media exposes adolescents to highly curated and selectively presented representations of other people's lives. Users commonly display attractive photographs, achievements, social activities, relationships, travel experiences, and positive emotional states while minimizing everyday difficulties or failures. Adolescents may therefore compare their ordinary lived experiences with idealized representations of others, potentially generating feelings of inadequacy, dissatisfaction, envy, or inferiority. Social media thus creates a persistent evaluative

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environment in which indicators of social approval, such as likes, comments, followers, and visible interactions, make social status unusually salient.

The importance of comparison processes has been increasingly recognized in studies of problematic smartphone and social media behavior. Research examining smartphone addiction and phubbing has demonstrated that FoMO and social comparison can function together within more complex psychological pathways linking problematic technology use to maladaptive interpersonal behavior (Bajwa et al., 2023). This finding is particularly relevant because it suggests that FoMO and social comparison should not necessarily be regarded as independent processes. Rather, FoMO may increase adolescents' attention to what others are doing, while this increased monitoring creates greater opportunities for comparison. Adolescents who are afraid of missing out may repeatedly inspect peers' posts, stories, social activities, achievements, and relationships; once exposed to these materials, they may evaluate their own lives against what they observe. Accordingly, FoMO may precede and intensify social comparison, creating a sequential psychological process through which problematic social media engagement contributes to negative emotional outcomes.

Social experiences within online environments may also strengthen comparison-related vulnerabilities because peer influence becomes increasingly visible and quantifiable. Research involving secondary and high school students has shown that social media experiences can affect academically related peer influence and FoMO, demonstrating that adolescents' digital experiences shape perceptions of what peers are doing and what they themselves should be doing (Ngo et al., 2024). This process may extend beyond academic behavior to appearance, lifestyle, friendships, popularity, possessions, and social participation. When adolescents repeatedly encounter selectively positive information about peers, they may conclude that others are happier, more successful, more socially connected, or more attractive than themselves. Such conclusions can contribute to reduced self-worth and elevated distress, especially among individuals who already engage in compulsive social media monitoring.

The broader adolescent literature also indicates that emotional vulnerability may amplify the impact of these digital mechanisms. Loneliness, for example, has been positively associated with FoMO, suggesting that adolescents or young adults who feel socially disconnected may be particularly concerned about missing opportunities for belonging and interaction (Mahanani & Arifiani, 2023). Similarly, trait-level psychological characteristics may affect how adolescents respond to digital environments. Research on early adolescents has found that negative affectivity and FoMO can mediate associations between individual characteristics and problematic smartphone use, illustrating how emotional predispositions and digital concerns may operate jointly (Jin et al., 2023). These findings indicate that compulsive social media engagement is unlikely to arise from a single cause; instead, it may reflect an interaction among emotional vulnerabilities, social monitoring, perceived exclusion, and repetitive digital behavior.

Recent research has increasingly adopted mediation and serial mediation frameworks to clarify these relationships. In emerging adults, self-control has been linked with psychological distress through sequential mechanisms involving FoMO and social media addiction, demonstrating that these constructs can form meaningful chains of association rather than isolated bivariate relationships (Koç et al., 2023). Among adolescents, serial mediation research has similarly suggested that social media addiction and FoMO may contribute to depressive outcomes through multiple psychological and academic processes (Ntumi et al., 2025). These models are important because they move beyond the simple question of whether social media use is associated with poorer mental health and instead ask how such associations may emerge. Understanding the ordering of psychological mechanisms is particularly valuable for intervention development because different points in the pathway may require different preventive strategies.

At the same time, digital addiction is not limited to conventional social networking platforms. Short-form video applications, smartphones, and other digital technologies increasingly rely on rapid, personalized, algorithmically curated content that can sustain prolonged engagement. Research on short-form video addiction has shown that emotional and motivational characteristics can contribute to addictive patterns through mediated pathways, further illustrating that problematic digital use is embedded within complex psychological processes (Wang et al., 2025). This broader digital context supports the need to examine social media addiction as part of a larger behavioral ecosystem in which reward seeking, boredom reduction, reassurance, social visibility, and peer comparison can reinforce repeated use.

Adolescents may also attempt to cope with social-media-related distress in different ways, ranging from adaptive self-

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regulation to avoidance, withdrawal, reassurance seeking, or further online engagement. Work examining the effects of social media on teenagers has emphasized the importance of coping mechanisms in shaping whether social media experiences lead to positive or negative psychological outcomes (Zhang et al., 2023). However, when the primary coping response involves more frequent checking, monitoring, or comparison, distress may be maintained rather than reduced. Cultural and relational contexts may also matter. For example, family-based approaches have been discussed as possible means of reducing FoMO among Generation Z by strengthening belonging and relational security outside digital environments (Hendrawan et al., 2023). Such perspectives reinforce the idea that adolescents' online behavior is embedded within broader interpersonal systems and that perceived social connectedness may either buffer or exacerbate digital vulnerability.

Despite a growing body of literature, several important gaps remain. First, many studies have examined social media addiction, FoMO, social comparison, or psychological distress in pairs rather than within a unified explanatory model. Second, a substantial portion of prior research has focused on university students or emerging adults rather than adolescents, even though adolescence is a developmental period characterized by heightened peer sensitivity and identity formation. Third, although FoMO and social comparison are theoretically connected, relatively little work has directly tested whether they operate sequentially in the pathway from social media addiction to psychological distress. Existing evidence supports associations between social media intensity and FoMO (Anjani & Widyatama, 2023), FoMO and digital addiction (Zhang, 2023), FoMO and psychological symptoms (Ediati et al., 2024), and social comparison within problematic technology-use pathways (Bajwa et al., 2023), but these relationships require integration into a coherent serial model. Fourth, research conducted across different cultural settings suggests that the psychological meaning of social media use may vary according to interpersonal norms, educational environments, and patterns of digital participation, making investigation within specific national contexts important.

The Canadian adolescent context provides a relevant setting for examining these mechanisms because social media is deeply embedded in peer communication, school-related interaction, entertainment, and identity expression. A theoretically integrated model may clarify whether adolescents who demonstrate stronger signs of social media addiction are more psychologically distressed partly because they become increasingly concerned about missing peer experiences and then engage more strongly in social comparison. Such a model may also help distinguish the direct association between addictive social media engagement and distress from the indirect pathways operating through these intermediary psychological processes. Identifying these mechanisms could inform school-based mental health programs, digital literacy initiatives, counseling interventions, and preventive approaches that target not only screen time but also the cognitive and emotional processes activated during online engagement.

Therefore, the aim of the present study was to examine the relationship between social media addiction and psychological distress among Canadian adolescents and to test the serial mediating roles of fear of missing out and social comparison in this association.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a cross-sectional correlational design with a structural mediation approach to investigate the relationship between social media addiction and psychological distress among adolescents and to examine the serial mediating roles of fear of missing out and social comparison. The target population consisted of adolescents enrolled in secondary schools in Canada during the 2025–2026 academic year. A total of 428 adolescents participated in the study. Participants were between 13 and 18 years of age and were recruited from public secondary schools in urban and suburban communities. A multistage sampling procedure was used to obtain a heterogeneous adolescent sample. Initially, participating schools were identified from selected educational districts, after which classes were selected from different grade levels, and eligible students within the selected classes were invited to participate. Eligibility criteria included being between 13 and 18 years of age, current enrollment in a Canadian secondary school, active use of at least one social media platform during the preceding six months, sufficient English-language proficiency to understand the questionnaires, and willingness to participate in the study. Adolescents who submitted substantially incomplete questionnaires, provided patterned or evidently careless responses, or reported conditions that prevented independent completion of the research measures were excluded from the final analysis. Participation was voluntary, and students

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were informed that they could discontinue participation at any stage without academic or personal consequences. Because the study involved participants younger than 18 years, appropriate parental or guardian consent and adolescent assent procedures were implemented in accordance with institutional ethical requirements and applicable Canadian standards for research involving minors. Participants were informed about the purpose and general procedures of the study, confidentiality of their responses, anonymity of the collected information, and the exclusive use of the data for scientific purposes. Questionnaires were administered either electronically through a secure survey platform or in supervised school settings, depending on the procedures permitted by each participating school. No personally identifying information was included in the analytical dataset. Ethical principles concerning voluntary participation, confidentiality, privacy, informed consent, and protection of adolescent participants were observed throughout the research process.

2.2. Measures

Social media addiction was assessed using the Bergen Social Media Addiction Scale (BSMAS). The BSMAS is a brief self-report instrument designed to assess problematic and potentially addictive patterns of social media use. The scale consists of six items reflecting central components of behavioral addiction, including salience, mood modification, tolerance, withdrawal, conflict, and relapse. Respondents indicate the extent to which they have experienced each behavior during their recent social media use on a five-point Likert-type scale ranging from 1, representing very rarely, to 5, representing very often. Item scores are summed to produce an overall social media addiction score, with higher total scores representing greater levels of problematic or addictive social media involvement. The BSMAS was selected because its concise structure is appropriate for adolescent populations and allows the assessment of dysfunctional engagement with social networking platforms without imposing an excessive response burden on participants. In the present study, the total score was treated as a continuous variable, with higher values indicating more pronounced symptoms of social media addiction. Internal consistency was evaluated in the study sample before conducting the primary analyses.

Fear of missing out was measured using the Fear of Missing Out Scale (FoMOS). This 10-item self-report instrument assesses persistent concerns that other individuals may be having rewarding experiences from which the respondent is absent, as well as the desire to remain continuously connected with the activities and experiences of others. Participants rate each statement on a five-point Likert scale ranging from 1, indicating not at all true of me, to 5, indicating extremely true of me. The items address concerns about missing enjoyable experiences, awareness of what friends are doing, feelings associated with exclusion from social activities, and the perceived need to remain connected to ongoing interpersonal events. Scores are summed or averaged to produce an overall fear of missing out score, with higher scores indicating a stronger tendency to experience apprehension about being excluded from rewarding social experiences. Within the conceptual model of the present study, fear of missing out was regarded as the first mediator through which problematic social media engagement might contribute to heightened psychological distress. Specifically, intensive and compulsive engagement with social media may increase adolescents' awareness of others' activities and perceived opportunities for social participation, thereby intensifying concerns about exclusion or missed experiences.

Social comparison orientation was assessed using the Iowa-Netherlands Comparison Orientation Measure (INCOM). The instrument consists of 11 items designed to measure individual differences in the tendency to compare one's opinions, abilities, achievements, experiences, and social circumstances with those of other people. Respondents rate the items using a five-point Likert-type response format, with higher scores indicating a stronger general orientation toward social comparison. The measure captures both ability-based and opinion-based comparison tendencies and is particularly relevant to the present study because social media environments provide adolescents with frequent exposure to selectively presented information concerning peers' appearance, achievements, social relationships, activities, and lifestyles. In the proposed serial mediation model, social comparison was conceptualized as the second mediator. It was hypothesized that adolescents experiencing stronger fear of missing out would be more likely to monitor and evaluate the experiences of others, which could subsequently increase their tendency to engage in social comparison. The total INCOM score was used in the statistical analyses, with higher values representing a stronger dispositional tendency toward social comparison.

Psychological distress was assessed using the Kessler Psychological Distress Scale (K10). The K10 is a 10-item self-report measure designed to assess nonspecific

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symptoms of psychological distress, particularly experiences associated with anxiety and depressive affect. Participants report how frequently they have experienced symptoms such as nervousness, restlessness, hopelessness, emotional exhaustion, sadness, and feelings that everyday activities require substantial effort. Items are rated on a five-point frequency scale, with higher total scores representing greater psychological distress. The K10 was used as the principal outcome measure because it provides a concise assessment of adolescents' overall emotional distress without restricting the construct to a single diagnostic category. The total score was calculated according to the standard scoring procedure and was entered as a continuous outcome variable in subsequent statistical analyses. Before hypothesis testing, the internal consistency of all measurement instruments was assessed using Cronbach's alpha coefficients. Demographic information, including age, gender, grade level, average daily time spent on social media, and commonly used social media platforms, was also collected to characterize the sample and evaluate potentially relevant background variables.

2.3. Data analysis

Data were analyzed using IBM SPSS Statistics version 29 together with the PROCESS macro for mediation analysis. Prior to conducting the primary analyses, the dataset was screened for data-entry errors, missing values, univariate outliers, and patterns of invalid responding. Descriptive statistics, including means, standard deviations, minimum and maximum scores, frequencies, and percentages, were calculated to describe the demographic characteristics of participants and the distributions of the principal study variables. Internal consistency coefficients were calculated for all multi-item scales. The assumptions required for parametric statistical analyses were subsequently evaluated. Normality was examined through skewness and kurtosis indices and inspection of score distributions, while linearity and homoscedasticity were assessed through examination of scatterplots and regression residuals. Potential multicollinearity was evaluated using tolerance values and variance inflation factors. Pearson product-moment correlation coefficients were calculated to examine the bivariate relationships among social media addiction, fear of missing out, social comparison, and psychological distress. Statistical significance for preliminary analyses was evaluated at an alpha level of .05.

The hypothesized indirect relationships were tested using serial multiple mediation analysis with PROCESS Model 6. In the proposed model, social media addiction was specified as the independent variable, psychological distress as the dependent variable, fear of missing out as the first mediator, and social comparison as the second mediator. The analysis estimated the total effect of social media addiction on psychological distress, the direct effect of social media addiction after accounting for the mediators, and the specific indirect effects operating through each mediator. Three principal indirect pathways were examined: the pathway from social media addiction to psychological distress through fear of missing out, the pathway from social media addiction to psychological distress through social comparison, and the hypothesized serial pathway from social media addiction to fear of missing out, from fear of missing out to social comparison, and subsequently from social comparison to psychological distress. This analytical strategy made it possible to determine whether problematic social media use was associated with psychological distress not only through independent psychological mechanisms but also through a sequential process in which heightened fear of missing out was associated with stronger social comparison tendencies and, in turn, greater psychological distress.

The statistical significance of indirect effects was evaluated using bias-corrected bootstrap confidence intervals based on 5,000 resamples. An indirect effect was considered statistically significant when its 95% bootstrap confidence interval did not include zero. Standardized and unstandardized regression coefficients, standard errors, confidence intervals, t values, and significance levels were examined when interpreting the estimated pathways. The proportion of variance explained in the mediator and outcome variables was evaluated using coefficients of determination. Age, gender, and average daily social media use were included as covariates in supplementary adjusted analyses to determine whether the principal associations remained stable after accounting for relevant demographic and behavioral characteristics. Because the study employed a cross-sectional design, the mediation coefficients were interpreted as evidence of statistically consistent indirect associations rather than definitive causal processes. The serial ordering of fear of missing out and social comparison was specified on the basis of the theoretical model underlying the study, according to which problematic social media engagement may heighten adolescents' concerns about missing socially rewarding experiences, subsequently

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increase attention to and comparison with the experiences of peers, and ultimately contribute to elevated psychological distress.

3. Findings and Results

A total of 428 Canadian adolescents were included in the final analyses. Participants ranged in age from 13 to 18 years, with a mean age of 15.51 years (SD = 1.53). Of the participants, 225 (52.6%) were girls and 203 (47.4%) were boys. With respect to age distribution, 51 participants (11.9%) were 13 years old, 73 (17.1%) were 14 years old, 86 (20.1%) were 15 years old, 91 (21.3%) were 16 years old, 79 (18.5%) were 17 years old, and 48 (11.2%) were 18 years old. Participants were distributed across Grades 8 through 12, including 79 students (18.5%) in Grade 8, 84 (19.6%) in Grade 9, 89 (20.8%) in Grade 10, 91 (21.3%) in Grade 11, and 85 (19.9%) in Grade 12. Participants reported spending an average of 4.52 hours per day (SD = 1.87) using social media. Regarding daily social media use, 48 adolescents (11.2%) reported using social media for less than two hours per day, 139 (32.5%) reported two to less than four hours, 150 (35.0%) reported four to six hours, and 91 (21.3%) reported more than six hours per day. Because participants could report more than one social media platform, platform-use percentages were not mutually exclusive. Instagram, TikTok, YouTube, and Snapchat were the most frequently reported platforms, whereas smaller proportions of participants reported regular use of X and Facebook. Overall, the demographic composition indicated representation across the full adolescent age range examined in the study and across different levels of secondary education and daily social media involvement.

Table 1

Descriptive Statistics, Internal Consistency, Distributional Characteristics, and Correlations Among the Main Study Variables

Variable	M	SD	Observed Range	Cronbach's α	Skewness	Kurtosis	1	2	3	4
Social media addiction	18.64	5.21	6–30	.88	.21	−.48	—			
Fear of missing out	29.83	7.06	10–50	.90	.13	−.35	.56***	—		
Social comparison	35.71	7.82	11–55	.86	.09	−.41	.47***	.61***	—	
Psychological distress	25.46	7.13	10–50	.92	.31	−.22	.52***	.57***	.59**	

As presented in Table 1, all four measures demonstrated satisfactory to excellent internal consistency, with Cronbach's alpha coefficients ranging from .86 for social comparison to .92 for psychological distress. The relatively small absolute values of skewness and kurtosis indicated that the score distributions did not exhibit substantial departures from normality, supporting the use of parametric correlation and regression procedures. Participants obtained a mean social media addiction score of 18.64 (SD = 5.21), a mean fear of missing out score of 29.83 (SD = 7.06), a mean social comparison score of 35.71 (SD = 7.82), and a mean psychological distress score of 25.46 (SD = 7.13). Pearson correlation analysis showed statistically significant positive relationships among all principal variables. Social media addiction was moderately and positively associated with fear of missing out, $r = .56$, $p < .001$, indicating that adolescents reporting greater problematic engagement with social media also tended to experience stronger concerns about missing rewarding social experiences. Social media addiction was also positively associated with social comparison, $r = .47$, $p < .001$, and psychological distress, $r = .52$, $p < .001$. Fear of missing out demonstrated a relatively strong positive association with social comparison, $r = .61$, $p < .001$, suggesting that adolescents who were more concerned about missing social experiences were also more inclined to compare themselves with others. Fear of missing out was positively related to psychological distress, $r = .57$, $p < .001$, while social comparison showed the strongest bivariate association with psychological distress, $r = .59$, $p < .001$. Thus, the correlational pattern was consistent with the hypothesized serial mediation model because the independent variable, both proposed mediators, and the outcome variable were significantly interrelated in the expected positive direction.

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Table 2

Regression Path Coefficients for the Serial Mediation Model

Outcome Variable	Predictor	Path	B	SE	β	t	p	95% CI for B
Fear of missing out	Social media addiction	a_1	.760	.055	.560	13.82	< .001	[.652, .868]
Social comparison	Social media addiction	a_2	.281	.060	.187	4.68	< .001	[.163, .399]
Social comparison	Fear of missing out	d_{21}	.559	.044	.505	12.70	< .001	[.473, .645]
Psychological distress	Social media addiction	c'	.313	.060	.229	5.22	< .001	[.195, .431]
Psychological distress	Fear of missing out	b_1	.237	.047	.235	5.04	< .001	[.145, .329]
Psychological distress	Social comparison	b_2	.309	.041	.339	7.54	< .001	[.229, .389]
Psychological distress	Social media addiction	c, total effect	.711	.057	.520	12.47	< .001	[.599, .823]

Table 2 presents the estimated regression coefficients for the hypothesized serial mediation model. Social media addiction significantly and positively predicted fear of missing out, B = .760, SE = .055, β = .560, t = 13.82, p < .001, 95% CI [.652, .868]. Accordingly, each one-point increase in social media addiction was associated with an estimated .76-point increase in fear of missing out. Social media addiction also had a significant direct association with social comparison after fear of missing out was considered, B = .281, SE = .060, β = .187, t = 4.68, p < .001. More importantly for the proposed sequence, fear of missing out significantly predicted social comparison while accounting for social media addiction, B = .559, SE = .044, β = .505, t = 12.70, p < .001. This finding indicated that stronger fear of missing out was associated with a substantially greater tendency to engage in social comparison. When psychological distress was entered as the final dependent variable, social media addiction remained a significant positive predictor after both mediators were included, B = .313, SE = .060, β = .229, t = 5.22, p < .001. Fear of missing out independently predicted greater psychological distress, B = .237, SE = .047, β = .235, t = 5.04, p < .001, and social comparison also showed a significant positive association with psychological distress, B = .309, SE = .041, β = .339, t = 7.54, p < .001. Prior to inclusion of the mediators, the total effect of social media addiction on psychological distress was B = .711, SE = .057, β = .520, t = 12.47, p < .001. The reduction of this coefficient from .711 for the total effect to .313 for the direct effect after inclusion of the mediators suggested substantial mediation, while the persistence of a statistically significant direct effect indicated that the mediation was partial rather than complete.

Table 3

Bootstrap Estimates of Specific and Total Indirect Effects of Social Media Addiction on Psychological Distress

Indirect Pathway	Effect	Boot SE	BootLLCI	BootULCI	Proportion of Total Indirect Effect
Social media addiction → Fear of missing out → Psychological distress	.180	.038	.112	.261	45.2%
Social media addiction → Social comparison → Psychological distress	.087	.024	.046	.139	21.9%
Social media addiction → Fear of missing out → Social comparison → Psychological distress	.131	.028	.081	.190	32.9%
Total indirect effect	.398	.044	.316	.488	100.0%

The bootstrap mediation analysis presented in Table 3 demonstrated that all three hypothesized indirect pathways were statistically significant. The first specific indirect effect, operating from social media addiction through fear of missing out to psychological distress, was B = .180, Boot SE = .038, 95% bootstrap CI [.112, .261]. Because the confidence interval did not contain zero, fear of missing out significantly mediated the association between social media addiction and psychological distress independently of the serial pathway. This was the largest individual indirect effect and accounted for approximately 45.2% of the combined indirect association. The second specific indirect pathway, from social media addiction through social comparison to psychological distress, was also significant, B = .087, Boot SE = .024, 95% bootstrap CI [.046, .139], accounting for approximately 21.9% of the total indirect effect. Thus, adolescents with higher social media addiction scores tended to report stronger social comparison tendencies, which were in turn associated with greater psychological distress. Of central importance to the primary hypothesis, the sequential

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indirect effect through both mediators was statistically significant. The path from social media addiction to fear of missing out, from fear of missing out to social comparison, and subsequently from social comparison to psychological distress yielded an indirect effect of B = .131, Boot SE = .028, 95% bootstrap CI [.081, .190]. This serial pathway accounted for approximately 32.9% of the total mediated association. The combined total indirect effect through fear of missing out and social comparison was B = .398, Boot SE = .044, 95% bootstrap CI [.316, .488]. Relative to the total effect of social media addiction on psychological distress, B = .711, approximately 56.0% of the overall statistical association was accounted for by the combined indirect pathways. Nevertheless, the residual direct effect remained statistically significant, confirming partial serial mediation. Collectively, these findings supported both the independent mediating roles of fear of missing out and social comparison and, most importantly, their hypothesized sequential mediating role.

Table 4

Summary of Variance Explained by the Regression Models

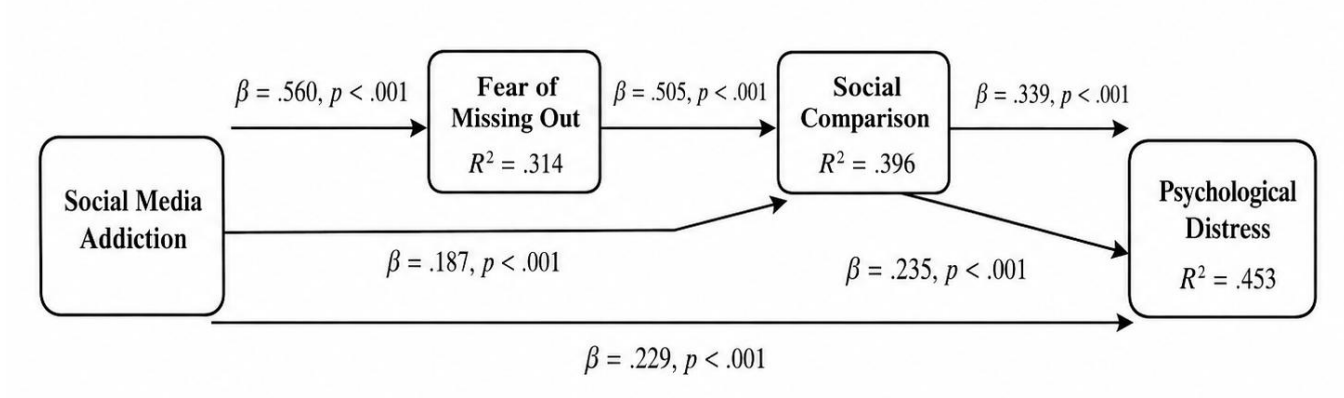
Outcome	Predictors Included in the Model	R^2	Adjusted R^2	F	df	p
Fear of missing out	Social media addiction	.314	.312	194.63	1, 426	< .001
Social comparison	Social media addiction, fear of missing out	.396	.393	139.39	2, 425	< .001
Psychological distress	Social media addiction, fear of missing out, social comparison	.453	.449	117.07	3, 424	< .001
Psychological distress, total-effect model	Social media addiction	.270	.269	157.88	1, 426	< .001

As shown in Table 4, each regression equation included in the serial mediation analysis was statistically significant. Social media addiction alone accounted for 31.4% of the variance in fear of missing out, $R^2 = .314$, adjusted $R^2 = .312$, $F(1, 426) = 194.63$, $p < .001$, demonstrating a substantial association between problematic social media use and adolescents' concerns about being excluded from rewarding social experiences. When social media addiction and fear of missing out were considered jointly, the model explained 39.6% of the variance in social comparison, $R^2 = .396$, adjusted $R^2 = .393$, $F(2, 425) = 139.39$, $p < .001$. The final outcome model containing social media addiction, fear of missing out, and social comparison explained 45.3% of the variance in psychological distress, $R^2 = .453$, adjusted $R^2 = .449$, $F(3, 424) = 117.07$, $p < .001$. By comparison, social media addiction alone explained 27.0% of the variance in psychological distress in the total-effect model, $R^2 = .270$, adjusted $R^2 = .269$, $F(1, 426) = 157.88$, $p < .001$. The increase in explained variance after fear of missing out and social comparison were introduced into the psychological distress model further demonstrated the explanatory contribution of the proposed mediating variables. Supplementary analyses controlling for age, gender, and average daily time spent on social media produced the same substantive pattern: the paths from social media addiction to fear of missing out, from fear of missing out to social comparison, and from social comparison to psychological distress remained statistically significant, and the bootstrap confidence interval for the sequential indirect effect continued to exclude zero. Thus, the observed mediation pattern could not be explained solely by differences in participants' age, gender, or overall amount of daily social media exposure.

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Figure 1

Serial Mediation Model of the Association Between Social Media Addiction and Psychological Distress Through Fear of Missing Out and Social Comparison



The pattern represented in Figure 1 supported the proposed sequential association among the study variables. Social media addiction was significantly associated with greater fear of missing out, β = .560, p < .001. Fear of missing out was subsequently associated with greater social comparison, β = .505, p < .001, and social comparison was positively associated with psychological distress, β = .339, p < .001. In addition to this sequential pathway, social media addiction had a smaller but statistically significant direct association with social comparison, β = .187, p < .001, and fear of missing out independently predicted psychological distress, β = .235, p < .001. Social media addiction also retained a direct association with psychological distress after the two mediators were included, β = .229, p < .001. Comparison of the standardized total effect, β = .520, with the standardized direct effect, β = .229, indicated that a considerable proportion of the overall association between problematic social media use and psychological distress was statistically accounted for by the two proposed mediating mechanisms. The configuration of the paths was therefore consistent with the theoretical proposition that greater problematic social media involvement is associated with heightened concern about missing the experiences of others, which is in turn related to greater comparison of oneself with peers, followed by increased psychological distress. At the same time, the remaining significant direct path indicated the presence of additional mechanisms beyond fear of missing out and social comparison through which social media addiction may be related to adolescent psychological distress.

4. Discussion

The present study examined the association between social media addiction and psychological distress among Canadian adolescents and tested the serial mediating roles of fear of missing out and social comparison. The findings supported the proposed conceptual model. Social media addiction was positively associated with psychological distress, fear of missing out, and social comparison. Fear of missing out was positively related to both social comparison and psychological distress, while social comparison was also positively associated with psychological distress. The mediation analyses further demonstrated that fear of missing out and social comparison each independently mediated the relationship between social media addiction and psychological distress. More importantly, the hypothesized serial indirect pathway was significant: higher social media addiction was associated with greater fear of missing out, which was subsequently associated with stronger social comparison, and stronger social comparison was in turn associated with greater psychological distress. The direct relationship between social media addiction and psychological distress remained significant after the mediators were included, indicating partial rather than complete mediation. Together, the findings suggest that the association between addictive social media engagement and adolescent distress is not attributable solely to the amount or intensity of digital involvement but is partly explained by the cognitive and emotional processes activated within social media environments.

The first major finding was that social media addiction was significantly and positively associated with

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psychological distress. Adolescents reporting stronger addictive patterns of social media use also reported higher levels of emotional distress. This finding is consistent with a growing literature linking excessive or problematic digital engagement with symptoms of anxiety, depression, emotional strain, and broader internalizing difficulties. Reviews of problematic internet and smartphone use have emphasized that excessive digital engagement among adolescents is frequently accompanied by psychological morbidities, including anxiety, depressive symptoms, impaired emotional functioning, and difficulties in everyday adjustment (Rathod et al., 2022; Ruckwongpatr et al., 2022). Similarly, reviews focused specifically on social media have concluded that intensive or maladaptive use may negatively affect psychological well-being, particularly when digital engagement becomes compulsive or interferes with sleep, relationships, academic functioning, and adaptive emotion regulation (Burgess, 2025; Pacocha & Gugała, 2024). The present findings therefore reinforce the distinction between ordinary social media use and addictive involvement characterized by loss of control, salience, and persistent engagement despite negative consequences.

One explanation for this relationship is that adolescents who use social media compulsively may experience repeated exposure to emotionally stimulating, socially evaluative, and rapidly changing content, while simultaneously losing opportunities for restorative offline activities. Addictive use may disrupt sleep routines, increase cognitive preoccupation, reduce face-to-face social engagement, and intensify emotional dependence on online feedback. Such patterns may contribute to persistent nervousness, low mood, restlessness, and feelings of inadequacy. The broader literature on digital-age addictive behaviors similarly indicates that excessive engagement with smartphones, social networking applications, and short-form digital content can become embedded in maladaptive reward and emotion-regulation cycles (Lu et al., 2024; Wang et al., 2025). Research examining the psychological impact of social media among Generation Z has likewise highlighted the possibility that repeated exposure to social feedback and idealized online content can create vulnerabilities to stress, insecurity, and emotional dysregulation (Hu, 2024). The present finding is therefore compatible with the view that social media addiction functions not merely as excessive screen use but as a behavioral pattern that can become integrated into adolescents' emotional functioning.

A second important finding was that social media addiction significantly predicted fear of missing out. Adolescents with stronger addictive social media tendencies were substantially more likely to report concerns that they were missing rewarding social experiences. This result is well aligned with prior studies demonstrating a close relationship between frequent social media use and FoMO. Research among adolescents has shown that greater frequency of social media use is associated with higher levels of FoMO (Anjani & Widyatama, 2023), while studies examining Instagram use have similarly identified FoMO as an important psychological correlate of intensive platform engagement (Dania et al., 2023; Gumelar, 2023). A meta-analysis also reported a robust association between FoMO and mobile phone addiction, indicating that the connection between digital dependency and fear of missing out is evident across multiple samples and contexts (Zhang, 2023). More recent systematic evidence similarly suggests that FoMO and compulsive social media use are strongly intertwined, with age and gender potentially influencing the strength of this relationship (Bakshi & Gait, 2026).

This association can be understood through the continuous-monitoring characteristics of social media. Adolescents with addictive social media patterns are repeatedly exposed to updates concerning peers' friendships, social activities, achievements, entertainment, and everyday experiences. The more frequently adolescents monitor these environments, the more opportunities they have to encounter activities in which they are not participating. This repeated exposure may increase the subjective perception that meaningful social experiences are constantly occurring elsewhere. At the same time, adolescents who become worried about missing these experiences may respond by checking social media more frequently, creating a self-reinforcing cycle between compulsive use and FoMO. Studies examining FoMO in adolescent digital interaction have emphasized that fear of missing out can shape social monitoring, connectedness needs, and sensitivity to exclusion (Meradaputhi et al., 2023). The significant relationship observed in the present study therefore appears consistent with the proposition that addictive use and FoMO mutually reinforce adolescents' dependence on continuous online connection.

Fear of missing out also significantly predicted psychological distress, and it independently mediated the relationship between social media addiction and psychological distress. This finding indicates that part of the association between addictive social media use and poorer mental health may be explained by adolescents' concerns about social exclusion and missed experiences. Previous

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evidence supports this interpretation. FoMO has been identified as a mediator linking psychological characteristics to symptoms of depression and anxiety among adolescents (Ediati et al., 2024), while symptom-network research has suggested that FoMO occupies an important position within the interconnected relationships among social networking addiction and mental health problems (Yao et al., 2025). Research examining problematic social media use has also indicated that FoMO can participate in pathways through which digital engagement affects adolescents' socio-emotional competence and internalizing difficulties (Fu et al., 2026). Furthermore, interventions designed to reduce FoMO have demonstrated improvements in associated psychological outcomes, including social anxiety, suggesting that FoMO represents a clinically relevant mechanism rather than simply a descriptive feature of social media use (Alassaf et al., 2024).

The relationship between FoMO and distress may reflect persistent social vigilance. Adolescents experiencing high FoMO may feel compelled to remain continuously aware of peer activities, respond rapidly to messages, and interpret periods of disconnection as threatening. Such concerns can create chronic psychological arousal and interfere with the ability to disengage from social evaluation. FoMO may also promote dissatisfaction by directing attention toward experiences that adolescents perceive themselves as lacking. Loneliness may intensify this process, as previous research has demonstrated a positive relationship between loneliness and FoMO (Mahanani & Arifiani, 2023). From this perspective, adolescents who already feel insufficiently connected may be particularly likely to interpret online evidence of others' social activities as confirmation of exclusion, thereby increasing distress.

The present study additionally found that social media addiction and fear of missing out both significantly predicted social comparison. Social comparison emerged as an important mediator of the association between social media addiction and psychological distress. This result is consistent with the inherently comparative structure of social media. Platforms provide continuous exposure to curated representations of peers' appearance, achievements, relationships, lifestyles, and social popularity, often accompanied by visible indicators of approval such as likes, comments, and follower counts. Such environments make comparisons unusually frequent and accessible. Research on problematic smartphone use and phubbing has demonstrated that FoMO and social comparison can operate together within mediated pathways involving maladaptive digital behavior (Bajwa et al., 2023). The present findings extend this logic to adolescent psychological distress by suggesting that comparison processes may constitute a mechanism through which problematic digital engagement becomes emotionally consequential.

The significant pathway from FoMO to social comparison is particularly important. Adolescents who fear missing out may monitor their peers more closely, and increased monitoring naturally increases opportunities for comparison. A young person who repeatedly checks whether friends are attending events, spending time together, achieving academic success, or receiving social recognition may begin to evaluate their own circumstances against these observations. Research on social media experiences among secondary and high school students has shown that digital exposure can influence peer-related perceptions and FoMO, illustrating how online environments shape adolescents' judgments about what others are doing and what they themselves should be doing (Ngo et al., 2024). Once comparisons become frequent, adolescents may perceive themselves as less successful, less socially connected, or less attractive than their peers, especially because social media content tends to emphasize favorable self-presentation. This mechanism provides a plausible explanation for why social comparison was significantly associated with psychological distress in the present study.

The central contribution of the study was the significant serial mediation pathway from social media addiction to fear of missing out, from fear of missing out to social comparison, and finally to psychological distress. This finding supports a sequential psychological interpretation of the association between problematic social media engagement and adolescent mental health. Social media addiction may first increase vigilance toward peers' online activities, thereby increasing FoMO. Elevated FoMO may then encourage adolescents to monitor and evaluate the experiences of others more closely, increasing social comparison. Persistent comparison may subsequently contribute to psychological distress by reinforcing feelings of inadequacy, exclusion, or dissatisfaction. This interpretation is compatible with previous mediation research indicating that FoMO and social media addiction can function sequentially in relation to distress (Koç et al., 2023). It is also consistent with adolescent serial mediation findings showing that social media addiction, FoMO, and other emotional and behavioral processes can jointly contribute to depressive outcomes (Ntumi et al., 2025).

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The serial pathway also helps reconcile findings from studies that have examined individual components of the model separately. FoMO has been associated with internet addiction among high school students (Setyaningsih et al., 2023), problematic smartphone behavior has been linked with negative affectivity and FoMO (Jin et al., 2023), and broader research has shown that adolescents' digital social interactions are increasingly organized around monitoring and avoiding perceived exclusion (Prasetyo et al., 2022). The present findings indicate that these mechanisms may be understood more effectively as elements of a connected process rather than independent risks. Once social media becomes a central means of maintaining social awareness, adolescents may become increasingly concerned about remaining connected; this concern may promote continued observation of peers, and that observation may invite comparisons that adversely affect emotional well-being.

5. Conclusion

The continued significance of the direct effect of social media addiction on psychological distress after FoMO and social comparison were included indicates that these mediators explain only part of the relationship. Other mechanisms are likely to contribute, including sleep disturbance, cybervictimization, reduced physical activity, emotional dysregulation, loneliness, academic distraction, and problematic reassurance seeking. The persistence of a direct effect is also compatible with the broader literature showing that digital addiction is a multifactorial phenomenon embedded in affective, behavioral, and social processes (Ndayambaje & Udohchukwu, 2025). Research emphasizing coping mechanisms among adolescents similarly suggests that the psychological effects of social media depend partly on how young people respond to online stressors and regulate their behavior (Zhang et al., 2023). Family relationships and supportive offline environments may also shape these processes by strengthening adolescents' sense of belonging and reducing dependence on online validation (Hendrawan et al., 2023). Consequently, the present model should be understood as one important pathway within a broader system of determinants of adolescent mental health.

6. Limitations & Suggestions

Several limitations should be considered when interpreting the findings. First, the cross-sectional design does not permit definitive conclusions regarding temporal or causal relationships among social media addiction, fear of missing out, social comparison, and psychological distress. Although the serial ordering of the mediators was theoretically specified, alternative directional relationships remain possible. Second, all variables were assessed using self-report instruments, which may be influenced by recall bias, social desirability, response tendencies, or participants' current emotional states. Third, the sample consisted of Canadian adolescents enrolled in secondary schools, which may limit generalizability to adolescents who are not attending school, younger children, emerging adults, or adolescents from substantially different sociocultural environments. Fourth, the study did not distinguish between specific social media platforms or types of online activity; active communication, passive browsing, content creation, and algorithmically driven short-form video consumption may have different psychological effects. Finally, potentially relevant variables such as socioeconomic status, offline social support, sleep quality, cyberbullying experiences, pre-existing psychological symptoms, personality traits, and family functioning were not included in the primary model.

Future studies should employ longitudinal and prospective designs to determine whether social media addiction precedes changes in fear of missing out, social comparison, and psychological distress over time and to test reciprocal relationships among these variables. Experimental and ecological momentary assessment approaches could also clarify how immediate exposure to peer-related social media content influences FoMO, comparison tendencies, and emotional states in everyday settings. Researchers should distinguish between specific platforms, patterns of use, and forms of engagement to determine whether passive browsing, social feedback seeking, appearance-focused content, or short-form video consumption produce different psychological pathways. Future studies should also investigate potential moderators, including gender, age, self-esteem, resilience, loneliness, family support, emotion regulation, and baseline mental health. Cross-cultural comparisons would be valuable for determining whether the serial mediation model operates similarly across societies with different norms regarding peer relationships, social media use, and adolescent autonomy. Intervention studies should further test whether directly reducing FoMO or maladaptive social comparison weakens the association between problematic social media use and psychological distress.

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The findings have several implications for schools, families, counselors, and adolescent mental health professionals. Prevention efforts should move beyond recommendations focused solely on limiting screen time and should address the psychological processes occurring during social media use. School-based digital well-being programs can help adolescents recognize compulsive checking, identify triggers for fear of missing out, critically evaluate curated online content, and develop healthier strategies for responding to social comparison. Counselors working with adolescents who report anxiety, low mood, or persistent social media engagement should assess not only the amount of platform use but also the extent to which clients feel compelled to remain connected, monitor peers, or evaluate themselves against idealized online portrayals. Practical interventions may include scheduled periods of digital disengagement, cognitive restructuring of comparison-based beliefs, strengthening offline social relationships, emotion-regulation training, and development of self-worth that is less dependent on online feedback. Parents and schools can also support adolescents by establishing predictable technology boundaries while maintaining open, nonpunitive discussions about social exclusion, peer pressure, online validation, and the emotional consequences of digital comparison.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

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