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Exploration of the association between social media addiction, self-esteem, self-compassion and loneliness

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Highlights

- Loneliness enhances social media addictive behaviors
- Self-compassion acts as a mediator for social media addiction and loneliness
- Self-esteem is not associated with social media addiction
- The number of followers is found to contribute to social media addiction

Abstract

Excessive social media use is associated with several adverse psychological outcomes, including psychological distress and lower levels of self-esteem. Research reports that feelings of loneliness enhance social media abuse, with individuals reporting stronger engagement in social media. However, self-esteem and self-compassion, considered complementary constructs, mitigate social media use. This research explores the association between social media and loneliness and how self-esteem and self-compassion may vary. A sample of 426 Greek adults fulfilled the first adapted version of the Social Media Disorder Scale to assess social media addiction, the UCLA loneliness scale, Rosenberg's self-esteem scale, and the Self Compassion Scale. Structural equation modeling was used, along with Analysis of Variance, to estimate the role of demographics in excessive social media use, such as gender, education, age, and the number of followers. Results revealed that self-esteem was not associated with social media use or other behaviors. Loneliness was positively associated with social media use. Alternatively, higher levels of self-compassion were associated with lower social media use. Self-compassion acted as a mediator with individuals feeling loneliness and exhibiting lower levels of social media addiction. Possible explanations, future directions, and factors contributing to the insignificant relationship between self-esteem and social media are discussed.

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1. Introduction

Social media has become an increasingly popular activity worldwide for users of all ages and nationalities, and concerns have been raised regarding their maladaptive use (Kuss & Griffiths, 2017). According to Andreassen and Pallesen (2014), social media maladaptive use, or addictive behavior, refers to an individual's excessive need to spend each and every day considerable time and energy on social media. As such, these individuals tend to neglect important aspects of their lives, such as ignoring friends and/or relations, missing important deadlines at work or studies, quitting hobbies to get extra time for engagement in social media, etc. Social media additive behavior has already been associated with many negative consequences for users (Keyte et al., 2021; Kuss et al., 2014; Mitropoulou et al., 2022; Sun & Zhang, 2021). Due to these alarming outcomes, social media addiction is becoming one of the most important health issues worldwide that requires systematic examination.

Research on social media addiction thus far validated significant associations between feelings of isolation, anxiety, and depression (e.g., Cuadrado et al., 2020; Mitropoulou et al., 2022), psychological distress (e.g., Keyte et al., 2021), problematic job performance (Kuss et al., 2014) and other maladaptive behaviors. However, research on social media and self-esteem, namely the individual's subjective value of oneself, remains ambiguous (Cingel et al., 2022). Studies present diverse patterns of small yet significant relations between self-esteem and social media addiction. Most of the research pertains to excessive social media use, which tends to lessen an individual's self-esteem (e.g., Andreassen et al., 2017; Tibber et al., 2020). Some researchers have identified no experimental effects on individuals' time on social media and their self-esteem, even when specific social media platforms were examined (Sherlock & Wagstaff, 2019). Few studies have reported more complex patterns of association between self-esteem and social media (Subrahmanyam et al., 2020). For example, Valkenburg and colleagues (2017) found that social media use (specifically getting feedback from friends) tends to ameliorate the users' self-esteem in the long term. Moreover, Cingel and Olsen (2018) found that although increased use of the Facebook social media platform tends to reveal lower levels of self-esteem to its users, how users report the platform's use seems to excessively ease the negative linear relation between their self-esteem and their social media platform. Nonetheless, self-esteem is an important contributor to individuals' well-being, and its impact on social media is significant in most research. Literature flags a negative relation between self-esteem and social media with non-significant behavioral differentiations daily (Subrahmanyam et al., 2020). Thus, focusing on the same-day effect and examining different behavioral patterns with different characteristics and traits will contribute to our understanding of maladaptive social media use. This research aims to provide new evidence on the relationship between self-esteem and social media by further investigating their relationship with loneliness and self-compassion in Greek adults.

1.1. Social Media Addiction

Although social media use is principally considered non-problematic, additive non-clinical behavioral patterns have also been documented. Despite the increased research interest, there is no consensus on how social media addiction (referenced as SMA) could be determined and which criteria indicate addiction, with researchers usually focusing on similar criteria and theorizing, like Internet Gaming Disorder. The American Psychiatric Association proposed nine behavioral criteria as indicators for determining Internet Gaming Disorder (5th ed.; American Psychiatric Association, 2013). These criteria share common ground with several other addictive behaviors, too, such as drug and alcohol addiction. In like manner, van den Eijnden and colleagues (2016) adopted the nine criteria for defining Internet Gaming Disorder in their research. They proposed that an individual endorses at least five of the nine criteria over a 12-month to be characterized as problematic/additive. These criteria are) the dominance of social media in daily life (preoccupation), 2) the uprising of unpleasant feelings when the user is not able/allowed to use the stimulus (withdrawal), 3) the ever-increasing need to spend more time on social media each day (tolerance), 4) the unsuccessful attempt to control social media usage (persistence), 5) the loss of interest in hobbies and activities, due to the excessive preoccupation with the stimulus (displacement), 6) the continuation of the excessive use of the social media, despite the knowledge of psychosocial problems (continuation), 7) the deception of important others (e.g., family members, friends) regarding the user's daily utility of the stimulus (deception), 8) the use of social media as a mean of relieve negative mood (escape) and finally 9) the loss of significant relationships, jobs and education/career opportunities due to the maladaptive use of the stimulus (problems).

Researchers have developed several measures to assess SMA. Some measures focus on specific social media platforms (e.g., Andreassen et al., 2012), while others focus on a specific nomological network, such as

the Social Media Disorder Scale (SMDS; van den Eijnden et al., 2016). The development of the SMDS is based on the nine criteria indicated by the DSM-V (APA, 2013). Although the SMDS is widely used and tested in different cultures, a Greek adaptation of the measure is not yet validated (Kokka et al., 2022). Such analysis is essential since it verifies whether a construct is recoverable in a set of item scores to a predetermined structure in a different culture (Bandalos & Gerstner, 2016). Therefore, justification for the use of the Greek-SMDS in research is essential.

1.2. Loneliness and Social Media

Loneliness refers to the individuals' feelings of not having a meaningful emotional relationship with significant others from personal or broader social networks, such as close friends, colleagues, and neighbors (Russell, 1996). Loneliness is characterized as a chronic status; individuals often experience loneliness, even when surrounded by friends or family. Feelings of loneliness result in significant deterioration in individuals' psychological well-being (O'Day & Heimberg, 2021). They are a significant predictor of suicidal ideation and behavior, especially among young adults (McClelland et al., 2020). Thus, establishing the association between social media addiction and loneliness seems imperative because both may be seriously harmful to users, especially young ones. Previous research explored the potential causal relations between loneliness and Facebook use. Individuals feeling lonely tend to use social media more often online to compensate for lacking in-person relations. Although loneliness is an important determinant of social media addiction, more research is needed to determine whether social media abuse also predicts loneliness (e.g., O'Day & Heimberg, 2021). Thus, the focus of this research is to examine the association of loneliness to social media and, specifically, whether loneliness triggers increasing online engagement in social media or whether social media is the source of discouraging social comparisons, exacerbating feelings of loneliness in adults. Therefore, it is hypothesized that loneliness will be positively associated with SMA.

1.3. Self-Esteem and Social Media

Self-esteem refers to the individual's perception of their personal worthiness (Rosenberg, 1965). Self-esteem is subjective; it does not necessarily depend on real talent and/or abilities but reflects self-acceptance and self-respect (Andreassen et al., 2017; Cingel et al., 2022). Self-esteem greatly impacts personal growth and has been associated with different types of behaviors and addictions like social media addiction (Moqbel & Kock, 2018).

Nowadays, individuals compare themselves to others through their social networks rapidly and relentlessly, with researchers indicating mixed results. Self-esteem has been linked positively to social media (Valkenburg et al., 2017). Users tend to feel more sociable and accepted by others; they form social relations through their social media profiles, potentially growing strongly as maladaptive in-person relations (e.g., being more addicted to followers than friends). However, most research reports negative associations between self-esteem and social media (e.g., Acar et al., 2022; Cingel et al., 2022). In their meta-analysis, Saiphoo et al. (2020) found small yet significant negative correlations between self-esteem and SMA, with higher levels of SMA associated with lower levels of self-esteem; low self-esteemed individuals tend to overly engage in social media and develop weaker online relationships on platforms, which are perceived as resilient relationships and consequently lead them to problematic social interactions (Barthorpe et al., 2020). However, the association between social media and self-esteem remains sparse, and more research is required to assist our understanding further. Therefore, it is hypothesized that self-esteem will be significantly associated with SMA, yet the direction of their association is not predicted.

1.4. Self-Compassion and Social Media

Self-compassion refers to self-acceptance, namely the understanding, acknowledgment, and transformation of personal suffering through self-kindness, self-acceptance, and mindfulness (Neff, 2003). Self-compassion is defined by three interactive components, each consisting of two opposite facets. The first facet is self-judgment/self-kindness, which refers to the ability to be caring and compassionate to oneself rather than being harsh, angry, and self-critical towards life and people. The second component pertains to common humanity and isolation. Isolated individuals are prone to social distancing and feel unable to cope with personal failure in contrast to individuals who exhibit common humanity and, thus, are considered more socially active and prone to human contact. The third component is mindfulness/over-identification. Mindfulness refers to the

awareness and acceptance of life's challenging experiences in a balanced way. Alternatively, over-identified individuals tend to suppress and/or exaggerate their negative emotions and feelings.

Self-compassion is an overlapping construct of self-esteem since both share nomological similarities and unique features (Muris & Otgaar, 2023). Since self-compassion and self-esteem have been strongly and positively associated, they are used in proactive interventions associated with addictive behaviors, such as problematic mobile phone use (Liu et al., 2020), social media (Mitropoulou et al., 2022) and emotional well-being and shame proneness (Neff, 2003). Individuals exhibiting social media addiction tend to express lower levels of self-compassion and feel less emotionally secure (Mitropoulou et al., 2022). However, self-compassion is also found to act also as a mediator for SMA (e.g., Keyte et al., 2021). Individuals characterized as self-compassionate report less maladaptive behaviors related to social media. Therefore, it is hypothesized that self-compassion will be negatively associated with SMA and loneliness and will mediate the relationship between loneliness and SMA.

1.5. Demographics and Social Media

Social media additive use is consistently more prevalent among women than men; women are more inclined to express problematic behavioral patterns on social networking interaction (Andreassen et al., 2017; Kuss et al., 2014). Research also reports that younger users are more prone to remain constantly active and thus express excessive social media use than older users (Andreassen et al., 2017; Cingel et al., 2022). Finally, the number of followers is perceived as a risk factor for SMA; users becoming more popular on social media tend to experience additive behaviors to a higher degree (Burrow & Rainone, 2017; Longobardi et al., 2020). Therefore, it is hypothesized that gender and number of followers will be positively associated with SMA, while age and education will exhibit a negative relation to SMA.

1.6. Research Objectives

The present study has four objectives. The first is to examine the association between social media, loneliness, self-esteem, and self-compassion; it is proposed that self-esteem will be significantly associated with self-compassion, and both constructs will be negatively associated with loneliness and social media addiction. Second, self-compassion will affect the relationship between loneliness and social media addiction, with stronger associations being found by individuals who exhibit higher levels of self-compassion. Thirdly, this research further aims to explore the psychometric properties of the Greek-SMDS by providing its first systematic adaptation to Greek social media users. Finally, demographic characteristics are examined among SMA and self-esteem to identify whether certain age groups, gender, and/or educational levels are more prone to maladaptive social media use and self-esteem. Such examination is important because it will further enhance our knowledge of the maladaptive social media behaviors among Greek adults.

2. Method

2.1. Item translation

The SMDS items were translated based on the committee translation process (Harkness & Schoua-Glusberg, 1998). This process includes three stages. During the first stage, three bilingual experts translate the original version of the SMDS into Greek in parallel. At a different time, the bilingual experts review both three created adaptations altogether in a meeting and provide consent for the final, unified, and refined version of the scale. During the final stage, a fourth additional bilingual expert acts as the final verifier for the adapted items and adjudicates any potential disagreement that may appear during the meeting that took part in the second stage of the process. The final translated Greek SMDS items that resulted from the committee translation process can be found in Table 1. All nine items are rated with a binomial response process, with yes (having a score of 1) and no (having a score of 0).

2.1. Participants and Procedure

Four hundred and twenty-six (n = 426) participants were recruited via snowball sampling. This cross-sectional research was conducted in Greece, and data collection occurred between July and October 2022. The inclusion required participants to be over 18 years old and to have an active profile account on at least one social media application (e.g., Facebook, Instagram, Viber, Pinterest, etc). Participants reported a mean age of

26 (SD = 8.43), ranging between 18 and 65 years, and 295 (69.2%) were females. The demographic characteristics of the participants are presented in Table 2.

Table 1. Criteria and items of the Social Media Disorder Scale in English and Greek

Item number	Criterion	Item wording English	Item wording Greek
1	Preoccupation	… regularly found that you cannot think of anything else but the moment you will be an use social media again?	…συνειδητοποιούσες συχνά ότι δεν μπορούσες να σκεφτείς κάτι άλλο, παρά τη στιγμή που θα χρησιμοποιήσεις ξανά τα μέσα κοινωνικής δικτύωσης;
2	Tolerance	…regularly felt dissatisfied because you wanted to spend more time on social media?	…ένιωθες συχνά δυσαρεστημένος/η, γιατί ήθελες να αφιερώσεις περισσότερο χρόνο στα μέσα κοινωνικής δικτύωσης;
3	Withdrawal	…often felt bad when you could not use social media?	…ένιωθες συχνά άσχημα επειδή δε μπορούσες να χρησιμοποιήσεις τα μέσα κοινωνικής δικτύωσης;
4	Persistence	…tried to spend less time on social media, but failed?	…προσπάθησες να αφιερώσεις λιγότερο χρόνο στα μέσα κοινωνικής δικτύωσης, αλλά δεν τα κατάφερες;
5	Displacement	…regularly neglected other activities (e.g. hobbies, sport) because you wanted to use social media?	…παραμελούσες συχνά άλλες δραστηριότητες (π.χ. χόμπυ, σπορ) επειδή ήθελες να χρησιμοποιήσεις τα μέσα κοινωνικής δικτύωσης;
6	Problem	…regularly had arguments with others because of your social media use?	…διαφωνούσες συχνά με άλλους εξαιτίας της χρήσης που έκανες με τα μέσα κοινωνικής δικτύωσης;
7	Deception	…regularly lied to your parents of friends about the amount of time you spend on social media?	…έλεγες συχνά ψέματα στους γονείς ή στους φίλους σου για τον χρόνο που αφιέρωνες στα μέσα κοινωνικής δικτύωσης;
8	Escape	…often used social media to escape from negative feelings?	…χρησιμοποιούσες συχνά τα μέσα κοινωνικής δικτύωσης για να ξεφεύγεις από δυσάρεστα συναισθήματα;
9	Conflict	…had serious conflict with your parents, brother(s) or sister(s) because of your social media use?	…είχες σοβαρούς καβγάδες με τους γονείς, τον αδερφό(-ούς), την αδερφή(-ές) σου εξαιτίας της χρήσης των μέσων κοινωνικής δικτύωσης;

Due to the online assessment, missing values and participation rates were not reported. Participants were recruited on a volunteer basis and invited to participate in the research by sharing the online survey link via their social media profiles. The link redirected individuals to the information sheet, and after consent, participants got access to the research questionnaires. The survey took approximately 15 minutes to complete. Ethical approval was granted by the University of Crete Ethics Committee (protocol no. 117/2022).

Table 2. Demographic characteristics of participants (*N*= 426)

	N	%	χ^2	*p*
Gender			63.1	< .001
Male	131	30.8		
Female	295	69.2		
Status			722	<.001
University student	260	61		
Employed	113	26.5		
Self-employed	23	5.4		
Unemployed	25	5.9		
Pensioner	5	1.2		
Education			484	<.001
Basic	7	1.6		
Higher	251	58.9		
University graduate	137	32.2		
Msc or PhD	31	7.3		
Number of followers			166	<.001
0-500 followers	165	39.6		
501-1000 followers	159	38.4		
1000-3000 followers	80	22		
>3001 followers	11	3.1		

2.2. Measures

2.2.1. Social Media Addiction

Social media addiction was measured with the Greek-SMDS, which consists of nine self-report items, each associated with a core addiction criterion (van den Eijnden et al., 2016). All items follow a binomial response process (Yes/No) regarding the use of social media within a 12-month period of reference. The results section provides information regarding the adapted measure's validity and reliability.

2.2.2. Loneliness

Loneliness was measured with the short version of the 8-item self-report UCLA Loneliness scale (Hays & DiMatteo, 1987). The measure assesses subjective feelings of loneliness over a period of time. Response categories range from 1 (never) to 4 (often). Internal consistency for the scale was α= .90. Anderson and Malikiosi-Loizos (1992) adapted the scale to Greek.

2.2.3. Self-esteem

Self-esteem was measured with the 10-item self-report scale (Rosenberg, 1965). The measure assesses personal sentiments of self-respect and self-acceptance. Response categories range from 1 (totally disagree) to 5 (totally agree). Internal consistency for the scale was α= .84. The scale is adapted to Greek with internal consistency reliability of α = .82 (Koumi, 1994).

2.2.4. Self-compassion

Self-compassion was measured with the Self-Compassion Scale (SCS), which consists of 26 items, with a 5-point Likert-type response scale from 1 (almost never) to 5 (almost always), distributed into six facets self-kindness (five items; α = .70), self-judgment (five items; α = .77), common humanity (four items; α = .72), isolation (four items; α = .71), mindfulness (four items; α = .72) and over-identification (four items; α = .76). The Greek-SCS has a reliability of α = .87 (Mantzios et al., 2015).

2.4. Data Analysis

Analysis was conducted using Jamovi software (the Jamovi project, 2023). Data normality was evaluated with the Shapiro-Wilk normality test (*p* values >.05 indicating data normality). CFA was contacted to validate the factor structure of all measures used (McCallum & Austin, 2000). Structural equation modeling was tested next to examine the fit of the proposed structural model. The diagonal weighted least square estimator method was used for the analysis because it exceeds in accuracy regarding another estimator, especially when the sample is small, non-normally distributed, and pertains to few model parameters (DiStefano, 2016). The χ^2 test was assessed by calculating the degrees of freedom (χ^2/df), with a ratio of ≤ 2 indicating a good fit. Also, the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) are examined, with values > .90 indicating adequate fit (Byrne, 2016). Also, the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Residual (SRMR) are estimated, with values < .05 indicating an excellent fit, while values ranging from .05 to .08 indicate a reasonable fit. The normal Bootstrap method was also employed, with 10,000 sample replications, to examine the mediation effect of self-compassion on loneliness and SMA. This method assesses the indirect effects of loneliness (independent variable) on social media addiction (dependent variable) through self-compassion, which is considered the mediator. Self-compassion will have a significant indirect effect if 0 is not included within the intersections of the 95% Confidence Intervals (Preacher & Hayes, 2008). Finally, Analysis of Variance (ANOVA) and Linear Regression Analysis were used to examine the variations between different groups of individuals and to identify potential risk factors. The data and analyses used for this research are available at the open science framework repository at (doi: 10.17632/txr34h8bgs.1).

3. Results

The psychometric properties of the SMDS were initially tested. Research prerequisites were examined prior to analysis. The factor analysis results revealed that the unidimensional model of SMDS did not fit the model adequately. Inspection of the modification indices revealed high associations between item pairs 9-6 and 8-4. However, it was preferred to associate only items 9 and 6 because these items share similar wording and meaning. Implementation of the reported modification improved the fit of the model [χ^2 (26) = 81.4, p< .001, CFI = .902, TLI = .865, SRMR = .048, RMSEA = .071 (CIs .054 - .088)]. Standardized estimates were > .40 for all

items. The internal consistency of the measure was ω = .74. To examine the research hypotheses, correlation coefficients are also examined and presented in Table 3. Results reveal a significant positive association between loneliness and social media and a significant negative relationship between social media and loneliness to age, education, self-judgment, isolation, and over-identification. Interestingly, self-esteem and gender were found to have insignificant associations with SMA, loneliness, and most self-compassion facets.

The full structural equation model was then tested to examine whether self-compassion mediates the link between loneliness and social media. A visual presentation of the model is provided in Figure 1. This proposed meditational model is illustrated to predict social media addiction. The model tests loneliness as the independent variable, social media addiction as the dependent variable, and self-compassion as a potential mediator, suggesting that loneliness will have a significant direct effect on social media addiction and an indirect one through self-compassion. The model revealed a good fit to the data [χ^2 (166) = 403, ρ< .001, CFI = .902 TLI = .888, SRMR = .058, RMSEA = .058 (CIs .051 - .065)].

Table 3. Correlations between research variables

	Mean	SD	1	2	3	4	5	6	7	8	9
1. SMDS	1.55	1.76	-								
2. UCLA	40.1	8.49	.24***	-							
3. Self-esteem	19.4	7.14	.05	-.05	-						
4. SCS over-identification	10.8	3.51	-.24***	-.35***	-.12*	-					
5. SCS self-kindness	16.6	4.22	-.07	-.33***	.10*	.29***	-				
6. SCS self-judgment	13.7	4.27	-.21***	-.30***	-.07	.60***	.34***	-			
7.SCS common humanity	12.8	3.46	-.05	-.21***	.07	.21***	.59***	.15**	-		
8. SCS isolation	12.7	3.66	-.33***	-.55***	-.02	.58***	.29***	.60***	.46**	-	
9. SCS mindfulness	13.9	3.16	-.09	-.22***	.00	.25***	.62***	.07	.57***	.17***	
10. Gender	-	-	.08	-.03	.02	-.13**	.01	.01	-.02	-.00	-.10*
11. Age	-	-	-.25***	-.08	-.27**	.19***	.12*	.13**	.10*	.14**	.14
12. Educational level	-	-	-.10*	-.14**	-.13**	.13**	.03	.10	.06	.15**	.02
13. Number of followers	878	981	.16**	-.06	-.03	-.03	.03	-.06	.09	-.05	.08

Note. N =426; *ρ< .05**ρ< .01, ***ρ< .001; SMDS = Social Media Disorder Scale; UCLA = Loneliness Scale; SCS = Self-Compassion Scale.

Finally, an ANOVA was conducted to demonstrate the difference between social media and users' age, gender, education, and the number of followers within social media platforms. Results reveal small yet significant differences in age for both self-esteem and social media use. Very young (<25 years old) and middle-aged adults (above 35 years old) report increased feelings of confidence [$F_{(2)}$ = 6.303, ρ = .002, η^2= .03] and spent more time on social media [$F_{(2)}$ = 8.28, ρ<.001, η^2= .04], than adults between 26 to 34 years old. Moreover, significant differences were also found among the number of followers [$F_{(2)}$ = 3.618, ρ = .028, η^2= .02]. Interestingly, only the number of followers is found to be a significant risk factor for exhibiting SMA [F(8, 405)= 2.98, ρ =.003; β = 0.17, ρ< .001]. Results suggest that many followers (>3000) constitute the potential risk factor for addictive tendencies to social media. It is also interesting to note that insignificant results have been reported regarding social media users' gender, age, and/or educational level.

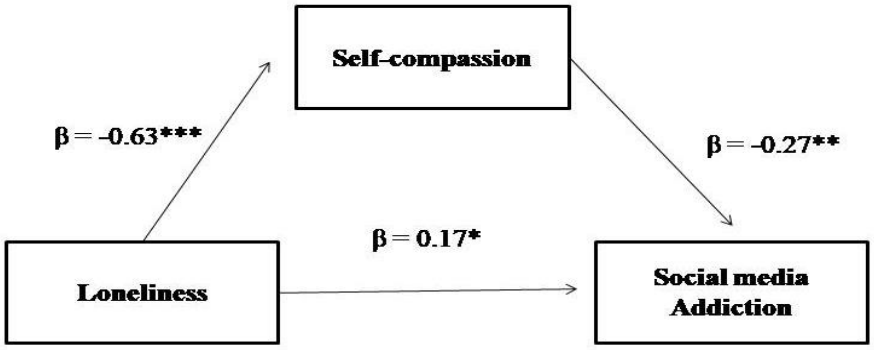

Figure 1. Structural equation model of social media, loneliness, and social-compassion. Notes: * ρ = .041, ** ρ =.002, ***ρ<.001

The factor loadings of the structural equation model were all statistically significant at $\rho < .001$ and are presented in Table 4. The standardized loadings reveal the magnitude of each variable to its latent variable; the higher the values, the stronger the association between the latent and the observed variables. Results in Table 4 reveal that all negative facets of self-compassion strongly influence the construct. In contrast, all variables of SMDS and loneliness reveal mostly moderate loadings to their designated construct.

Table 4. Standardized and unstandardized loadings for the structural equation model.

Parameter estimates	Unstandardized loadings (SE)	Standardized loadings
1. loneliness → item 2	1.00	.44
2. loneliness → item 3	1.19 (0.15)	.65
3. loneliness → item 9	0.89 (.14)	.41
4. loneliness → item 11	1.39 (.16)	.76
5. loneliness → item 14	1.49 (.17)	.82
6. loneliness → item 15	0.90 (.13)	.48
7. loneliness → item 17	1.40 (.14)	.77
8. loneliness → item 18	1.33 (.16)	.65
9. SCS → over-identification	1.00	.70
12. SCS → self-judgment	1.24 (.10)	.72
13. SCS → isolation	1.28 (.09)	.86
14. SMDS → item 1	1.00	.58
15. SMDS → item 2	0.87 (.10)	.62
16. SMDS → item 3	0.82 (.11)	.48
17. SMDS → item 4	1.19 (.15)	.48
18. SMDS → item 5	0.95 (.12)	.50
19. SMDS → item 6	0.57 (.09)	.38
20. SMDS → item 7	0.58 (.08)	.43
21. SMDS → item 8	1.14 (.16)	.45
22. SMDS → item 9	0.51 (.07)	.40

The tested meditational model predicted the hypothesized relations. The mediation model's results and bootstrap confidence intervals, are presented in Table 5. They reveal that almost all effects do not intersect the value of zero, thus verifying the magnitude of the indirect effect. The exception seems to be the direct effect of loneliness on SMD, which intersects zero and thus reveals a non-significant output. Self-compassion, focusing on the negative facets of the construct, is considered an important mediator for mitigating social media addiction.

Table 5. Mediation of the effect of loneliness by SMD through self-compassion

		b	*z*	*P*	95% CI	
Loneliness	Direct to SMD	0.170	1.74	.041	-0.012	0.150
	Indirect to SMD	0.168	2.88	.004	0.025	0.121
	Direct to self-compassion	-0.626	-8.07	<.001	-4.151	-2.524
Self-compassion	Direct to SMD	-0.268	-2.88	.004	-0.036	-0.007

Note. *N*=426, Bootstrap sample size = 10000, CI=confidence interval

4. Discussion

The present study explores the association between loneliness and social media use and their relation to self-compassion. Findings partially confirm our first hypothesis: social media is positively related to loneliness, and both constructs are negatively related to self-compassion, education, and age. However, it is important to note that loneliness represents a trend rather than a statistically significant outcome in this research due to the insignificant outcome of the bootstrap analysis regarding the direct association with SMA. These results further illustrate the complexity of the association between loneliness and social media, supported by previous research. For example, Mao, Fu, and Huang (2023) identified different relationship patterns between loneliness and social media use. Specifically, they found that loneliness is negatively related to the active use of social media. Thus, texting friends, updating personal status, and uploading photos help decrease the subjective emotional experience of loneliness. Alternatively, loneliness insignificantly correlates to the passive way of using social media. These namely behaviors are not necessarily dynamically engaged in communicating with others but rather passively, like browsing other users' profiles and reading comments from third parties. Researchers identified indirect linkages between social media use and loneliness through mediators, such as interpersonal satisfaction and fear of missing out. Similarly, Yang and colleagues (2021) also found that active social media use is negatively related to feelings of loneliness, suggesting that how we engage with social media greatly influences feelings of loneliness in daily life. In this research, the measure used adopts the nine clinical criteria for evaluating addiction, as initially proposed for Internet Gaming Disorder. However, it does not assess the users' active/passive communicative behaviors. Estimating such information would further value our knowledge of SMA to the Greek population, and such practice is proposed for future research.

Moreover, self-esteem is not associated with SMA, as reported in the first hypothesis. Findings reveal a non-significant relation and contradict previous research since most of the literature indicates that SMA is mainly associated with lower levels of self-esteem (Andreassen et al, 2017; Cingel et al., 2022; Saiphoo et al., 2020). Cultural differences could be a rationale for this variation; Greeks could generally be less active and less attached to social media, reducing the social media effect on their mental well-being. However, previous research indicates that Greek adults present similar patterns of social media use, and critical cut-off scores on social media addiction were reached by a relatively low percentage of the Greek sample as reported in different cultures (Mitropoulou et al., 2022).

Non-significant associations between self-esteem and social media use have been reported in the literature (e.g., Kircaburun, 2016). In his meta-analysis, Huang (2022) analyzed the association between social media use and self-esteem and reported variations within research, possibly due to gender differences; SMA and self-esteem correlation was stronger for samples with more male participants than female ones. However, another explanation could be that most researchers (over 50%) use Rosenberg's scale. This measure's psychometric properties remain scrutinized (Schmitt & Allik, 2005). Although the measure is constructed under a unidimensional factor structure model, it exhibits diverse results in several replications, causing researchers to explore alternative models, such as two-factor models, with items grouping into negative and positive factors (Gnambs et al., 2018), bifactor models, comprised by a general self-esteem factor and two specific sub-factors depending on the positive and negative response of the items (Marsh et al., 2010), or finally short-forms scales, aiming at improving the measure's consistency and stability (Monteiro et al., 2022). The challenge remains whether such misfits originate from the measure's incapability to capture the full spectrum of the construct under scrutiny. Another important issue that needs to be specified is whether the model's misfit depends on cultural variations (e.g., Bandalos & Gerstener, 2016; Schmitt & Allik, 2005). The results of the present analysis confirm the misfit of the unidimensional model to the data, thus calling attention to re-examining and/or re-developing a new, improved measure for assessing self-esteem.

To address our second objective, the mediating role of self-compassion was also examined in relation to loneliness and SMA. Findings confirm the second hypothesis: self-compassion mediates the use of social media by individuals perceived as lonely. Exploration of findings through mediation confirmed the relationship between loneliness, social media addiction, and self-compassion; moreover, self-compassion fully explains how it enables a positive relationship. Individuals who acknowledge personal suffering, are compassionate to them and accept life's challenging experiences in a balanced way, mitigate the excessive, addictive use of social media despite and protect their selves even if they are perceived as lonely. Individuals who use social media daily tend to feel lonelier and socially insecure when interacting via social media platforms (Muris & Otgaar, 2023; O'Day & Heimberg, 2021). Users engaging in social media tend to evaluate their behavior negatively, consequently influencing their perceived lack of close in-person relations. These results suggest that interventions promoting

psychological well-being and social media healthy habits must focus on self-compassion to alter the negative impact of social media and loneliness (e.g., Keyte et al., 2021).

This research contributes to the literature in several ways. Initially, it is the first research that examines social media addiction, loneliness, and the mediating role of self-compassion. Intervention programs could focus on self-compassion to enhance psychological well-being and mitigate addictive behaviors. Secondly, it further enhances our knowledge of the complexity of social media use and self-esteem. It highlights the importance of using sound psychometric tools for research and clinical purposes (Kuss & Griffiths, 2017). Research should focus on more complex models to assess the effect of social media on psychological well-being. For example, it may not be the number of followers but the type of interaction one maintains with each one; users interact daily with only a few followers, those of his/her friendly party. Such interaction indicates a more habitual behavior, which may be important in examining the mental well-being of social media users (Bayer et al., 2022). Another important finding is the negative association of social media and the negative facets of self-compassion. Our results align with those of Mitropoulou and colleagues (2022); social media users feel less self-critical and angry, less prone to social distancing, and more able to cope with personal failures since they can control negative emotions and feelings. Finally, findings revealed that adults aged 25 or less and over 35 are more confident and frequent social media users, with significant differences in their number of followers than those aged between 26 and 34.

An important issue that needs to be addressed is how social media use is interpreted. The literature cites several definitions regarding understanding social media's maladaptive behavior, which is referred to as addiction (Andreassen & Pallesen, 2014; Marino et al., 2018; Sun & Zhang, 2021). However, such differences lead to deficiencies in the concept's psychometric assessment. Specific measures assess dispositions and self-perceptions of social media use (Andreassen et al., 2012; van de Eijnden et al., 2016), while other measures focus on the behavioral patterns users express while being active social media (Mao et al., 2023). Such inconsistencies hinder research findings, with variations being identified in several behaviors and attitudes. The assessment of SMA should incorporate a more holistic, integrated approach than merely adopting clinical criteria; emphasis should be given equally to the behavioral patterns expressed by maladaptive users and their personal characteristics and attitudes. Thus, a distinction between ability and trait could benefit research. Specifically, the term ability refers to the specific capacities that help individuals to perform particular tasks or activities. Regarding SMA, active and passive social media use could be identified to elucidate the user's behaviors of communicating with others on social media (like texting directly to friends as opposed to just browsing their personal profile). Moreover, trait refers to the relatively stable characteristics or dispositions that generally influence an individual's behaviors, such as the characteristics that enhance withdrawal symptoms from friends and family due to excessive social media use. Alternative social media models could benefit research more because researchers and clinicians could develop more targeted interventions to help individuals manage their social media use more effectively by addressing the underlying predispositions and the capacities required to cope with potentially addictive behaviors.

This study has certain limitations. Initially, data were self-based, and no information was gathered about non-respondents. Self-selection in web-based surveys may negatively influence representativeness, as evident from the participation of young people and women in the present sample (Andreassen et al., 2017). However, the difference in mean scores between men and women may indicate non-skewed associations. Moreover, the research's design is solely cross-sectional. Namely, data are collected from different individuals simultaneously. This type of research is reported to pertain to bias, especially in estimating mediation effects (Maxwell & Cole, 2007). Future research may collect multi-method data by having peers/friends report on the same attitudes and behaviors or collect data from the same individuals across different time periods. Moreover, participants were only from Greece; results may not represent different populations and cultures. The results add to the existing literature by examining the relationship and the mediation effect between social media addiction, loneliness, self-esteem, and self-compassion. Results revealed that although self-esteem is not a protective factor for social media addictive behaviors, the mediating role of self-compassion is evident, and more elaborated patterns of research need to be established to assist individuals in their feelings of loneliness. Strengthening individuals' self-esteem may not act as a potential component in social network addiction interventions targeting adults after all. However, the construction of sound psychometric measures is considered crucial in order to make inferences about social media addictive behaviors.

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Conflict statement:
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