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Inferiority feelings and internet addiction among Turkish University students in the context of COVID-19: The mediating role of emotion dysregulation

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Abstract
Emotion dysregulation is a major predictor of increased internet addiction. However, the psychological experiences linked to increased internet addiction through higher emotion dysregulation are poorly understood. The aim of this study was to investigate if inferiority feelings, an Adlerian construct theorized to be rooted in childhood, are associated with increased Internet addiction through emotion dysregulation. Another objective of the study was to determine if the internet use characteristics of young adults changed during the pandemic. A conceptual model was validated statistically using the PROCESS macro with a survey method involving 443 university students living in different regions of Turkey. The results support the significance of all three effects of inferiority feelings on internet addiction, namely the total (B = 0.30, CI = [0.24, 0.35]), the direct (B = 0.22, BootCI = [0.15, 0.29]), and the indirect (B = 0.08, BootCI = [0.04, 0.12]). In other words, inferiority feelings are associated with a greater level of internet addiction both directly and indirectly through greater emotion dysregulation. Moreover, the overall prevalence of Internet addiction was 45.8% among the participants and that of severe Internet addiction was 22.1%. Almost 90% of the participants reported an increase in their recreational Internet use during the pandemic, with an average daily increase of 2.58 h (SD = 1.49), the significance of which was supported by the *t*-test results. The results provide important insights for parents, practitioners, and researchers on addressing the internet addiction problem among young adults living in Turkey or other countries that are similar to Turkey.

Keywords Inferiority feelings · Emotion Regulation Difficulties · Internet Addiction

Introduction

Described as a psychological reliance on the Internet, independent from the kind of activity once logged on (Kandell, 1998), internet addiction has been viewed by many scholars as a public health problem (Lozano-Blasco et al., 2022) as well as an obsessive–compulsive disorder (Block, 2008; Young, 1998a). Internet addiction is associated with decreased levels of physical, mental, and social functioning, as evidenced by its positive relationships with depression and anxiety (Li et al., 2019), pain, discomfort, and difficulty with performing the activities of self-care and daily routine (Tran et al., 2017). According to studies, young adults are among the most frequent Internet users, spending a large percentage of their waking hours online, which increases their risk of internet addiction (Bakken et al., 2009; Morrison & Gore, 2010; Lozano-Blasco et al., 2022).

Internet addiction was already a serious problem and a subject of frequent investigation around the world before the onset of the novel coronavirus-2019 (COVID-19) pandemic. It appears to have escalated its prevalence and severity since the outbreak of the pandemic, largely due to the reasons related to the strict precautions implemented during the pandemic, such as increased social isolation and the need for easy information (Li et al., 2021; Masaeli & Farhadi, 2021; Sun et al., 2020). Given the comorbidity between internet addiction and other psychological problems, especially depression and anxiety (Li et al., 2019; Soulioti et al., 2018), the rise in the Internet addiction problem during the pandemic has become a topic of increased concern (Marzilli

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et al., 2022). Having had to abruptly adapt to a wide array of challenges related to the pandemic, such as online classes, online assessments, and isolation from peers, university students, including those in Turkey, were specifically susceptible to the pandemic's detrimental effects on psychosocial functioning (Cam et al., 2022; Fila-Witecka et al., 2022; Savage et al., 2020), and Internet addiction (Mota et al., 2021; Varer Akpinar et al., 2022).

Not surprisingly, associations between various distress symptoms (e.g., specific phobia, anxiety, depression, avoidance behaviors, and compulsive behaviors) and internet addiction have been supported among university students both immediately following the onset of COVID-19 (Priego-Parra et al., 2020; Servidio et al., 2021) and in the subsequent stages of the pandemic (Karakose, 2022). Although it has been highlighted that these associations may be reciprocal and bidirectional, recent researchers have suggested that internet addiction might be a potential coping strategy employed by those with already existing psychopathological difficulties (Marzilli et al., 2022). The Adlerian construct of inferiority feelings, as a challenging psychological experience, may be particularly important when it comes to explaining internet addiction during the pandemic, both directly and indirectly through its potential relationship to increased emotion dysregulation.

Inferiority feelings and internet addiction

The Adlerian construct of Inferiority feelings indicates a psychological disposition that is characterized by overwhelming feelings of inferiority, discouragement, and a constant self-comparison leading to an increased need for superiority over others (Akdoğan & Ceyhan, 2014; Strano & Petrocelli, 2005). Viewed as a normal part of human development, a certain level of inferiority feelings is viewed as essential for achievement in some areas of life (Adler, 1996). Predictably, a link between a moderate level of inferiority feelings and a higher level of academic achievement has been supported in a sample of university students (Strano & Petrocelli, 2005). On the other hand, a number of negative childhood experiences, such as dysfunctional parental behaviors and/or certain disabilities, are known to result in an unhealthy inflation of inferiority feelings (Adler, 1982, 1996). Such inferiority feelings have been suggested to result in various types of negative psychosocial outcomes (see Dreikurs, 1950), such as depression, anxiety, hostility (Akdoğan & Ceyhan, 2014); suicidal ideation and insomnia (Lung & Lee, 2008), loneliness and attachment insecurity (Akdoğan, 2017), both dispositional and interpersonal rumination (Cimsir, 2019) and self-concealment and decreased well-being (Akdoğan & Cimsir, 2019).

Alfred Adler suggests that individuals with greater inferiority feelings may experience extreme difficulty coping with the life tasks of work, love, friendship, spirituality, and self in socially acceptable ways (Dreikurs, 1990), which is known by a difficulty also experienced by those with higher internet addiction. In addition, individuals with higher inferiority feelings have been found to experience higher levels of neuroticism, depression, anxiety, loneliness, and attachment problems (e.g., Adler, 1996; Akdoğan, 2017; Akdoğan & Ceyhan, 2014, Akdoğan & Cimsir, 2019; Dreikurs, 1950, 1957), similarly to those with increased internet addiction (e.g., Dalbudak & Evren, 2014; Eichenberg et al., 2017; Ha et al., 2007; Servidio et al., 2021; Yan et al., 2014; Yao & Zhong, 2014). A recent finding that inferiority feelings are contemporaneously associated with increased time spent on passive social media use (PSMU) points to a potential direct relationship between internet addiction and inferiority feelings (Aalbers et al., 2019). Furthermore, according to Liu et al. (2022), individuals who feel inferior are frequently hesitant to ask for assistance in person due to privacy concerns, and instead, they voice their thoughts on social media. The findings of these studies, along with the additional research showing a connection between inferiority feelings and increased social anxiety (Akdoğan & Cimsir, 2022; Li et al., 2022) suggest that individuals with higher inferiority feelings may be more likely to seek out online validation due to their diminished ability to gain social validation in their offline interactions.

Emotion dysregulation, inferiority feelings, and internet addiction

Successful regulation of emotions provides an ability to regulate the intensity and duration of emotional responses (Weiss et al., 2015). Individuals with increased difficulty in emotion regulation experience an increased internet addiction problem (e.g., Casale et al., 2016; Evren et al., 2018; Karaer & Akdemir, 2019; Spada & Marino, 2017; Yildiz, 2017), as well as other psychosocial problems, such as depression, loneliness, suicidal ideation, eating disorders, post-traumatic stress, substance abuse, and externalizing (e.g., Baldofski et al., 2016; Garofalo & Velotti, 2015; Marroquín et al., 2016; Paulus et al., 2016; Tull et al., 2015). Increased difficulty in the regulation of negative emotions, such as anger, anxiety, neuroticism, hostility, and rumination, specifically in the face of challenging situations (Neuringer, 1974) such as pandemics, is also known to be an important characteristic of those with increased inferiority feelings (e.g., Akdoğan & Ceyhan, 2014, Cimsir, 2019; also see Adler, 1996; Dreikurs, 1950, 1957). Despite these parallels between emotion dysregulation and inferiority feelings, emotion dysregulation has never been

investigated in relation to inferiority feelings or its potential to facilitate the hypothesized relationship between inferiority feelings and internet addiction.

Present study

Given that inferiority feelings have been theorized to be associated with a decreased capacity to cope with challenging situations (Adler, 1996), they may have become more likely to underlie the increased internet addiction problems (Li et al., 2021; Masaeli & Farhadi, 2021; Sun et al., 2020) experienced by young adults during the pandemic. Therefore, we planned this study to investigate if inferiority feelings were associated with greater internet addiction problems through the facilitator role of emotion dysregulation during the pandemic lockdown among young adults in Turkey. Considering that the COVID-19 pandemic may have changed the frequency and pattern of Internet use among young adults in Turkey, another objective of this study was to identify if the Internet use characteristics of this population changed during the pandemic. Consequently, the following hypotheses are proposed in the present study:

H1: Higher inferiority feelings are associated with increased Internet addiction.
H2: Higher inferiority feelings are associated with an increased level of difficulty in the regulation of emotions.
H3: The potential relationship between higher inferiority feelings and increased internet addiction is mediated by an increased level of difficulty in the regulation of emotions.
H4: The recreational internet use characteristics of young adults, in Turkey, have changed during the pandemic.

Method

Participants and procedure

The sample of this cross-sectional study using a convenience sampling approach comprised a total of 443 university students, 343 females [77.4%] and 100 males [22.6%], with an age range of 18–28 years (M = 20.12 years, SD = 1.51). G*Power, a free program used for the determination of the required sample size, indicated that a sample of 218 participants is sufficient for three predictors with a 0.95 power. Therefore, the sample size (443) in the present study can be seen as being more than sufficient. Before starting the data collection, approval for the study was obtained from the University Institutional Review Board. Because classes were being conducted online due to the COVID-19 pandemic, the participants were recruited via a web-based survey. The survey was designed in a way that allowed the participants to withdraw at any time, and no incentives were offered to individuals to participate. Due to the fact that only surveys where all questions of the self-report measures were answered could be submitted, there was no missing data in the main study variables. The study data was collected between 1–30 May, 2021, which was a period when the quarantine measures were being strictly implemented in Turkey, and the COVID-19 vaccine was not available to the age range of the participants of this study.

Utilizing Google Forms, the authors sent the survey link to the students taking their classes and asked the volunteering students to share the survey link with their friends after completing it themselves. As a result, participants from different cities, as well as different universities, were recruited. Specifically, participants from sixty of the eighty-one cities of Turkey are represented in the study, with the majority ($n = 61$, 13.8%) living in Eskisehir (i.e., the city where the authors teach), followed by those living in Ankara ($n = 38$, 8.6%) and Konya ($n = 27$; 6.1%). The majority of students ($n = 350$, 79%) reported attending Anadolu University with the rest ($n = 93$, 21%) attending twenty-four different universities located in all seven regions of Turkey. Although forty-four students (9.9%) did not indicate their grade levels, fourteen students were at the English language preparatory level (3.2%), two hundred and twenty-two (50.1%) were freshmen, seventy-one (16%) were sophomores, forty-six (10.4%) were junior students, and forty-six (10.4) were senior students. Sixty-five ($n = 65$, 14.7%) students did not report the name of the faculty they were attending, while the majority of the students ($n = 265$, 60%) reported being enrolled at a Faculty of Education. Other faculties that are represented in the study sample include the following: the Faculty of Engineering ($n = 17$; 3.8%); the Faculty of Law ($n = 12$, %2.7); the Faculty of Health Science ($n = 9$, 2%); the Faculty of Nursing ($n = 8$, %1.8); the Faculty of Economics ($n = 7$, 1.6%); the Faculty of Medicine ($n = 7$, 1.6%); and other faculties ($n = 53$, 13.8%).

Measures

Inferiority Feelings Scale, Difficulties in Regulation of Emotions Scale, and Young Internet Addiction Test-Brief Form, which are introduced below, were the measures used in the data collection of this study. Three self-made questions were also included in the data collection tool to collect information regarding the internet use characteristics of young adults during the pandemic. Asking the respondents to first *exclude the time they have to spend on online courses and/or work-related meetings*, the questions requested answers to the following: 1) On average, how much time do you spend daily

on the Internet; 2) Has there been any change in the average time you spend daily on the internet during the Covid; 3) If your answer to the preceding question is yes, how long was the average daily increase?

Inferiority Feelings Scale (IFS; Akdoğan and Ceyhan, 2014)

The IFS is a 20-item measure scored on a 5-point Likert-type scale (1 = Never; 5 = Very Often), comprising three subscales, assessing denial of one's own value, feelings of discouragement, and useless superiority efforts. The Inferiority Feelings Scale produces a score ranging between twenty and one hundred, with higher scores indicating greater levels of inferiority feelings. The scale was developed in Turkish with a test–retest reliability of 0.88 and an internal consistency of 0.86 (Akdoğan & Ceyhan, 2014). A reliability coefficient of 0.86 was attained in the present study.

Difficulties in regulation of emotions scale (DERS-16; Bjureberg et al., 2016)

Assessing various aspects of emotion regulation difficulties, the DERS-16 is a shorter version of the DERS, which was developed by Gratz and Roemer (2004) as a 36-item. The DERS-16 consists of five subscales, namely Clarity, Goals, Impulse, Strategies, and Non-acceptance. As with the DERS, the items in DERS-16 are indicated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). Higher scores point to greater emotion dysregulation. In an original study by Bjureberg et al. (2016), DERS-16 shows high internal consistency ($\alpha = 0.92$) and satisfactory test–retest reliability ($r = 0.85$). The scale was adapted into Turkish by Yiğit and Yiğit (2019), with internal consistency coefficients ranging between 0.78 and 0.87 for its sub-dimensions, and 0.92 for the entire scale. A reliability coefficient of 0.92 was attained in the present study.

Young internet addictiontest-brief form (YIAT-BF; Pawlikowski et al., 2013)

Being a shorter version of the scale that was originally developed by Young (1998b), the YIAT-BF consists of 12 items that are rated on a 5-point Likert type (1 = Never; 5 = Very Often) scale. Many characteristics of Internet addiction are represented by the items, including loss of control, obsession, and psychological reliance. Sample items include 'How often do you find that you stay online longer than you intended?' and 'How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?' A score of > 30 was deemed as the cut-off score for problematic Internet use, while the cut-off score for pathological use was determined to be > 37. The YIAT-BF was adapted into Turkish by Kutlu et al. (2016) for both adolescents and university students. The Cronbach's alpha coefficient for the Turkish version of the scale was found to be 0.91, and the test–retest reliability was found as 0.93 for university students. A reliability coefficient of 0.85 was obtained in the present study.

Statistical analysis

The first step of the statistical analyses involved the investigation of the means, standard deviations, skewness, kurtosis, and bivariate correlations among the study variables, which were conducted using the IBM SPSS-26. Second, a model hypothesizing difficulty with the regulation of emotions as a mediator in the potential connection between inferiority feelings and internet addiction was tested using the PROCESS macro (model number 4) developed by Hayes (2018). The model involves one mediator, and therefore one specific indirect effect: inferiority feelings → emotion regulation difficulties → Internet addiction. The significance of the indirect effect was tested using 5000 bootstrap samples, and the associated 95% confidence intervals (CI) are considered significant if they do not include zero.

Results

Descriptive statistics and preliminary analysis

The means, the values of skewness and kurtosis of all of the study variables, and bivariate correlations are presented in Table 1. As can be seen, all three of the main study variables of this study (i.e., inferiority feelings, emotion regulation difficulties, and Internet addiction) are significantly and positively correlated with each other. In addition, the *t*-test results show that women had significantly higher

Table 1 Descriptive Statistics and Correlations among Study Variables ($N = 443$)

Variable	Mean (SD)	Skewness	Kurtosis	1	2
1. Inferiority Feelings	54.68 (11.84)	.271	-.077	-	
2. Emotion Dysregulation	40.77 (12.38)	.302	-.689	.600**	-
3. Internet Addiction	30.21 (7.72)	.294	-.375	.461**	.411**

** $p < .001$ * $p < .05$

Table 2 Total, Direct, and Indirect Effects of Inferiority Feelings on Internet Addiction through Emotion Dysregulation

Coefficients					95% Confidence Interval	
Effects	Effect	SE	t	p	Lower	Upper
Total Effect	.299	.028	10.77	.0000***	.244	.353
Direct Effect	.217[a]	.034[a]			.151[a]	.285[a]
Indirect Effect	.082[a]	.022[a]			.039[a]	.124[a]

CI confidence interval; ***$p < .0001$ [a]5000 bootstrap sample Covariate: gender

mean scores on main study variables than men, except for Internet addiction. Specifically, women's inferiority feelings ($M = 55.38$, $SD = 11.85$) were significantly higher than those of men ($M = 52.28$, $SD = 11.57$); $t(441) = 2.32$, $p = 0.02$. They also had higher emotion regulation difficulties ($M = 41.42$, $SD = 12.33$) than men ($M = 38.56$, $SD = 12.37$); $t(441) = 2.04$, $p = 0.04$. On the other hand, there was no significant effect for sex in internet addiction, $t(441) = 1.6$, $p = 0.11$, despite women ($M = 30.52$, $SD = 7.81$) attaining slightly higher scores than men ($M = 29.12$, $SD = 7.33$). As a result, gender was included as a control variable in the mediation analysis to cancel out its potential confounding impact (Table 2).

Prior to mediation analysis, assumptions of multivariate statistics were also tested. The absolute values of skewness and kurtosis were not higher than ± 2, supporting the normality of the variables (George & Mallery, 2003). No Mahalanobis value that is greater than fifteen was identified, indicating no problem value. The values of the variance inflated factor (VIF), tolerance, and Durbin-Watson (DW) were also checked, which indicated that all of the VIFs were lower than 10, tolerance values were above 0.10, and the DW value was 1.87. Therefore, no multicollinearity problem existed (Field, 2009). Finally, the model was examined for Common Method Bias using Harman's single factor score, which supported no one factor explaining more than the cut-off score of 50% (Mat Roni, 2014).

The results of the mediation analysis

After the assumptions were satisfied, a mediation analysis was performed through the PROCESS macro. The results indicate that the total effect (B = 0.30, CI = [0.24, 0.35]), the direct effect (B = 0.22, BootCI = [0.15, 0.29]), and the indirect effect (through emotion regulation, B = 0.08, BootCI = [0.04, 0.12]) of inferiority feelings on internet addiction were all significant. Figure 1A shows that the standardized path coefficient between inferiority feelings and Internet addiction is significant ($\beta = 0.46$, $p < 0.001$). However, as can be seen in Fig. 1B, it significantly decreases

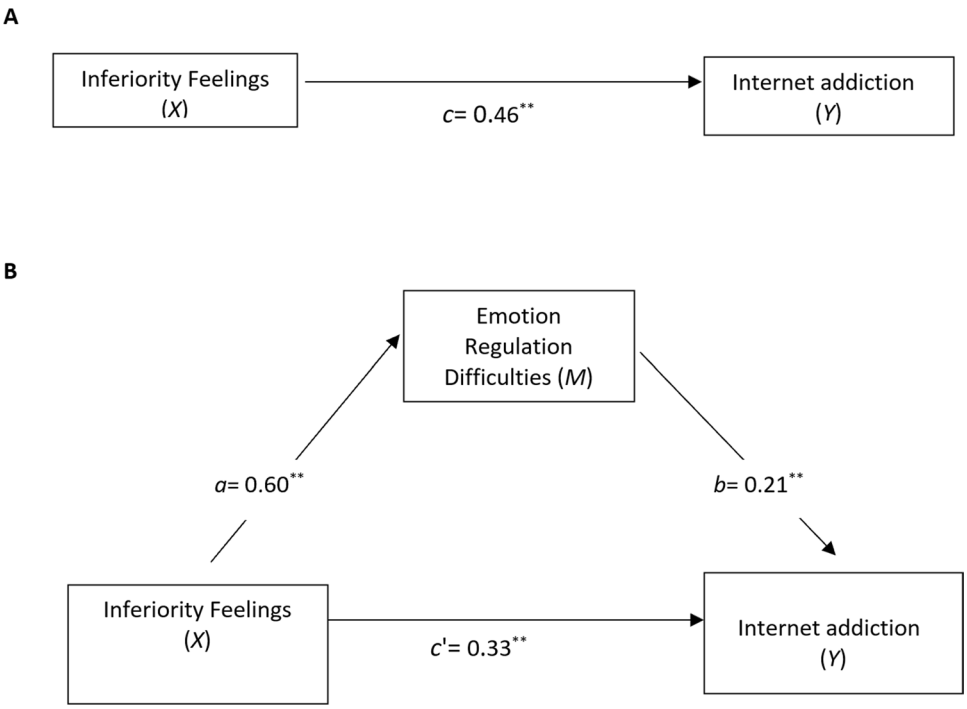


Fig. 1 The statistical diagram of the Mediator Model ** $p < .001$

when the mediator (difficulties in regulating emotions) is added to the analysis, which means the indirect effect of inferiority feelings on Internet addiction is significant (β = 0.13, BootSE = 0.032, 95% BootCI = [0.064, 0.189]). However, the significant direct impact of inferiority feelings on internet addiction (β = 0.33, $p < 0.001$) indicates that inferiority feelings have a partial mediation effect on internet addiction. The results also show that inferiority feelings (*X*) significantly predict difficulties in regulating emotions (β = 0.60, $p < 0.001$). Additionally, the model with inferiority feelings and emotion dysregulation (mediator) explains 49% (F [3 − 439] = 46.48, $p < 0.001$) of the total variance in internet addiction, which was 46% (F [2 − 440] = 59.56, $p < 0.001$) with no mediator in the model.

Internet use characteristics during the COVID-19 pandemic

The internet use characteristics of young adults in Turkey have significantly changed during the pandemic. The results of a t-test show that the recreational time spent on the Internet during COVID-19 (M = 5.04, SD = 1.71) was significantly higher than what it was before the onset of the pandemic (M = 2.73, SD = 2.48); t (439) = -0.49, $p < 0.001$. Specifically, 396 participants (89.4%) reported that their recreational Internet use had increased since the start of the COVID-19 pandemic, with the average of this increase being 2.58 h (SD = 1.49). When also including the participants who reported no change or a decrease in their recreational Internet use (11.6%), the change was still an increase, with an average of 2.30 h (SD = 1.40). Lastly, the Internet platform that was used most frequently by the participants for recreational purposes during the pandemic was reported as Instagram ($n = 218$, 49.2%), followed by YouTube ($n = 80$, 18.1%), Twitter ($n = 53$, 12%), WhatsApp ($n = 40$, 9%), Netflix ($n = 18$, 4.1%) and other platforms (e.g., Pubg Mobile, Facebook, other movie websites, $n = 34$, 7.6%).

Discussion

This study was conducted to determine if inferiority feelings were associated with increased Internet addiction through greater emotion dysregulation as well as to identify the potential changes in participant internet use habits since the onset of the pandemic. The findings support that inferiority feelings are associated with a greater level of internet addiction both directly and indirectly through greater emotion dysregulation. Moreover, the majority of the participants (89.4%) reported an increase in their recreational Internet use during the pandemic, with an average daily increase of 2.58 h.

The results support the first hypothesis (H_1) that an increased level of inferiority feelings would be associated with a higher level of internet addiction. Earlier studies have already drawn many parallels between the experiences of individuals with higher inferiority feelings (e.g., Akdoğan & Ceyhan, 2014; Cimsir, 2019) and those with greater internet addiction (e.g., Eichenberg et al., 2017; Ha et al., 2007; Servidio et al., 2021; Yao & Zhong, 2014). Moreover, Aalbers et al. (2019) have shown that inferiority feelings are contemporaneously associated with increased time spent on passive social media use (PSMU). However, the present study is the first to show that inferiority feelings, as measured through a psychometrically sound scale constructed based on the Adlerian theory, is associated with increased internet addiction. It should be noted that, given the cross-sectional design of this study, we do not know if inferiority feelings cause increased internet addiction or vice versa, or both. However, the finding of the present research aligns with the conclusions of a recent study that individuals who experience increased inferiority may be reluctant to ask for assistance in person because of privacy concerns and instead anonymously post their opinions on social media (Liu et al., 2022). Similarly, recent studies associating social anxiety with increased inferiority (Akdoğan & Cimsir, 2022; Li et al., 2022) suggest that individuals with increased inferiority may experience an increased fear of being negatively judged by others. As a result, based on the finding of this study and the cited studies, it plausible that individuals with increased inferiority may have higher internet addiction due to their increased tendency toward seeking out online validation, potentially resulting from their aversion to and/or fear of face-to-face social interactions.

As already highlighted, studies conducted in different stages of the COVID-19 pandemic have revealed a positive corelation between different distress symptoms (e.g., specific phobia, anxiety, depression, avoidance behaviors, and compulsive behaviors) and internet addiction in samples of university students (e.g., Karakose, 2022; Priego-Parra et al., 2020; Servidio et al., 2021). As a result, many scholars have suggested that internet addiction might be a coping strategy employed by those with existing psychopathological difficulties (Marzilli et al., 2022). The positive correlation between inferiority feelings and internet addiction found in the present study might also point to a similar mechanism. That is, it is possible that creating a new virtual identity may act as a coping strategy for individuals with higher inferiority feelings who are theorized to have increased difficulty dealing with both negative emotions and difficult situations, such as pandemics (e.g., Adler, 1996; Akdoğan, 2017; Akdoğan & Ceyhan, 2014, Akdoğan & Cimsir, 2019; Dreikurs, 1950, 1957). It is thus likely that participants with higher inferiority may have spent more time on the Internet during the pandemic to numb and/or avoid existing inferiority feelings

as well as the additional negative emotions, such as panic, anxiety, stress, and fear, brought on by the pandemic. As we already suggested, due to the cross-sectional design of this study making it impossible to guarantee connections of a causal nature, it is also plausible that it might the increased internet use leading to inferiority feelings, and not vice versa. That is, increased internet use, particularly passive social media use (PSMU), could increase social comparison, envy, and concomitant feelings of inferiority (Appel et al., 2015, 2016) due to exposing individuals to social media contacts who are seemingly happier and more popular than themselves (Bollen et al., 2017). However, the Adlerian construct of inferiority feelings is theorized to be rooted in childhood, predicting later outcomes and functioning in life. Therefore, we believe that our hypothesized model, in which inferiority feelings (X) are associated with higher emotion dysregulation (M), which in turn, predicts an increase in internet addiction (Y), makes not only statistical but also more hypothetical sense.

The present study's findings also support the second hypothesis (H_2) that inferiority feelings would be associated with increased difficulty regulating emotions. As suggested previously, similar to those with higher emotion regulation difficulties, individuals with increased inferiority are theorized to have greater difficulty controlling the intensity and/or outcomes of their emotional reactions (Adler, 1996; Dreikurs, 1950, 1957). However, no empirical research has investigated the existence of a direct association between the two constructs, rendering the present study the first to show this positive association. The results also support the last hypothesis (H_3) that the positive relationship between inferiority feelings and Internet addiction would be mediated by a difficulty in the regulation of emotions. As suggested previous research has already identified individuals struggling with regulating their emotions having an increased tendency toward spending more time on the Internet (Casale et al., 2016; Karaer & Akdemir, 2019; Spada & Marino, 2017; Yildiz, 2017). However, no previous research has examined the construct of inferiority feelings as a potential psychological experience that is shared by those with increased difficulty regulating their emotions and those with increased addiction to the Internet. The present study thus contributes to the existing literature that a greater propensity to feel inferior is associated with increased difficulty in the regulation of emotions, which, in turn, predicts an elevated level of internet addiction. Relating these results to the pandemic, the suggested associations may have become more highlighted due to the uncertainties and anxieties brought on by the pandemic.

Lastly, this study also provides information regarding the prevalence and severity of Internet addiction among young adults during the pandemic lockdown in Turkey. Consistent with our fourth hypothesis (H_4), the recreational internet use characteristics of Turkish university students significantly changed during the pandemic. To be specific, 396 participants (89.4%) reported that their daily Internet use increased since the start of the COVID-19 pandemic, even when excluding the time that they had to spend online for classes and/or meetings, with the average of this daily increase being reported as 2.58 h (SD = 1.49). The findings also show that the prevalence of Internet addiction is remarkably high, as half of the subjects are classified as having a moderate or severe level of Internet addiction, based on the YIAT-BF scores. Unfortunately, previous studies that were conducted with different groups or in different regions in Turkey before the pandemic did not indicate the severity of Internet addiction based on YIAT-BF cut-off scores, unlike studies conducted in other countries. We are therefore unable to provide an estimation of the increase in the severity of Internet addiction among the participants during the pandemic, despite being able to maintain that the overall prevalence of Internet addiction (45.8%) during the pandemic is considerably high, with 23.7% for moderate addiction (i.e., problematic use) and 22.1% for severe addiction (i.e., pathological use). We can still speculate that Internet addiction during the pandemic is higher than before because the mean score of 30.21 (SD = 7.71) that we obtained in this study using the YIAT-BF is considerably higher than the mean scores revealed by a number of the studies conducted just before the pandemic, which range between 26–27 (e.g., Arslan & Kiper, 2018; Kaya & Çopur, 2019). The findings of this study, therefore, may be proposed to support international studies (e.g., Li et al., 2021; Sun et al., 2020) indicating that the COVID-19 pandemic has exacerbated the Internet addiction problem.

Limitations

There are certain limitations to this study, the first of which is the use of the PROCESS Macro in the mediation analysis due to its practicality. It should be noted that a mediation analysis may be conducted with both structural equation modeling (SEM) and PROCESS macro. However, it is generally advisable to test mediation models within the confines of structural equation models with latent variables to produce results that take into account the issue of measurement error and, hence, can be suggested to produce indirect effects that are more accurate. The second limitation concerns the use of self-report scales in the collection of the data, rendering responses that may be impacted by social desirability a potential confounder. Third, the participants of this study were university students who were predominantly female (77.4%). Therefore, caution should be used when generalizing the research results to the whole population. Finally, due to the nature of cross-sectional designs, the findings of this

study actually depend on correlational evidence, which makes it impossible to guarantee the specific causal relationships that are built into the specific mediation model. As a result, longitudinal or experimental studies may be recommended for researchers aiming to explore the long-term influences of inferiority feelings on the study variables (i.e., Internet addiction, and emotion dysregulation).

Conclusion

The research findings suggest that emotion dysregulation acts as a mediator between inferiority feelings and Internet addiction, meaning that individuals with an increased level of inferiority have a reduced tendency to successfully regulate their emotions, which, in turn, is associated with an increased addiction to the internet. By revealing that individuals experiencing greater difficulty in their emotions may also experience increased inferiority and greater internet addiction, the findings of this study provide a new psychological perspective for parents, educators, and mental health providers aiming to understand and develop interventions for the crisis of Internet addiction among young adults. This perspective suggests that not only emotion dysregulation but also its positive correlation with inferiority feelings should be considered in the conceptualization of the internet addiction problem. This is not only to prevent and/or successfully intervene in internet addiction at any given time but also to prepare individuals for difficult situations, such as the COVID-19 pandemic, to help them to overcome such difficult situations by using more productive coping strategies and without extreme fear and/or anxiety. It is suggested that inferiority feelings are rooted in childhood, resulting from being subjected to dysfunctional parenting (Adler, 1982, 1996) and/or failing at specific learning tasks at school (Çelik and Ergün, 2016). This study thus highlights the importance of functional parenting and experiencing a sense of accomplishment in the early years of life so that inferiority feelings do not increase to a point where they interfere with an individual's ability to successfully regulate their emotions and develop effective coping mechanisms.

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Data availability Data is available on request from the corresponding author.

Declarations

Conflicts of interest The authors declare no conflicts of interest.

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