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# Turkish validation of the internet addiction test-short form (IAT-7): psychometric properties and age-related differences

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**Abstract**
The lack of standardized diagnostic criteria hinders Internet addiction research by forcing reliance on varied measurement tools. The Internet Addiction Test (IAT) remains the most widely used tool for assessing this construct. This study examined the psychometric properties of the Turkish version of the Internet Addiction Test–Short Form (IAT-7) in a sample of 664 students, including 279 college and 385 high school students from Ankara and Erzincan, Türkiye. The findings supported the unidimensional structure of the IAT-7 in the combined sample, demonstrating strong structural validity and stable factorial representation across adolescent and emerging adult groups. The study findings revealed that internet addiction was positively correlated with smartphone addiction, internet gaming disorder, and difficulties in emotion regulation and negatively correlated with self-compassion among both high school students and college students. In addition, while there was a positive correlation between Internet addiction and loneliness among college students, there was no significant correlation between internet addiction and loneliness among high school students. Multi-group confirmatory factor analysis supported configural and metric invariance and partial scalar invariance across high school and college student samples. Cronbach's alpha, McDonald's omega, and test-retest correlation coefficients were computed to evaluate reliability. Overall, the Turkish IAT-7 is a reliable, valid, and culturally appropriate instrument for assessing Internet addiction among adolescents and college students, suitable for correlational, regression, and structural modeling applications in educational and research settings.

**Keywords** Internet addiction test · Short form · Psychometric properties · Smartphone addiction · Internet gaming disorder · Emotion regulation · Self-compassion · Loneliness · Measurement invariance · Adolescents · Emerging adults

## Introduction

Every aspect of life, from leisure pursuits to the formation of social bonds, has seen a steady and unstoppable increase in Internet usage (Tafur-Mendoza et al., 2020). In practically every area of human life, including communication, work, education, and leisure, the Internet has become an essential tool. It is noteworthy that the number of hours spent using it is rising along with the number of users (Hawi et al., 2015). Globally, there were an estimated 6 billion internet users as of 2025, up from 5.5 billion the year before. This percentage amounts to 74% of the world's population (Statista, 2025). The Internet's popularity is also rising in Türkiye. The internet usage rate among individuals aged 16–74 was 88.8% in 2024 and 90.9% in 2025 (Turkish Statistical Institute, 2025).

Using the internet has improved people's lives in a number of ways. In everyday life, the Internet is a very useful tool for information searching, communicating with friends worldwide, completing academic and professional tasks, and other areas of social or professional life (Pawlikowski et al., 2013). On the other hand, it is impossible to overlook the detrimental effects of Internet use (Dhir et

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al., 2015). As the Internet becomes more widely available, the epidemic of Internet addiction (IA) is rapidly growing, and people require assistance to deal with the issues brought on by excessive Internet use (Przepiorka et al., 2014). In a similar vein, Pan et al. (2020) discovered that the prevalence of IA increased over time in their systematic review and meta-analysis of the epidemiology of IA studies. The research supports the positive correlation between IA and bullying victimization (Cao et al., 2021; Liu et al., 2025); attention deficit/hyperactivity disorder (Wang et al., 2017); depression (Cao et al., 2021), academic stress (Yang et al., 2025); sleep disorder (Sun et al., 2025); and social anxiety (Masi et al., 2021). A systematic review and meta-analysis by Noroozi et al. (2021) revealed a significant negative correlation between IA and quality of life as measured by psychological, physical, and overall quality of life scores.

Notwithstanding the detrimental consequences of IA, according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) and the International Classification of Diseases-11 (ICD-11), IA is not yet considered a disorder (APA, 2022; WHO, 2019). The absence of clear and standardized diagnostic criteria complicates research on IA, as studies rely on a variety of measurement instruments that attempt to capture a multifaceted phenomenon (Lozano-Blasco et al., 2022). Additionally, researchers have yet to agree on a common definition of IA (Pontes et al., 2014; Valenti et al., 2025). The absence of precise standards for identifying and diagnosing IA contributes to the controversy (Valenti et al., 2025) and results in disparities in taxonomy and terminology (Griffiths, 2021). Researchers investigating Internet-related issues have used a variety of terms to characterize the detrimental impacts of excessive Internet use on private lives, including IA, problematic Internet use, Internet dependence, Internet addiction disorder, internet abuse, excessive use of the internet, compulsive use of the internet, impulse-control disorder, or pathological use of the internet (e.g., Masi et al., 2021; Morahan-Martin, 2005; Starcevic & Aboujaoude, 2017; Wang et al., 2025; Young, 1998). Due to these differences, it is now more difficult to define the disorder and, consequently, to develop suitable clinical diagnoses (Shapira et al., 2003). The inconsistency makes it more challenging to interpret findings and develop interventions aimed at reducing and preventing IA. The prevalence of IA varies based on outcome measures and target populations because of these discrepancies and the complexity of IA (Fendel et al., 2024).

Many scales have been developed to measure IA in various countries due to the growing interest in this topic in research (Pontes et al., 2014). More than 40 such measures were found in a review by Laconi et al. (2014). The first validated tool to measure IA is the Internet Addiction Test (IAT) (Fioravanti & Casale, 2015). Young (1998) developed the IAT, a self-reported scale with 20 items on a five-point Likert scale that asks about pertinent behaviors. The DSM IV criteria for pathological gambling, such as tolerance, withdrawal symptoms, mood modification, or relapse, served as the foundation for Young's (1998) development of the IAT. According to her, IA is primarily a psychological dependence on the Internet and is classified as an impulse-control disorder (Young, 2004). The tendency of an Internet user to use the Internet for longer than planned, even when aware of the clear negative consequences, is known as IA, and it is one of the main negative effects of Internet use (Young, 1996).

To date, the IAT has been the most popular tool for evaluating IA in clinical and research settings (Moon et al., 2018; Pino et al., 2022). According to Tudorel et al. (2019), IAT (Young, 1998) appears to be a well-validated tool that has been translated and validated into multiple languages. The IAT has been validated and translated into over 20 other languages in addition to English (Ali et al., 2021; Moon et al., 2018; Pino et al., 2022), including French (Khazaal et al., 2008), Polish (Hawi et al., 2015) etc. As a result, the IAT has accumulated the strongest and extensive empirical data over the last 20 years, making it the primary instrument for IA diagnosis and the gold standard (Sela et al., 2021). Nevertheless, the factorial structure of the IAT remains ambiguous and contentious despite its extensive use (Ali et al., 2021; Sela et al., 2021). The range of factors includes one factor (Khazaal et al., 2008), two factors (Faraci et al., 2013), three factors (Chang & Law, 2008), and six factors (Ferraro et al., 2007). Notwithstanding these discrepancies in the factor structure, Moon et al. (2018) highlighted the IAT's high quality for evaluating IA in their meta-analysis, which found that it has good psychometric properties in terms of test score reliability and validity of test score interpretations.

No matter its usefulness and strength, Valenti et al. (2025) highlight that developing and using a brief version of the IAT may be advantageous. They state that internal consistency greater than 0.90 in a 20-item measure may indicate some redundancy, suggesting that multiple items may evaluate the same content, even though homogeneity is typically thought of as a helpful indicator of a scale's quality (Streiner, 2003), indicating the Cronbach's alpha values of the scale being 0.90 or higher (e.g., Boysan et al., 2017). Furthermore, Pawlikowski et al. (2013) highlighted how some items, such as item 7 in the original questionnaire, "How often do you check your email before something else that you need to do?" are no longer relevant. It is no longer necessary to "check" emails because smartphones make it easy to access them and new and alternative forms of communication, like social media, have largely replaced email communications. Over the years, a number of short versions of the IAT have been created, the majority of which

suggest removing one or more items from the factor analysis (e.g., Chang & Law, 2008; Pontes et al., 2014; Valenti et al., 2025). Indeed, as mentioned above in the literature, the inconsistent findings regarding the factor structure of the IAT and the reporting of varying dimension structures across different cultures provide a rationale supporting the development of more homogeneous and structurally more stable short forms.

In the meantime, brief versions of psychological assessment tools are becoming more and more popular (Koğar, 2020). Short scales are practical and quick to administer, and they offer benefits to participants and researchers alike, making it possible to carry out survey research and complicated multivariate models effectively (Smith et al., 2000). In their recent development of a shorter 7-item version, Valenti et al. (2025) emphasized that the strength of using the IAT-7 rather than the conventional 20-item version stems from the ability to assess IA in a valid and reliable manner, with the benefit of relying on a less time-consuming scale and a loss of item redundancy.

The application of long forms, especially in large-scale studies, can lead to response fatigue and consequently to systematic measurement error. Additionally, research on IA is often conducted in conjunction with various psychological variables like loneliness, emotion regulation problems, behavioral addictions, and others. In such multivariate designs, scale length can increase participant burden and also reduce data quality. Furthermore, screening for the risk of IA in school settings and developing effective intervention programs accordingly necessitates the use of concise, valid, and reliable measurement tools.

Adolescence and young adulthood differ developmentally in terms of the psychological meaning of internet use. For children and teenagers, who are still developing self-control, the allure of digital experiences can be particularly strong, and it may promote addictive behaviors (Nambirajan et al., 2025). The prevalence of smartphone addiction is higher among teenagers aged 15 to 17 than among young people aged 19 and up (Haug et al., 2015). Adolescents use the internet as an important part of their daily lives (Dhir, 2015) and are more vulnerable to the negative effects of overuse (Ferraro et al., 2007). Furthermore, an increased tendency towards addictive behaviors has been reported during the transition from adolescence to adulthood (Boursier et al., 2020). These developmental and motivational differences raise the question of whether IA items represent the same construct for high school and university students. Therefore, testing for measurement invariance is methodologically necessary to ensure meaningful intergroup comparisons (Reise et al., 1993). Additionally, studying factorial invariance across age groups, particularly adolescents, is recommended by Valenti et al. (2025).

Adaptation studies of the IAT in Türkiye have focused on the validity of the original 20-item (Balta & Horzum, 2008) and 12-item forms (Kutlu et al., 2016) in different samples, but none of these studies have tested intergroup measurement invariance. The current literature directly compares the scores of high school and university students, but it does not validate the methodological basis of this comparison. In conclusion, this study aims to fill a significant gap in the literature by not only adapting the scale to a specific culture but also examining its structural integrity and comparability across different developmental stages.

In addition, this study aimed to examine the IAT's criterion-related validity by examining its connections to theoretically related constructs. IA provides a broad framework for online activities, with digital gaming and smartphone addiction representing more specific manifestations (Kwon et al., 2013; Savcı & Aysan, 2017). In this context, positive correlations between the internet and smartphone addiction (Ayar et al., 2017; Chin & Leung, 2018; Lee et al., 2020) and digital gaming addiction (Ayas, 2012; Baturay & Toker, 2019; Korkmaz Aslan & Batı, 2024) support the common technological basis of these behaviors. Furthermore, the relationships between smartphone usage frequency and IA (Ben-Yehuda et al., 2016) and the consideration of IA criteria in the criterion development process (Kwon et al., 2013) justify the selection of variables within the scope of criterion-related validity.

The Compensatory Internet Use Theory (Kardefelt-Winther, 2014) suggests that unmet social and emotional needs can be compensated for through the internet. IA may be a coping mechanism to make up for deficiencies in emotional management for young people (Gioia et al., 2021). People who have negative feelings are more likely to use the internet to try to deal with their problems (Wang et al., 2024), and deficits in emotion regulation are reflected in excessive mobile phone use (Macklem, 2008; Monemi & Zeinali, 2022). Studies have shown that loneliness and IA are positively associated (Bozoglan et al., 2013; Gu et al., 2023; Mozafar Saadati et al., 2021).

In addition, self-compassion reduces psychological distress by recognizing, accepting, and reinterpreting negative emotions (Phillips & Wisniewski, 2021; Wang et al., 2023) and lowers the risk of addiction by transforming stressful moods into positive psychological states (Yang et al., 2023). The findings show negative correlations between internet, smartphone, and gaming addiction and self-compassion, negatively impacting addiction in both adolescents and college students (Duarte et al. 2026; Liu et al., 2020b; Qiang et al. 2025; Yang et al., 2023). All these theoretical and empirical findings strongly support the selection of loneliness, difficulty in emotion regulation, self-compassion, digital game addiction, and smartphone addiction variables to test the

criterion-related validity of the internet addiction scale in a sample of high school and university students.

By offering a psychometrically sound assessment tool for IA, translating the IAT-7 into Turkish and investigating whether it shows measurement equivalency across various educational levels (such as high school and university students) will greatly advance the field. The goal of the current study is to translate the IAT-7 into Turkish and assess the validity and reliability of its psychometric qualities. The study specifically aimed to examine the scale's construct validity using Confirmatory Factor Analysis (CFA) and its criterion-related validity by examining its connections to theoretically related constructs like internet gaming disorder, smartphone addiction, emotional regulation difficulties, self-compassion, and loneliness. Lastly, a test of measurement invariance between university and high school samples was conducted. The overall goal of the study is to ascertain whether, in the Turkish cultural context, the IAT-7 serves as a quick, accurate, and structurally valid measure of IA. The hypotheses of the study are presented below.

1. The proposed one-factor structure of the IAT-7 will be supported by confirmatory factor analysis results.
2. The measurement model of the IAT-7 will demonstrate measurement invariance across educational levels at least at the configural and metric levels; partial scalar invariance will be supported if full scalar invariance is not achieved.
3. IAT-7 scores will show significant associations with theoretically related constructs, including smartphone addiction, internet gaming disorder, difficulties in emotion regulation, self-compassion, and loneliness, providing evidence for criterion-related validity.
4. The IAT-7 will demonstrate adequate internal consistency reliability.

## Method

### Participants and procedure

This study included 279 university students and 385 high school students from Ankara and Erzincan, Türkiye. Data were collected between February and July 2024 on a voluntary basis from college students attending a single university and high school students attending four different high schools. Because data collection was conducted in classroom settings during the February–July 2024 period, all eligible and consenting students who were accessible during that time were invited and included; therefore, the final sample size was determined by practical feasibility rather than an a priori stopping rule. There were no requirements or incentives for taking part in the study; participation was completely voluntary. Convenience sampling was used to facilitate access to students with diverse demographic characteristics and educational backgrounds. Although convenience sampling may limit generalizability, this approach is frequently employed in psychometric validation studies aiming to evaluate factor structure and measurement properties across accessible yet heterogeneous student populations. The inclusion of both high school and college students was intended to increase developmental variability and enable the examination of measurement invariance across age groups. This sampling strategy was therefore considered appropriate for evaluating the psychometric performance of the scale across distinct developmental stages. Demographic characteristics of the participants, including gender distribution and age statistics across educational groups, are presented in Table 1.

Sample size adequacy was evaluated based on commonly recommended participant-to-item ratio criteria in psychometric research. It is generally suggested that at least 3–5 to 10 participants per item should be included in scale validation studies. Considering that the IAT-7 consists of seven items, the minimum recommended sample size ranged between 35 and 70 participants. The present study substantially exceeded these recommendations, including 385 high school students and 279 university students, thereby providing sufficient statistical power for factor analyses and measurement invariance testing (Yıldız et al., 2025).

Every response was gathered anonymously and used only for research purposes. These procedures followed commonly recommended cross-cultural adaptation guidelines to ensure semantic, conceptual, and structural equivalence between the original and adapted versions. In the context of a scale adaptation study, this study used a quantitative, correlational research design. The main goal was to translate the IAT-7 into Turkish and assess its measurement invariance, validity, and reliability. Every process was completed in compliance with accepted international standards for the adaptation of psychological scales. To guarantee linguistic, structural, and psychometric equivalency between the original and Turkish versions, the adaptation process involved several steps. Forward-back translation and expert review were the first methods used for linguistic validation. Initially, the items were independently

**Table 1** Demographic Characteristics of Participants by Educational Level

| Variable | High school ($n$=385) | University ($n$=279) | Total ($n$=664) |
|---|---|---|---|
| Gender | | | |
| Female | 264 (68.6%) | 208 (74.6%) | 472 (71.1%) |
| Male | 121 (31.4%) | 71 (25.4%) | 192 (28.9%) |
| Age (Mean ± SD) | 16.20 ± 0.90 | 23.50 ± 4.37 | 19.20 ± 4.64 |

Note. Percentages are calculated within each educational group.

translated into Turkish by bilingual experts familiar with psychological terminology. The Turkish version was then back-translated into English by five independent bilingual translators who were blind to the original scale. Discrepancies between versions were reviewed by a panel of researchers experienced in psychological measurement, and consensus was reached to ensure linguistic accuracy and conceptual equivalence. The Turkish form's unidimensional factor structure was then tested using CFA. Model fit was evaluated using multiple goodness-of-fit indices. The relationships between IAT-7 scores and theoretically related constructs, such as smartphone addiction, internet gaming disorder, loneliness, self-compassion, and difficulties in emotion regulation, were investigated in order to assess criterion-related validity.

Cronbach's alpha, McDonald's omega, and test-retest correlation coefficients were computed to evaluate reliability. Lastly, the configural, metric, and scalar measurement invariance of the IAT-7 across high school and college student groups were investigated using multi-group confirmatory factor analyses (MG-CFA). The purpose of these analyses was to ascertain whether the scale serves as a valid, trustworthy, and structurally equivalent tool for evaluating IA in the context of Turkish culture.

All information was gathered in-person in classroom environments using paper and pencil. To guarantee uniform administration conditions throughout schools and university courses, the implementation process was overseen by the researchers and qualified field assistants. Participants were informed about confidentiality and their right to withdraw at any stage without penalty prior to participation. Every scale, with the exception of the IAT-7, was previously translated into Turkish and subjected to psychometric validation. The original authors granted formal permission for the IAT-7 adaptation (Valenti et al., 2025). Prior to the main data collection, a pilot study was conducted with 50 students to evaluate item clarity and administration procedures. Participants reported no substantial difficulties in understanding the items, and completion time was considered appropriate. Minor linguistic refinements were made based on participant feedback without altering item content. Details of the statistical analyses and missing-data handling are provided in the Data Analyses section. Ethical approval was given by the Erzincan Binali Yıldırım University Human Research Ethics Committee of Educational Sciences (14/19 Date: 29.12.2023)

## Measurements

### Internet addiction test – short form (IAT-7)

The Internet Addiction Test–Short Form (IAT-7), developed by Valenti et al. (2025) as a brief version of Young's (1998) Internet Addiction Test, assesses IA as a unidimensional construct and consists of seven items. Items are rated on a 5-point Likert scale ranging from 1 (never) to 5 (always). A sample item is "How often do you find that you stay online longer than intended?" Total scores are calculated by summing item responses, with higher scores indicating higher levels of internet addiction. Excellent psychometric fit indices ($\chi^2 = 13.37$, $df = 8$, CFI = 0.994, TLI = 0.983, RMSEA = 0.030, SRMR = 0.016) and reliability coefficients greater than 0.75 for both McDonald's $\omega$ and Cronbach's $\alpha$ were reported in the original validation study. In the present study, the scale was translated into Turkish, and its validity, reliability, and measurement invariance across high school and university samples were examined.

### Internet gaming disorder scale – short form (IGDS9-SF)

The Internet Gaming Disorder Scale–Short Form (IGDS9-SF), originally developed by Pontes and Griffiths (2015), assesses internet gaming disorder based on DSM-5 diagnostic criteria and consists of nine items representing a single-factor structure. Items are rated on a 5-point Likert scale ranging from 1 (never) to 5 (very often). A sample item is "Do you feel preoccupied with your gaming activity?" Total scores are calculated by summing item responses, with higher scores indicating greater internet gaming disorder. The Turkish adaptation was conducted by Evren et al. (2018), reporting Cronbach's $\alpha = 0.89$ and excellent model fit indices. In the present study, internal consistency analyses demonstrated excellent reliability in both samples (high school: $\alpha = 0.91$, $\omega = 0.91$; university: $\alpha = 0.94$, $\omega = 0.94$).

### Smartphone addiction scale – short form (SAS-SF)

The Smartphone Addiction Scale–Short Form (SAS-SF), developed by Kwon et al. (2013), measures problematic smartphone use using ten items representing a unidimensional construct. Responses are provided on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). A sample item is "I use the smartphone for a longer period and spend more money than I intended." Total scores are calculated by summing item responses, with higher scores indicating greater smartphone addiction risk. The Turkish adaptation was conducted by Muharremoğlu and Paksoy Erbaydar (2021). In the present study, internal consistency coefficients indicated high reliability across both samples (high school: $\alpha = 0.89$, $\omega = 0.90$; university: $\alpha = 0.92$, $\omega = 0.92$).

### Self-compassion scale – short form (SCS-SF)

The Self-Compassion Scale–Short Form (SCS-SF), developed by Raes et al. (2011) based on Neff (2003), assesses

individuals' self-compassion levels. Items are rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). A sample item is "I try to see my failings as part of the human condition." Total scores are calculated by averaging item responses after reverse-coded items are recoded, with higher scores indicating greater self-compassion. The Turkish adaptation was conducted by Yıldırım and Sarı (2018) for adolescents (11 items) and by Barutçu-Yıldırım et al. (2023) for college students (12 items). Internal consistency analyses in the present study indicated acceptable reliability in both samples (high school: $\alpha = 0.74$, $\omega = 0.74$; university: $\alpha = 0.79$, $\omega = 0.79$).

#### Difficulties in emotion regulation scale – short form (DERS-SF)

The Difficulties in Emotion Regulation Scale–Short Form (DERS-SF), developed by Kaufman et al. (2016), consists of 16 items assessing multiple aspects of emotion regulation difficulties. Items are rated on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). A sample item is "I have difficulty making sense out of my feelings." Total scores are calculated by summing item responses, with higher scores indicating greater difficulties in emotion regulation. The Turkish adaptation was conducted by Yiğit and Guzey Yiğit (2019). In the present study, the scale demonstrated excellent internal consistency (high school: $\alpha = 0.92$, $\omega = 0.92$; university: $\alpha = 0.96$, $\omega = 0.96$).

#### UCLA loneliness scale – short form (ULS-8)

The UCLA Loneliness Scale–Short Form (ULS-8) is a brief measure of perceived loneliness derived from the original scale developed by Russell et al. (1980). Items are rated on a 4-point Likert scale ranging from 1 (never) to 4 (often). A sample item is "I feel isolated from others." Total scores are calculated by summing item responses, with higher scores indicating greater perceived loneliness. The Turkish adaptation was conducted by Doğan et al. (2011) for college students (8 items) and by Yıldız and Duy (2014) for adolescents (7 items). In the present study, internal consistency analyses indicated acceptable reliability in both samples (high school: $\alpha = 0.78$, $\omega = 0.81$; university: $\alpha = 0.74$, $\omega = 0.77$).

### Data analyses

Software programs SPSS (data screening, descriptive statistics, and outlier diagnostics) and Jamovi 2.6.23 (lavaan) (CFA/MG-CFA and reliability analyses) were used to analyze the data. The datasets were screened to ensure data quality and to check statistical assumptions prior to the primary analyses. A small proportion of item-level missing data (approximately 1.4% of all responses) was observed. After examining the missing-data pattern, CFA and MG-CFA were conducted in Jamovi 2.6.23 (lavaan) using robust maximum likelihood (MLR) estimation with full information maximum likelihood (FIML) for missing data. This approach allows cases with partially missing responses to contribute to estimation, thereby reducing information loss. Thirteen multivariate outliers (Mahalanobis distance; $p < .001$) were excluded to reduce undue influence on covariance estimates prior to CFA/MG-CFA. The assumptions of linearity, multicollinearity, and univariate and multivariate normality were investigated before the primary analyses. Skewness and kurtosis coefficients within the $\pm 1.5$ range were used to confirm univariate normality (Kline, 2016). Observed skewness values ranged between $-0.09$ and 0.58, and kurtosis values ranged between $-1.12$ and $-0.34$ across the IAT-7 items, indicating acceptable univariate normality. Multivariate normality was evaluated using Mardia's coefficient. The linearity assumption was validated by scatterplots between variable pairs. Intercorrelations among study variables were below 0.90, indicating no risk of redundancy. Multicollinearity was further assessed using tolerance and Variance Inflation Factor (VIF) values. The results showed that VIF values ranged between 1.05 and 1.59 and tolerance values ranged between 0.629 and 0.955, demonstrating that multicollinearity was not a concern (Çokluk et al., 2010). These findings demonstrated that the dataset satisfied the statistical assumptions required for CFA and MG-CFA.

Construct validity was examined via CFA, and measurement invariance across high school and college students was evaluated using sequential MG-CFA (configural, metric, and scalar models, followed by partial scalar invariance if needed). Model fit was evaluated using $\chi^2$, CFI, TLI, RMSEA, and SRMR, with $\chi^2/df \leq 5$, CFI/TLI $\geq 0.90$, and RMSEA/SRMR $\leq 0.08$ considered indicative of acceptable model fit (Browne & Cudeck, 1992; Hu & Bentler, 1999). Invariance decisions were based primarily on changes in approximate fit indices ($\Delta CFI \leq 0.010$, $\Delta TLI \leq 0.010$, $\Delta RMSEA \leq 0.015$; Chen, 2007; Cheung & Rensvold, 2002). Criterion-related validity was assessed using Pearson correlations between IAT-7 scores and the theoretically related measures. Reliability was examined using Cronbach's $\alpha$, McDonald's $\omega$, and test–retest correlations (3-week interval); reliability analyses were performed in Jamovi 2.6.23.

## Findings

MG-CFA was used to evaluate measurement invariance across high school and university samples after CFA was used to investigate the scale's structural validity. In order

to assess the instrument's internal consistency and temporal stability, reliability analyses such as Cronbach's alpha, McDonald's omega, and test-retest correlations were carried out. Overall, the findings show that the IAT-7 exhibits acceptable psychometric qualities, demonstrating its validity, reliability, and significant measurement consistency across various educational levels.

CFA was performed on the combined dataset comprising both high school and university participants in order to investigate the factorial structure of the Turkish version of IAT-7. In line with the theoretical framework put forth by Valenti et al. (2025), the model examined a single latent construct that represented IA. Figure 1 shows standardized parameter estimates. The overall model fit indices showed an acceptable to excellent model fit, and all items loaded significantly on the latent factor.

All seven items of the Turkish version of the IAT-7 loaded on a single latent construct representing internet addiction (IA) in the one-factor model shown in Fig. 1A. Standardized factor loadings ranged from 0.42 to 0.70 and were statistically significant (all $p < .001$), indicating that each item contributed meaningfully to the latent factor. Separate CFAs supported the same unidimensional structure across educational levels (Fig. 1B–C). In the high school sample (Fig. 1B), standardized loadings ranged from 0.37 to 0.68 (all $p < .001$), whereas in the university sample (Fig. 1C), loadings ranged from 0.34 to 0.81 (all $p < .001$). Overall model fit indices for the combined and subgroup CFAs are reported in Table 2.

Table 2 summarizes the CFA model fit indices for the Turkish version of the Internet Addiction Test–Short Form (IAT-7) in the combined sample and separately for the high school and university subsamples. The one-factor measurement model showed good fit in the combined sample, $\chi^2(14) = 27.70$, $p = .015$, with $\chi^2/df = 1.98$. Additional indices supported model adequacy (CFI = 0.973, TLI = 0.965, RMSEA = 0.061, SRMR = 0.032; Hu & Bentler, 1999).

Fit indices also indicated good-to-excellent model fit in both educational groups (CFI = 0.986–0.992; TLI = 0.965–0.985; RMSEA = 0.051–0.052; SRMR = 0.032–0.033), supporting the stability of the unidimensional structure across educational levels (Table 2). Standardized factor loadings were statistically significant in all samples ($p < .001$), ranging from 0.42 to 0.70 in the combined sample.

Descriptive statistics and correlations among the study variables are presented in Table 3. Descriptive statistics show that high school students have higher IAT-7 scores than the university group; however, the lack of complete scalar invariance (see Table 4) suggests caution in interpreting this difference and recommends that this finding be considered a descriptive indicator rather than a direct intergroup comparison. In the combined sample ($n = 664$), IAT-7 scores were positively associated with loneliness (ULS-8; $r = .10$, $p < .05$), internet gaming disorder (IGDS9-SF; $r = .43$, $p < .001$), smartphone addiction (SAS-SF; $r = .65$, $p < .001$), and difficulties in emotion regulation (DERS-SF; $r = .40$, $p < .001$), and negatively associated with self-compassion (SCS-SF; $r = -.32$, $p < .001$). Overall, this pattern supports the criterion-related validity of the Turkish IAT-7, with the strongest association observed between internet addiction and smartphone addiction ($r = .65$, $p < .001$).

Subsample correlations indicated a largely consistent nomological network across educational levels, with generally stronger associations in the university sample, particularly for loneliness and smartphone addiction. In the high school sample ($n = 385$), internet addiction was positively correlated with smartphone addiction ($r = .58$, $p < .001$), internet gaming disorder ($r = .36$, $p < .001$), and difficulties in emotion regulation ($r = .35$, $p < .001$), and negatively correlated with self-compassion ($r = -.25$, $p < .001$), whereas loneliness was not significantly correlated with internet addiction ($r = -.01$, $p > .05$). Additional associations in the high school group were theoretically consistent, including positive correlations between smartphone addiction and gaming disorder ($r = .58$, $p < .001$) and between difficulties in emotion regulation and both smartphone addiction ($r = .29$, $p < .001$) and gaming disorder ($r = .21$, $p < .001$). Moreover, self-compassion was negatively associated with loneliness ($r = -.23$, $p < .001$) and with difficulties in emotion regulation ($r = -.50$, $p < .001$).

In the university sample ($n = 279$), internet addiction was positively correlated with smartphone addiction ($r = .77$, $p < .001$), internet gaming disorder ($r = .55$, $p < .001$), difficulties in emotion regulation ($r = .47$, $p < .001$), and loneliness ($r = .22$, $p < .001$), and negatively correlated with self-compassion ($r = -.41$, $p < .001$). The particularly high correlation between internet addiction and smartphone addiction ($r = .77$, $p < .001$) may reflect shared behavioral and cognitive mechanisms such as habitual checking and reward sensitivity. Consistent with this interpretation, smartphone addiction was also strongly related to difficulties in emotion regulation ($r = .58$, $p < .001$) and moderately related to gaming disorder ($r = .48$, $p < .001$). In addition, gaming disorder was negatively correlated with self-compassion ($r = -.26$, $p < .001$) and positively correlated with loneliness ($r = .33$, $p < .001$).

To examine whether the strength of the association between loneliness and internet addiction differed across educational levels, a Fisher's r-to-z difference test was conducted, given that loneliness was expected to be more salient in the university context due to changes in social networks and living conditions. The correlation between loneliness and internet addiction was not significant among high school students ($r = -.01$) but was significant among

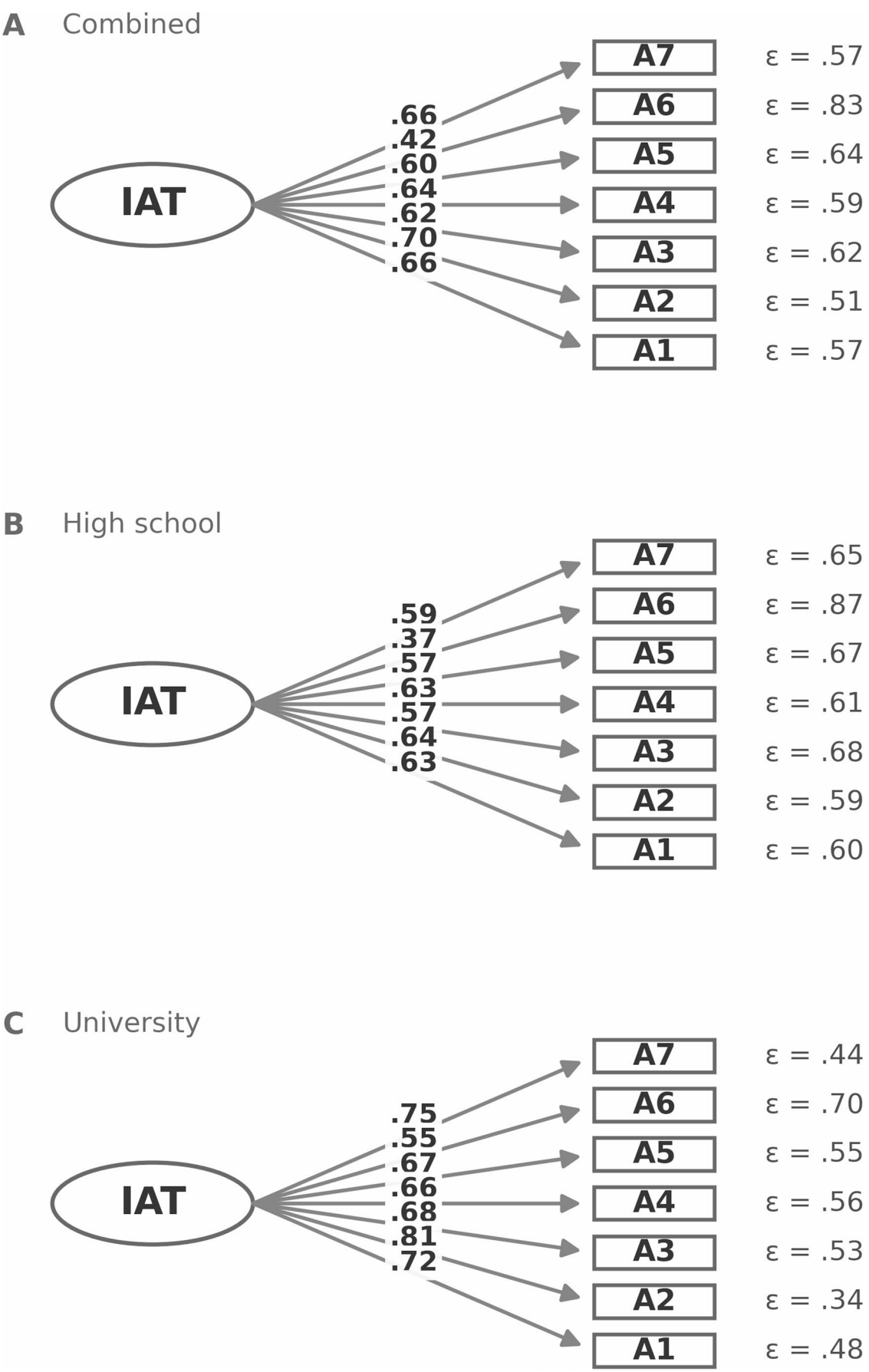
A Combined
IAT
.66
.42
.60
.64
.62
.70
.66
A7
A6
A5
A4
A3
A2
A1
ε = .57
ε = .83
ε = .64
ε = .59
ε = .62
ε = .51
ε = .57
B High school
IAT
.59
.37
.57
.63
.57
.64
.63
A7
A6
A5
A4
A3
A2
A1
ε = .65
ε = .87
ε = .67
ε = .61
ε = .68
ε = .59
ε = .60
C University
IAT
.75
.55
.67
.66
.68
.81
.72
A7
A6
A5
A4
A3
A2
A1
ε = .44
ε = .70
ε = .55
ε = .56
ε = .53
ε = .34
ε = .48

**Fig. 1** Confirmatory Factor Analysis Models of the Internet Addiction Test–Short Form (IAT-7) Across Educational Levels (**A**) Combined sample, (**B**) High school sample, and (**C**) University sample Note. Standardized estimates are shown. Residual (error) variances (ε) are displayed for each indicator. Standardized factor loadings were statistically significant ($p < .001$) in all samples. Model fit indices are reported in Table 2

university students ($r = .22$), and this difference was statistically significant ($z = -2.96$, $p = .003$), indicating a stronger relationship in the university sample.

Reliability analyses were conducted separately for the high school and university samples. Over a three-week interval, test–retest correlations indicated good temporal stability in the high school ($n = 45$; $r = .79$) and university ($n = 48$; $r = .82$) subsamples. In the high school sample, internal consistency was acceptable (Cronbach's $\alpha = 0.76$; McDonald's $\omega = 0.77$), whereas in the university sample, reliability estimates were higher ($\alpha = 0.86$; $\omega = 0.87$). Collectively, these results indicate that the Turkish adaptation of the IAT-7 functions as a reliable measure across educational levels.

To determine whether the IAT-7 measures the same underlying construct equivalently across high school and college students, measurement invariance was tested using MG-CFA. Measurement invariance is a key indicator of structural validity, assessing whether a scale represents the same latent construct across different groups (Vandenberg & Lance, 2000). Without invariance, observed score differences may reflect measurement bias rather than true latent differences. Following the hierarchical approach, configural (equal form), metric (equal factor loadings), and scalar (equal intercepts) invariance were tested sequentially. Model fit was evaluated using $\chi^2$, df, RMSEA, CFI, TLI, and SRMR, and model comparisons were judged according to $\Delta CFI \leq 0.010$, $\Delta TLI \leq 0.010$, and $\Delta RMSEA \leq 0.015$ (Chen, 2007; Cheung & Rensvold, 2002). Because $\chi^2$ difference tests are sensitive to sample size, invariance decisions were based primarily on changes in approximate fit indices (Chen, 2007; Cheung & Rensvold, 2002).

As shown in Table 4, the configural model demonstrated good fit, $\chi^2(28) = 52.03$, $p = .004$; CFI = 0.981; TLI = 0.972; RMSEA = 0.051; SRMR = 0.029, supporting the same one-factor structure across groups. Next, constraining factor loadings to equality yielded the metric model with similarly good fit, $\chi^2(34) = 55.23$, $p = .012$; CFI = 0.983; TLI = 0.980; RMSEA = 0.043; SRMR = 0.034. Changes relative to the configural model ($\Delta CFI = -0.002$, $\Delta TLI = -0.008$, $\Delta RMSEA = -0.008$, $\Delta SRMR = 0.005$) were within recommended limits, supporting full metric invariance and indicating that item–factor relationships are comparable across educational levels.

Scalar invariance was then tested by additionally constraining item intercepts to equality. The scalar model showed a substantial reduction in fit, $\chi^2(40) = 124.40$, $p < .001$, CFI = 0.934, TLI = 0.931, RMSEA = 0.080, and SRMR = 0.057, and changes exceeded recommended cutoffs ($\Delta CFI = -0.049$; $\Delta TLI = -0.049$; $\Delta RMSEA = +0.037$; $\Delta SRMR = +0.023$), indicating that full scalar invariance was not supported. To locate potential sources of non-invariance, constraint score tests and modification information were inspected. This follow-up evidence suggested that intercept constraints involving Item 5 (A5) and Item 6 (A6) were the primary contributors to the scalar misfit, implying that students from different educational levels may endorse these items at different baseline levels even when they possess the same latent level of internet addiction.

Accordingly, a partial scalar invariance model was estimated by freely estimating the intercepts of Item 5 (A5) and Item 6 (A6) across groups while retaining equality constraints on the remaining item intercepts. This partial scalar model demonstrated clearly improved fit, $\chi^2(38) = 74.40$, $p < .001$, CFI = 0.972, TLI = 0.969, RMSEA = 0.054, and SRMR = 0.040, indicating that allowing intercept differences for these two items substantially reduced the misfit observed in the full scalar model (Table 4). In the partial scalar model, intercept invariance was maintained for the majority of items (five of seven), which is generally considered adequate for many cross-group purposes, particularly comparisons of structural relations (Putnick & Bornstein, 2016). In line with recommended practice, SRMR was treated as a supplementary fit indicator, while invariance conclusions were based primarily on changes in CFI/TLI and RMSEA together with the overall adequacy of model fit. Given that only partial scalar invariance was supported, the present study did not emphasize latent mean comparisons between high school and university groups; instead, subsequent interpretations focused on the comparability of the latent construct and the stability of relations with external variables across educational levels. Overall, these findings support the use of the Turkish IAT-7 for cross-group comparisons of correlates and structural relations across educational levels, while cautioning against unadjusted mean-level comparisons.

## Discussion

The goal of the current study was to translate the IAT-7 (Valenti et al., 2025) into Turkish and investigate its psychometric qualities in samples from universities and high schools. Overall, the findings offer compelling empirical support for the validity, reliability, and structural coherence of the Turkish version of the IAT-7 as a measure of IA. The main contribution of this study to the literature is twofold: First, by empirically evaluating the measurement

**Table 2** Model Fit Indices for the IAT-7 One-Factor CFA Across Educational Levels

| Sample | $\chi^2$ | df | $\chi^2$/df | RMSEA | SRMR | CFI | TLI |
|---|---|---|---|---|---|---|---|
| Combined | 27.7 | 14 | 1.98 | 0.061 | 0.032 | 0.973 | 0.965 |
| High School | 27.2 | 14 | 1.94 | 0.051 | 0.033 | 0.986 | 0.965 |
| University | 24.8 | 14 | 1.77 | 0.052 | 0.032 | 0.992 | 0.985 |

**Table 3** Descriptive Statistics and Correlations Among Study Variables (Combined Sample)

| Variable | M | SD | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. IAT-7 | 19.6 | 5.80 | — | | | | | |
| 2. ULS-8 | 15.2 | 2.81 | 0.10* | — | | | | |
| 3. SCS-SF | 34.5 | 5.17 | −0.32*** | −0.01 | — | | | |
| 4. IGDS9-SF | 16.6 | 8.11 | 0.43*** | 0.18*** | 0.12** | — | | |
| 5. SAS-SF | 22.1 | 7.36 | 0.65*** | 0.08* | 0.14*** | 0.54*** | — | |
| 6. DERS-SF | 41.0 | 14.83 | 0.40*** | 0.26*** | 0.18*** | 0.26*** | 0.40*** | — |

Note.$n = 664$.Values below the diagonal are Pearson correlation coefficients.*IAT-7* Internet Addiction Test–Short Form, *ULS-8 UCLA* Loneliness Scale–Short Form, *SCS-SF* Self-Compassion Scale–Short Form, *IGDS9-SF* Internet Gaming Disorder Scale–Short Form, *SAS-SF* Smartphone Addiction Scale–Short Form, *DERS-SF* Difficulties in Emotion Regulation Scale–Short Form. $p < .05$. $p < .01$. $p < .001$.

invariance of internet addiction across high school and university samples—noting that only partial scalar invariance was achieved—it increases the methodological foundation for intergroup comparisons. Second, it offers multidimensional validation by testing the validity of the scale through its relationship with risk factors such as loneliness and emotion regulation difficulties, protective mechanisms such as self-compassion, and related concepts such as internet gaming/smartphone addiction. This comprehensive relational analysis provides one of the most current and comprehensive pieces of evidence in a Turkish sample for understanding how IA differs developmentally. This study is distinct because it offers the first Turkish validation of the IAT-7 and uses measurement invariance to compare its psychometric performance across developmental stages (high school vs. university). This study demonstrates that the seven-item short form not only shortens the application time but also preserves its nomological network with important psychological constructs such as loneliness, self-compassion, and emotion regulation and allows for more accurate comparisons of latent constructs and their relationships with other variables across high school and university samples.

## Construct validity and reliability

With all standardized loadings falling between 0.34 and 0.81 and model-fit indices exceeding suggested cut-offs (CFI ≥ 0.97, TLI ≥ 0.96, RMSEA ≤ 0.06, SRMR ≤ 0.03), confirmatory factor analyses confirmed the IAT-7's unidimensional structure in both the combined and subgroup samples. These findings are consistent with earlier validations carried out (Ali et al., 2021; Valenti et al., 2025), which all conceptualized IA as a single latent construct representing problematic and compulsive Internet use. The high test-retest correlations (0.79 – 0.82) and internal consistency coefficients ($\alpha = 0.76$ – 0.86; $\omega = 0.77$ – 0.87) show that the Turkish IAT-7 offers consistent and reliable measurement across time and educational levels. According to Pawlikowski et al. (2013) and Pino et al. (2020), these reliability coefficients are entirely consistent with those found in the initial short-form validation studies, suggesting that measurement precision is not compromised by the condensed format.

## Criterion-related validity

The correlation analyses provided additional evidence of the IAT-7's theoretical coherence with conceptually related constructs. Among college students and teenagers, IA was negatively correlated with self-compassion and positively correlated with Internet gaming disorder, smartphone addiction, and difficulties in emotion regulation. The university sample's Internet and smartphone addiction showed the strongest correlation ($r$ = .77), highlighting the behavioral mechanisms that overlap and the crucial role that mobile Internet use plays in the spectrum of digital dependency. At the same time, this magnitude may also reflect conceptual and measurement overlap between mobile-based internet use and generalized internet addiction, which should be considered in future modeling studies. Furthermore, despite the reduction in items, the preservation of expected correlations with these variables, considered the strongest predictors of IA in the literature, proves that the short form represents the theoretical essence of the construct.

Technology-related addictions themselves—such as IA, smartphone addiction, and digital game addiction—show substantial overlap in both adolescents and university students. Studies have consistently found moderate to strong positive correlations between IA and smartphone addiction (Ayar et al., 2017; Lee et al., 2020), as well as between IA and digital game addiction (Baturay & Toker, 2019; Korkmaz

**Table 4** Measurement Invariance Results of the Internet Addiction Test–Short Form (IAT-7) Across High School and University Samples

| Model | $\chi^2$ | df | *p* | RMSEA | CFI | TLI | SRMR | Δdf | ΔCFI | ΔTLI | ΔRMSEA | ΔSRMR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Configural | 52.028 | 28 | 0.004 | 0.051 | 0.981 | 0.972 | 0.029 | – | – | – | – | – |
| Metric | 55.234 | 34 | 0.012 | 0.043 | 0.983 | 0.98 | 0.034 | 6 | 0.002 | 0.008 | −0.008 | 0.005 |
| Scalar | 124.4 | 40 | <0.001 | 0.08 | 0.934 | 0.931 | 0.057 | 6 | −0.049 | −0.049 | 0.037 | 0.023 |
| Partial Scalar* | 74.4 | 38 | <0.001 | 0.054 | 0.972 | 0.969 | 0.04 | −2 | 0.038 | 0.038 | −0.026 | −0.017 |

Note. Δ change from the previous model. Invariance criteria: ΔCFI ≤ 0.010, ΔTLI ≤ 0.010, ΔRMSEA ≤ 0.015 (Chen, 2007; Cheung & Rensvold, 2002). Models were estimated in Jamovi 2.6.23 (lavaan) using robust maximum likelihood (MLR) with full information maximum likelihood (FIML) for missing data and the Yuan–Bentler scaled test statistic. *Intercepts of Item 5 (A5) and Item 6 (A6) were freely estimated across groups to establish partial scalar invariance. SRMR was treated as a supplementary indicator; primary invariance decisions were based on changes in CFI/TLI and RMSEA alongside overall model fit

Aslan & Batı, 2024). These findings reflect the shared technological basis of these behaviors, although smartphones' portability and constant accessibility may introduce unique characteristics to smartphone addiction (Ben-Yehuda et al., 2016).

The research findings indicate a positive correlation between IA and loneliness among university students, while no significant relationship was found between IA and loneliness among high school students. This discrepancy can be evaluated within the context of developmental stage and cultural context. For university students, the literature consistently shows a significant and positive relationship between loneliness and IA (Bozoglan et al., 2013; Gu et al., 2023; Mozafar Saadati et al., 2021). Furthermore, it has been suggested that loneliness may be a predictor of IA in this age group (Ceyhan & Ceyhan, 2008). During emerging adulthood, tasks such as forming relationships and pursuing academic advancement are significant sources of stress (Masten et al., 2004), and this period is a critical process in which individuals construct their identity by integrating their past experiences with their future expectations (McAdams, 2015). It has been shown that individuals experiencing negative emotions are more likely to turn to the internet to cope with stress (Wang et al., 2024). In this context, our findings are consistent with Compensatory Internet Use Theory (Kardefelt-Winther, 2014): university students experiencing loneliness may use the internet more intensively to regulate their psychosocial needs and seek social interaction.

In contrast, loneliness is a common emotional experience during adolescence (Liu et al. 2020a). Therefore, loneliness may not have emerged as a variable that distinctly explains IA in the high school sample. Furthermore, it is noted that in Türkiye's relatively collectivist structure, social control over adolescents is normalized (Sunar & Fişek, 2004), and individuality can be limited by family control mechanisms (Yüksek & Solakoğlu, 2016). Meta-analytic findings show a negative relationship between parent-child relationships and IA, and this relationship varies according to age and country (Zhu et al., 2022). Indeed, this negative relationship has been reported to be stronger in Türkiye compared to Italy (Zhu et al., 2022). Furthermore, it has been noted that low levels of parental monitoring are associated with IA (Ding et al., 2017) and that increased perceived levels of parental monitoring are negatively correlated with smartphone addiction (Sun et al., 2022). Living with family and having parents watch over you as a teen is a great way to avoid becoming addicted to the internet. However, when students go to college and move into a dorm or a separate apartment, they may feel more alone, and the protective effect of direct parental control may weaken. Considering these together, it can be said that family bonds and parental supervision during high school can limit the transformation

of loneliness into IA while transitioning to independent living, and lack of family social support and supervision may lead to loneliness among college students.

Furthermore, studies have shown that the purposes of internet use among adolescents are grouped under the headings of learning and development, socialization, psychological reasons, and entertainment (Akar, 2017). It is also suggested that adolescents use social media messaging to maintain and strengthen friendships (Davies, 2014). The finding that online interactions largely occur with friends present in daily life (Gross, 2004) suggests that internet use may function not only as a tool to compensate for loneliness but also as a digital extension of existing peer relationships. This may explain the lack of a correlation between loneliness and IA among high school students. On the other hand, university students' internet use is mostly for external purposes (Geyer et al., 2017), and addiction develops towards specific activities on the internet rather than the internet itself (Adiele & Olatokun, 2014). In this context, loneliness, especially when the need for emotional regulation and social compensation increases, can emerge as a risk factor that can take internet use to a more problematic level. In conclusion, the findings suggest that the relationship between loneliness and IA depends on developmental stage and cultural context. In Türkiye, relationships are weakened by the moderating influence of peer and family structures among high school students, but loneliness and IA may be more strongly correlated with increased individuation and developmental stress among college students.

Furthermore, the study findings demonstrated that IA is positively correlated with difficulties in emotion regulation among both high school students and university students. People who are feeling down are more likely to use the internet to try to deal with their stressors (Wang et al., 2024). Empirical studies show that IA and smartphone addiction are negatively correlated with emotion regulation (Gülden & Polat, 2024; Yin et al., 2024). Another line of research highlights the role of self-compassion. Research shows that self-compassion negatively predicts smartphone or mobile phone addiction, suggesting a protective psychological factor among university students (Qiang et al., 2025; Yang et al., 2023) and among adolescents (Liu et al., 2020b). The limited but growing research in this area underscores the importance of considering individual emotional resources when examining technology-related addictions. Furthermore, the findings revealing a negative correlation between self-compassion and IA demonstrate that the scale can accurately measure not only risk factors but also protective factors. Together, these patterns confirm the criterion and convergent validity of the Turkish IAT-7.

## Measurement invariance across educational levels

Measurement invariance indicates that when the same scale is administered to different groups, it measures the same underlying construct in a comparable way (Millsap, 2011). In the present study, MG-CFA supported configural and metric invariance across high school and college students, indicating that the Turkish IAT-7 reflects the same one-factor structure and that item–factor relations are comparable across educational levels. However, full scalar invariance was not achieved, suggesting that at least some item intercepts differed across groups. After examining constraint score tests and modification information, partial scalar invariance was supported by freeing the intercepts of items 5 ("*How often do you fear that life without the Internet would be boring*, *empty*, *and joyless?*") and Item 6 ("*How often do you snap*, *yell*, *or act annoyed if someone bothers you while you are on-line?*") across groups, while retaining intercept equality for the remaining five items. Item 5 demonstrates that because of high school students' restricted autonomy as a result of family control, they may assign the internet a deeper emotional significance. High school students typically have less autonomy, live with their families, and spend the most of their time at home and at school. The internet serves as this age group's main means of entertainment and communication with the outside world. However, compared to high school students, college students may not view a life without the internet as "boring, empty, and joyless" due to their greater social circle and freedom to make their own decisions. The difference described in item 6 may stem from the social context in which the interruption occurs. High school students are typically supervised by their parents, and online interruptions are often caused by a mother or father. Considering the need for independence and the struggle to form an identity during adolescence, this can result in a higher level of reaction, such as anger. However, college students have greater freedom than high school students, and peers are typically the ones who create online disruptions. Item 6 does not assess the same degree of responsiveness in the two groups, which can be explained by this contextual difference.

Importantly, because configural and metric invariance were established, comparisons of structural relations (e.g., correlations, regression paths, and SEM relations with external constructs) can be interpreted meaningfully across groups. In contrast, given the lack of full scalar invariance and the presence of partial intercept non-invariance, latent mean comparisons (and by extension observed mean comparisons based on total scores) were not emphasized in the present study. Future research should replicate the partial invariance pattern and examine item-level non-equivalence using approaches such as DIF analyses or alternative

partial-invariance specifications to refine age- and context-sensitive interpretations of IAT-7 item functioning.

The absence of full scalar invariance further indicates that item intercepts differ across groups, suggesting that individuals with identical levels of latent internet addiction may respond differently to certain items depending on their developmental context. This lack of scalar invariance has important implications for interpretation. Specifically, direct comparisons of latent means between high school and university students should be approached with caution, as observed differences may partially reflect measurement non-equivalence rather than true differences in the latent construct. Accordingly, conclusions regarding group differences in average levels of internet addiction cannot be considered fully invariant without additional adjustments. In line with Byrne et al. (1989), partial scalar invariance can be established by identifying invariant intercepts and freeing non-invariant parameters, as done in the present study. Taken together, these results suggest that while the Turkish IAT-7 reliably captures the same conceptual construct across educational stages, developmental and contextual factors may influence how certain items are interpreted. Accordingly, future cross-group investigations using the IAT-7 should prioritize comparisons of structural relations rather than direct latent mean differences, and any latent mean comparisons should be interpreted cautiously given the partial intercept non-invariance.

## Limitations

The study has a number of limitations despite its strengths. First, in terms of external validity, the samples were drawn from one university and four different high schools in Erzincan and Ankara. Therefore, the findings may not be fully representative of the broader youth population across different socio-economic backgrounds. Second, response bias may have been introduced because all data were self-reported. Criterion-related validity comparisons across educational groups should also be interpreted cautiously when external measures are not strictly equivalent across age groups as, the Turkish adaptations of loneliness and self-compassion scales were slightly modified for different age groups (e.g., different forms or item sets of the scales). Third, individuals with clinical diagnoses were not included in the study; this leads to a lack of information regarding the validity and reliability of the scale in clinical populations. Fourth, concurrent validity could not be adequately assessed because external criteria (e.g., daily internet usage time) were not considered.

## Future directions

Future research should prioritize more diverse datasets to confirm the robustness of these findings. The scale's measurement invariance should be tested across different cultures. Factorial invariance between clinical and non-clinical groups should be examined. External criteria such as daily internet usage time should be included to evaluate the concurrent validity of the scale. In addition, the study's achievement of structural and metric invariance indicates that interactions between variables may be confidently compared and that IA shows a similar factor structure in high school and university populations. Nonetheless, the inability to attain total scalar invariance suggests that researchers should be cautious when comparing these two groups' latent means directly. Instead of considering the scale's results as the whole truth, experts should consider them as a clue. It is also recommended that intervention programs be structured in a developmentally sensitive manner and take age-specific norms into account. Using different forms or item sets of certain criterion measures across age groups may limit the strict comparability of criterion-related validity patterns between samples.

## Practical implications

The current findings have significant implications for practitioners as well as researchers. First, the Turkish IAT-7 reduces response burden and makes it easier to incorporate into multi-construct SEM models or large-scale surveys by providing a brief yet psychometrically sound substitute for the original 20-item IAT. The instrument can serve as a practical tool for identifying target groups for interventions aimed at reducing or preventing IA within school and university counseling services. Using a 7-item short form instead of a 20-item form offers a significant advantage in large-scale school and campus-wide screenings. Counseling services can conduct rapid screenings at the beginning of the academic year using this short form, which reduces the risk of response fatigue. This allows for the identification of at-risk students without delay. For example, the Turkish IAT-7 may be integrated into routine beginning-of-term student support screenings as a brief first-stage indicator of problematic internet use. Rather than using a fixed diagnostic cut-off, counseling services may use elevated scores as a signal for follow-up assessment, including clinical interview, functional impairment, internet-use routines, and co-occurring risks such as smartphone addiction, digital game addiction, sleep problems, and emotion-regulation difficulties. This stepped-screening approach may help institutions identify potentially vulnerable students efficiently while minimizing respondent burden.

Second, its use in comparative studies examining developmental variations in digital addiction is supported by evidence of configural and metric invariance across educational levels. Differing dynamics, such as loneliness in high school and university samples, demonstrate the need to avoid standardized intervention programs. Third, rather than treating different types of technology-based behavioral addiction as separate phenomena, integrated intervention programs are necessary, as evidenced by the strong correlations with smartphone and gaming addictions. Practitioners should organize preventive workshops incorporating emotion regulation skills and self-compassion techniques to reduce the risk of IA for both adolescents and university students. Because self-compassion can be learned (Neff & Germer, 2013), education institutions can incorporate it into their curricula to help students develop it via constant practice.

## Conclusion

The IAT-7 in Turkish is a valid, reliable, and structurally stable tool for evaluating IA in teenagers and emerging adults. This study presents the psychometric advantages of the short form and provides the first evidence in Türkiye that the IAT-7 shows comparable factor structure and item–factor relations across high school and university students (configural and metric invariance), supporting cross-group comparisons of associations and structural relations. However, latent mean comparisons should be interpreted cautiously due to partial intercept non-invariance. It offers conciseness and cultural relevance while maintaining the original version's conceptual and psychometric advantages. The overall evidence supports its use for correlational, regression, and structural modeling purposes in Turkish educational and clinical settings, despite the failure to achieve full scalar invariance. Thus, the IAT-7 is a useful instrument for developing empirical research on behavioral addictions associated with the Internet in Türkiye.

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**Author contributions** ÇG: The design and implementation of the research, and the writing of the manuscript, writing of the manuscript revision MK: The analysis of the results and the writing of the manuscript revision, proofreading. All authors reviewed the manuscript.

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**Data availability** The data that support the findings of this study are available from the corresponding author upon a reasonable request. A reasonable request for data access entails the researcher providing a brief protocol detailing the study's objectives, applying via their institutional email account, and signing a Data Use Agreement certifying that the data will only be used for the designated analysis. In compliance with local Personal Data Protection Law requirements, data will be supplied in anonymised format for requests from international institutions. Additionally, the requesting party may need to produce an Ethics Committee Approval document from their own university.

## Declarations

**Ethics Approval** Ethics approval was obtained from Erzincan Binali Yıldırım University Human Research Ethics Committee of Educational Sciences (14/19 Date: 29.12.2023), respondents' and their legal guardians consent were acquired before the study. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study.

**Conflict of interest** There is no conflict of interest.

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## References

Adiele, I., & Olatokun, W. (2014). Prevalence and determinants of Internet addiction among adolescents. *Computers in Human Behavior*, *31*(1), 100–110. https://doi.org/10.1016/j.chb.2013.10.028

Akar, F. (2017). Purposes, causes and consequences of excessive internet use among turkish adolescents. *Eurasian Journal of Educational Research*, *15*(60), 35–56. https://doi.org/10.14689/ejer.2015.60.3

Ali, A. M., Hendawy, A. O., Almarwani, A. M., Alzahrani, N., Ibrahim, N., Alkhamees, & Kunugi, A. A., H (2021). The six-item version of the internet addiction test: Its development, psychometric properties, and measurement invariance among women with eating disorders and healthy school and university students. *International Journal of Environmental Research and Public Health*, *18*, 12341. https://doi.org/10.3390/ijerph182312341

American Psychiatric Association (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.; DSM-5-TR). American Psychiatric Publishing.

Ayar, D., Bektas, M., Bektas, I., Akdeniz Kudubes, A., Selekoglu Ok, Y., Altan, S., S., & Celik, I. (2017). The effect of adolescents' internet addiction on smartphone addiction. *Journal of Addictions Nursing*, *28*(4), 210–214. https://doi.org/10.1097/JAN.0000000000000196

Ayas, T. (2012). The relationship between ınternet and computer game addiction level and shyness among high school students. *Educational Sciences: Theory & Practice*, *12*(2), 632–636.

Balta, Ö., & ve Horzum, M. B. (2008). İnternet Bağımlılığı Testi. *Eğitim Bilimleri ve Uygulama*, *7*(13), 87–102.

Barutçu-Yıldırım, F. B., Onaylı, S., & Taşkesen, N. (2023). Psychometric properties of Self-Compassion Scale-Short form in a Turkish university student sample. *Sakarya University Journal of Education Faculty*, *23*(1), 23–34. https://doi.org/10.53629/sakaefd.1241066

Baturay, M. H., & Toker, S. (2019). Internet addiction among college students: Some causes and effects. *Education and Information Technologies*, *24*(2), 1–23. https://doi.org/10.1007/s10639-019-09894-3

Ben-Yehuda, L., Greenberg, L., & Weinstein, A. (2016). Internet addiction by using the smartphone-relationships between ınternet addiction, frequency of smartphone use and the state of mind of male and female students. *Journal of Reward Deficiency Syndrome & Addiction Science*, *2*(1), 22–27. https://doi.org/10.17756/jrdsas.2016-024

Boursier, V., Gioia, F., & Griffiths, M. D. (2020). Do selfie expectancies and social appearance anxiety predict adolescents' problematic social media use? *Computers in Human Behavior*, *106395*, 1–8. https://doi.org/10.1016/j.chb.2020.106395 chb.2020.106395

Boysan, M., Kuss, D. J., Barut, Y., Ayköse, N., Güleç, M., & Özdemir, O. (2017). Psychometric properties of the Turkish version of the Internet Addiction Test (IAT). *Addictive behaviors*, *64*, 247–252. https://doi.org/10.1016/j.addbeh.2015.09.002

Bozoglan, B., Demirer, V., & Sahin, I. (2013). Loneliness, self-esteem, and life satisfaction as predictors of Internet addiction: a cross-sectional study among Turkish university students. *Scandinavian Journal of Psychology*, *54*(4), 313–319. https://doi.org/10.1111/sjop.12049

Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, *21*(2), 230–258. https://doi.org/10.1177/0049124192021002005

Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin*, *105*(3), 456–466. https://doi.org/10.1037/0033-2909.105.3.456

Cao, R., Gao, T., Ren, H., Hu, Y., Qin, Z., Liang, L., & Mei, S. (2021). The relationship between bullying victimization and depression in adolescents: multiple mediating effects of internet addiction and sleep quality. *Psychology Health & Medicine*, *26*(5), 555–565. https://doi.org/10.1080/13548506.2020.1770814

Ceyhan, A. A., & Ceyhan, E. (2008). Loneliness, depression, and computer self-efficacy as predictors of problematic internet use. *Cyberpsychology & Behavior:The Impact of the Internet Multimedia and Virtual Reality on Behavior and Society*, *11*(6), 699–701. https://doi.org/10.1089/cpb.2007.0255

Chang, M. K., & Law, S. P. M. (2008). Factor structure for Young's Internet Addiction Test: A confirmatory study. *Computers in Human Behavior*, *24*(6), 2597–2619. https://doi.org/10.1016/j.chb.2008.03.001

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, *9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Chin, F., & Leung, C. H. (2018). The concurrent validity of the Internet Addiction Test (IAT) and the Mobile Phone Dependence Questionnaire (MPDQ). *Plos One*, *13*(6), e0197562. https://doi.org/10.1371/journal.pone.0197562

Çokluk, Ö., Şekercioğlu, G., & Büyüköztürk, Ş. (2010). *Sosyal bilimler için çok değişkenli istatistik: SPSS ve LISREL uygulamaları*. Pegem Akademi.

Davies, H. (2014). Social media and personal relationships: Online intimacies and networked friendship. *Information Communication & Society*, *17*(2), 279–281. https://doi.org/10.1080/1369118x.2013.850527

Dhir, A., Chen, S., & Nieminen, M. (2015). Psychometric validation of internet addiction test with Indian adolescents. *Journal of Educational Computing Research*, *53*(1), 15–31. https://doi.org/10.1177/0735633115597491

Ding, Q., Li, D., Zhou, Y., Dong, H., & Luo, J. (2017). Perceived parental monitoring and adolescent internet addiction: A moderated mediation model. *Addictive Behaviors*, *74*, 48–54. https://doi.org/10.1016/j.addbeh.2017.05.033

Doğan, T., Akıncı Çötok, N., & Göçet Tekin, E. (2011). Reliability and validity of the Turkish version of the UCLA Loneliness Scale (ULS-8) among university students. *Procedia - Social and Behavioral Sciences*, *15*(6), 2058–2062. https://doi.org/10.1016/j.sbspro.2011.04.053

Duarte, J., Salvador, M., & Matos, A. P. (2026). Internet is not the answer: social anxiety, self-compassion, and experiential avoidance in internet dependency symptoms during the COVID-19 pandemic. *Current Psychology*, *45*, 181. https://doi.org/10.1007/s12144-025-08516-1

Evren, C., Dalbudak, E., Topcu, M., Kutlu, N., Evren, B., & Pontes, H. M. (2018). Psychometric validation of the Turkish nine-item Internet Gaming Disorder Scale-Short Form (IGDS9-SF). *Psychiatry Research*, *265*, 349–354. https://doi.org/10.1016/j.psychres.2018.05.002

Faraci, P., Craparo, G., Messina, R., & Severino, S. (2013). Internet Addiction Test (IAT): which is the best factorial solution? *Journal of medical Internet research*, *15*(10), e225. https://doi.org/10.2196/jmir.2935

Fendel, J. C., Vogt, A., Brandtner, A., & Schmidt, S. (2024). Mindfulness programs for problematic usage of the internet: A systematic review and meta-analysis. *Journal of Behavioral Addictions*, *13*(2), 327–353. https://doi.org/10.1556/2006.2024.000244

Ferraro, G., Caci, B., D'Amico, A., & Blasi, M. D. (2007). Internet addiction disorder: An Italian study. *CyberPsychology & Behavior*, *10*, 170–175. https://doi.org/10.1089/cpb.2006.9972

Fioravanti, G., & Casale, S. (2015). Evaluation of the psychometric properties of the Italian Internet Addiction Test. *Cyberpsychology Behavior and Social Networking*, *18*(2), 120–128. https://doi.org/10.1089/cyber.2014.0493

Geyer, S., Hall, H., Le Roux, L., & Crafford, G. (2017). Internet use among university students: A reason for concern? *Perspectives in Education*, *35*(1). https://doi.org/10.18820/2519593X/pie.v35i1.6

Gioia, F., Rega, V., & Boursier, V. (2021). Problematic Internet use and emotional dysregulation among young people: A literature review. *Clinical Neuropsychiatry*, *18*(1), 41–54. https://doi.org/10.36131/cnfioritieditore20210104

Griffiths, M. D. (2021). Internet use disorders: What's new and what's not? *Journal of Behavioral Addictions*, *9*(4), 934–937. https://doi.org/10.1556/2006.2020.00072

Gross, E. F. (2004). Adolescent Internet use: What we expect, what teens report. *Journal of Applied Developmental Psychology*, *25*(6), 633–649. https://doi.org/10.1016/j.appdev.2004.09.005

Gu, J., Wu, P., Luo, Y., He, X., Fu, L., Liu, H., Lin, F., Xu, Q., & Wu, X. (2023). Internet addiction, loneliness, and academic burnout among Chinese college students: a mediation model. *Frontiers in Psychiatry*, *14*, 1176596. https://doi.org/10.3389/fpsyt.2023.117659

Gülden, Ç., & Polat, K. (2024). Mobile phone addiction, emotion regulation, mindfulness, and self-control among adolescents: A

serial mediation analysis. *Erzincan University Journal of Education Faculty*, *26*(4), 542–578. https://doi.org/10.17556/erziefd.1500379

Haug, S., Castro, R. P., Kwon, M., Filler, A., Kowatsch, T., & Schaub, M. P. (2015). Smartphone use and smartphone addiction among young people in Switzerland. *Journal of Behavioral Addictions*, *4*(4), 299–307. https://doi.org/10.1556/2006.4.2015.037

Hawi, N. S., Blachnio, A., & Przepiorka, A. (2015). Polish validation of the Internet Addiction Test. *Computers in Human Behavior*, *48*, 548–553. https://doi.org/10.1016/j.chb.2015.01.058

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior*, *31*, 351–354. https://doi.org/10.1016/j.chb.2013.10.059

Kaufman, E. A., Xia, M., Fosco, G., Yaptangco, M., Skidmore, C. R., & Crowell, S. E. (2016). The Difficulties in Emotion Regulation Scale Short Form (DERS-SF): Validation and replication in adolescent and adult samples. *Journal of Psychopathology and Behavioral Assessment*, *38*(3), 443–455. https://doi.org/10.1007/s10862-015-9529-3

Khazaal, Y., Billieux, J., Thorens, G., Khan, R., Louati, Y., Scarlatti, E., Theintz, F., Lederrey, J., Van Der Linden, M., & Zullino, D. (2008). French validation of the internet addiction test. *Cyberpsychology & Behavior: The Impact of the Internet Multimedia and Virtual Reality on Behavior and Society*, *11*(6), 703–706. https://doi.org/10.1089/cpb.2007.0249

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.

Koğar, H. (2020). Development of a short form: Methods, examinations, and recommendations. *Journal of Measurement and Evaluation in Education and Psychology*, *11*(3), 302–310. https://doi.org/10.21031/epod.739548

Korkmaz Aslan, T., & Batı, S. (2024). Addiction in university students – determining the levels of cigarette, alcohol, substance, game, and Internet addiction. *European Journal of Clinical and Experimental Medicine*, *21*(1), 58–67. https://doi.org/10.15584/ejcem.2023.1.8

Kutlu, M., Savcı, M., Demir, Y., & Aysan, F. (2016). Turkish adaptation of Young's Internet Addiction Test-Short Form: A reliability and validity study on university students and adolescents. *Anadolu Psikiyatri Dergisi*, *17*(Ek.1), 69–76. https://doi.org/10.5455/apd.190501

Kwon, M., Lee, J. Y., Won, W. Y., Park, J. W., Min, J. A., Hahn, C., Gu, X., Choi, J. H., & Kim, D. J. (2013). Development and validation of a smartphone addiction scale (SAS). *PloS one*, *8*(2), e56936. https://doi.org/10.1371/journal.pone.0056936

Laconi, S., Rodgers, R. F., & Chabrol, H. (2014). The measurement of Internet addiction: A critical review of existing scales and their psychometric properties. *Computers in Human Behavior*, *41*, 190–202. https://doi.org/10.1016/j.chb.2014.09.026

Lee, M., Chung, S. J., Lee, Y., Park, S., Kwon, J. G., Kim, D. J., Lee, D., & Choi, J. S. (2020). Investigation of correlated ınternet and smartphone addiction in adolescents: copula regression analysis. *International Journal of Environmental Research and Public Health*, *17*(16), 5806. https://doi.org/10.3390/ijerph17165806

Liu, Q., Wu, Zhou, Z., & Wang, W. (2020a). Parental technoference and smartphone addiction in Chinese adolescents: The mediating role of social sensitivity and loneliness. *Children and Youth Services Review*, *118*, 105434. https://doi.org/10.1016/j.childyouth.2020.105434

Liu, Q. Q., Yang, X. J., Hu, Y. T., & Zhang, C. Y. (2020b). Peer victimization, self-compassion, gender and adolescent mobile phone addiction: Unique and interactive effects. *Children and Youth Services Review*, *118*, 105397. https://doi.org/10.1016/j.childyouth.2020.105397

Liu, Y., Peng, J., Ding, J., Wang, J., Jin, C., Xu, L., Zhang, T., & Liu, P. (2025). Anxiety mediated the relationship between bullying victimization and internet addiction in adolescents, and family support moderated the relationship. *BMC Pediatrics*, *25*, 8. https://doi.org/10.1186/s12887-024-05348-z

Lozano-Blasco, R., Latorre-Martínez, M., & Cortés-Pascual, A. (2022). Screen addicts: A meta-analysis of internet addiction in adolescence. *Children and Youth Services Review*, *135*. https://doi.org/10.1016/j.childyouth.2022.106373. Article 106373.

Macklem, G. L. (2008). *Practitioner's guide to emotion regulation in school-aged children*. Springer Science+Business Media.

Masi, G., Berloffa, S., Muratori, P., Paciello, M., Rossi, M., & Milone, A. (2021). Internet addiction disorder in referred adolescents: A clinical study on comorbidity. *Addiction Research & Theory*, *29*(3), 205–211. https://doi.org/10.1080/16066359.2020.1772242

Masten, A. S., Burt, K. B., Roisman, G. I., Obradovic, J., Long, J. D., & Tellegen, A. (2004). Resources and resilience in the transition to adulthood: Continuity and change. *Development and Psychopathology*, *16*(4), 1071–1094. https://doi.org/10.1017/S0954579404040143

McAdams, D. P. (2015). Life authorship in emerging adulthood. In J. J. Arnett (Ed.), *The Oxford handbook of emerging adulthood* (p. 438 446). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199795574.013.004

Millsap, R. E. (2011). *Statistical approaches to measurement invariance*. Routledge.

Monemi, A., & Zeinali, A. (2022). The role of difficulty in emotion regulation and loneliness feeling in predicting cellphone over use in adolescents. *Contemporary Psychology, 17*(1), 1–11 http://dorl.net/dor/20. 1001.1.20081243.1402.16.2.1.9.

Moon, S. J., Hwang, J. S., Kim, J. Y., Shin, A. L., Bae, S. M., & Kim, J. W. (2018). Psychometric properties of the Internet Addiction Test: A systematic review and meta-analysis. *Cyberpsychology Behavior and Social Networking*, *21*(8), 473–484. https://doi.org/10.1089/cyber.2018.0154

Morahan-Martin, J. (2005). Internet abuse: Addiction? Disorder? Symptom? Alternative explanations? *Social Science Computer Review*, *23*(1), 39–48. https://doi.org/10.1177/0894439304271533

Mozafar Saadati, H., Mirzaei, H., Okhovat, B., & Khodamoradi, F. (2021). Association between internet addiction and loneliness across the world: A meta-analysis and systematic review. *SSM - Population Health*, *16*, 100948. https://doi.org/10.1016/j.ssmph.2021.100948

Nambirajan, M. K., Vidusha, K., Kailasam, J. G., Kannan, S., Govindan, D., Ganesh, K., Priyan, U. S., S., & Krishnamoorthy, Y. (2025). Association between smartphone addiction and sedentary behaviour amongst children, adolescents and young adults: A systematic review and meta-analysis. *Journal of Psychiatric Research*, *184*, 128–139. https://doi.org/10.1016/j.jpsychires.2025.02.049

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223–250. https://doi.org/10.1080/15298860309027

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the Mindful Self-Compassion program. *Journal of Clinical Psychology*, *69*(1), 28–44. https://doi.org/10.1002/jclp.21923

Noroozi, F., Hassanipour, S., Eftekharian, F., Eisapareh, K., & Kaveh, M. H. (2021). Internet addiction effect on quality of life: A systematic review and meta-analysis. *The Scientific World Journal Article*, 2556679. https://doi.org/10.1155/2021/2556679

Pan, Y. C., Chiu, Y. C., & Lin, Y. H. (2020). Systematic review and meta-analysis of epidemiology of internet addiction. *Neuroscience*

*& Biobehavioral Reviews*, *118*, 612–622. https://doi.org/10.1016/j.neubiorev.2020.08.013

Pawlikowski, M., Altstötter-Gleich, C., & Brand, M. (2013). Validation and psychometric properties of a short version of Young's Internet Addiction Test. *Computers in Human Behavior*, *29*(3), 1212–1223. https://doi.org/10.1016/j.chb.2012.10.014

Phillips, W. J., & Wisniewski, A. T. (2021). Self-compassion moderates the predictive effects of social media use profiles on depression and anxiety. *Computers in Human Behavior Reports*, *4*, 100128. https://doi.org/10.1016/j.chbr.2021.100128

Pino, M. J., Herruzo, J., Raya, A., Ruiz-Olivares, R., & Herruzo, C. (2022). Development of IAT-12, a reduced Spanish version of the internet addiction test. *Current Psychology*, *41*(12), 8471–8480. https://doi.org/10.1007/s12144-020-01167-4

Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 Internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior*, *45*, 137–143. https://doi.org/10.1016/j.chb.2014.12.006

Pontes, H. M., Patrão, I. M., & Griffiths, M. D. (2014). Portuguese validation of the Internet Addiction Test: An empirical study. *Journal of Behavioral Addictions*, *3*(2), 107–114. https://doi.org/10.1556/JBA.3.2014.2.4

Przepiorka, A. M., Blachnio, A., Miziak, B., & Czuczwar, S. J. (2014). Clinical approaches to treatment of Internet addiction. *Pharmacological Reports: PR*, *66*(2), 187–191. https://doi.org/10.1016/j.pharep.2013.10.001

Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review*, *41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Qiang, J., Jin, Y., Li, Y., & Xu, C. (2025). The relationship between self-compassion and mobile phone addiction in university students: a chain mediation model. *Frontiers in Psychiatry*, *16*, 1603860. https://doi.org/10.3389/fpsyt.2025.1603860

Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology & Psychotherapy*, *18*(3), 250–255. https://doi.org/10.1002/cpp.702

Reise, S. P., Widaman, K. F., & Pugh, R. H. (1993). Confirmatory factor analysis and item response theory: Two approaches for exploring measurement invariance. *Psychological Bulletin*, *114*(3), 552–566. https://doi.org/10.1037/0033-2909.114.3.552

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, *39*(3), 472–480. https://doi.org/10.1037//0022-3514.39.3.472

Savci, M., & Aysan, F. (2017). Technological addictions and social connectedness: Predictor effect of internet addiction, social media addiction, digital game addiction and smartphone addiction on social connectedness. *Dusunen Adam: The Journal of Psychiatry and Neurological Sciences*, *30*, 202–216. https://doi.org/10.5350/DAJPN2017300304

Sela, Y., Bar-Or, R. L., Kor, A., & Lev-Ran, S. (2021). The Internet addiction test: Psychometric properties, socio-demographic risk factors and addictive co-morbidities in a large adult sample. *Addictive Behaviors*, *122*, 107023. https://doi.org/10.1016/j.addbeh.2021.107023

Shapira, N. A., Lessig, M. C., Goldsmith, T. D., Szabo, S. T., Lazoritz, M., Gold, M. S., & Stein, D. J. (2003). Problematic internet use: proposed classification and diagnostic criteria. *Depression and Anxiety*, *17*(4), 207–216. https://doi.org/10.1002/da.10094

Smith, G. T., McCarthy, D. M., & Anderson, K. G. (2000). On the sins of short-form development. *Psychological Assessment*, *12*(1), 102–111. https://doi.org/10.1037//1040-3590.12.1.102

Starcevic, V., & Aboujaoude, E. (2017). Internet addiction: reappraisal of an increasingly inadequate concept. *CNS Spectrums*, *22*(1), 7–13. https://doi.org/10.1017/S1092852915000863

Statista (2025). Number of internet users worldwide from 2005 to 2025(in millions). https://www.statista.com/statistics/273018/number-of-internet-users-worldwide/

Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, *80*(1), 99–103. https://doi.org/10.1207/S15327752JPA8001_ 18.

Sun, R., Gao, Q., & Xiang, Y. (2022). Perceived parental monitoring of smartphones and problematic smartphone use in adolescents: mediating roles of self-efficacy and self-control. *Cyberpsychology Behavior and Social Networking*, *25*(12), 784–792. https://doi.org/10.1089/cyber.2022.0040

Sun, Y., Wang, Z., & Liu, T. (2025). Association of Internet addiction with psychiatric symptom levels and sleep disorders: a systematic review and meta-analysis. *Frontiers in Psychology*, *16*, 1573058. https://doi.org/10.3389/fpsyg.2025.1573058

Sunar, D., & Fisek, G. O. (2004). Contemporary Turkish families. In U. Gielen, & J. Roopnarine (Eds.), *Families in global perspective* (pp. 169–183). Allyn & Bacon.

Tafur-Mendoza, A. A., Acosta-Prado, J. C., Zárate-Torres, R. A., & Ramírez-Ospina, D. E. (2020). Assessing the psychometric properties of the Internet addiction test in Peruvian university students. *International Journal of Environmental Research and Public health*, *17*(16), 5782. https://doi.org/10.3390/ijerph17165782

Tudorel, O. I., Vintilă, M., Vlaicu, L., Bălăuță, D., Goian, C., & Rusu, A. (2019). Romanian version of the Internet Addiction Test: Psychometric properties and cross-gender invariance. *International Journal of Mental Health and Addiction*, *17*, 234–246. https://doi.org/10.1007/s11469-018-0014-6

Turkish Statistical Institute (2025). Hanehalkı Bilişim Teknolojileri (BT) Kullanım Araştırması. https://data.tuik.gov.tr/Bulten/Index?p=Hanehalki-Bilisim-Teknolojileri-(BT)-Kullanim-Arastirmasi-2025-53925

Valenti, G. D., Craparo, G., & Faraci, P. (2025). The development of a short version of the Internet Addiction Test: The IAT-7. *International Journal of Mental Health and Addiction*, 1–26. https://doi.org/10.1007/s11469-023-01153-4

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*, 4–70. https://doi.org/10.1177/109442810031002

Wang, B. Q., Yao, N. Q., Zhou, X., Liu, J., & Lv, Z. T. (2017). The association between attention deficit/hyperactivity disorder and internet addiction: a systematic review and meta-analysis. *Bmc Psychiatry*, *17*(1), 260. https://doi.org/10.1186/s12888-017-1408-x

Wang, Y., Liu, M., & Nogueira, O. C. B. L. (2023). Prevalence and risk factors of internet gaming disorder under the COVID-19 pandemic among university students in Macao. *SAGE Open Nursing*, *9*, 23779608231158158. https://doi.org/10.1177/23779608231158158

Wang, D., Zhou, M., & Hu, Y. (2024). The relationship between harsh parenting and smartphone addiction among adolescents: Serial mediating role of depression and social pain. *Psychology Research and Behavior Management*, *17*, 735–752. https://doi.org/10.2147/PRBM.S438014

Wang, Y., Wu, W., Cao, X., & Tang, X. (2025). Multi-Informant profiles of helicopter parenting and parent-child intimacy: longitudinal links with adolescents' self-discipline and problematic ınternet use. *Journal of Youth and Adolescence*, *54*, 2049–2061. https://doi.org/10.1007/s10964-025-02179-8

World Health Organization (2019). *International classification of diseases for mortality and morbidity statistics* (11th rev.). World Health Organization.

Yang, X., Ma, H., Zhang, L., Xue, J., & Hu, P. (2023). Perceived social support, depressive symptoms, self-compassion, and mobile phone addiction: A moderated mediation analysis. *Behavioral Sciences*, *13*, 769. https://doi.org/10.3390/bs13090769

Yang, Q., Xu, P., Shi, M., & Peng, T. (2025). Will academic stress lead to internet addiction among adolescents? The role of self-concealment and academic performance. *Current Psychology*, *44*, 13444–13456. https://doi.org/10.1007/s12144-025-08097-z

Yigit & Guzey Yiğit. (2019). Psychometric properties of Turkish version of difficulties in emotion regulation scale-brief form (DERS-16). *Current Psychology*, *38*(6), 1503–1511. https://doi.org/10.1007/s12144-017-9712-7

Yin, X., Yu, Y., Qian, H., & Wang, Z. (2024). Family happiness and college students' smartphone addiction control: the chain mediation effect of emotion regulation and self-control. *Frontiers in Public Health*, *12*, 1444033. https://doi.org/10.3389/fpubh.2024.1444033

Yıldırım, M., & Sarı, T. (2018). Öz-Şefkat Ölçeği Kısa Formu'nun Türkçe uyarlaması: Geçerlik ve güvenirlik çalışması. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, *18*(4), 2502–2517. https://doi.org/10.17240/aibuefd.2018.18.41844-452171

Yıldız, M. A., & Duy, M. (2014). Adaptation of the short-form of the UCLA Loneliness Scale (ULS-8) to Turkish for the adolescents. *Düşünen Adam The Journal of Psychiatry and Neurological Sciences*, *27*, 194–203. https://doi.org/10.5350/DAJPN2014270302

Yıldız, N. T., Canlı, M., Kocaman, H., Yetiş, A., Yıldırım, H., & Valamur, I. (2025). Validity and reliability of the Turkish version of the Ottawa Sitting Scale in patients with multiple sclerosis. *Acta Neurologica Belgica*, *125*(2), 501–508. https://doi.org/10.1007/s13760-025-02736-9

Young, K. S. (1996). Pathological Internet use: A case that breaks the stereotype. *Psychological Reports*, *79*, 899–902.

Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *Cyber Psychology & Behavior*, *1*(3), 237–244. https://doi.org/10.1089/cpb.1998.1.237

Young, K. S. (2004). Internet Addiction: A New clinical phenomenon and ıts consequences. *American Behavioral Scientist*, *48*(4), 402–415. https://doi.org/10.1177/0002764204270278

Yuksek, D. A., & Solakoglu, Ö. (2016). The relative influence of parental attachment, peer attachment, school attachment, and school alienation on delinquency among high school students in Turkey. *Deviant Behavior*, *37*(7), 723–747. https://doi.org/10.1080/01639625.2015.1062683

Zhu, Y., Deng, L., & Wan, K. (2022). The association between parent child relationship and problematic internet use among English and Chinese language studies: A metaanalysis. *Frontiers in Psychology*, *13*, 885819. https://doi.org/10.3389/fpsyg.2022.885819

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