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Psychometric Evaluation of the Trait-State FoMO Scale in a Turkish University Sample: Validity, Reliability, and Invariance Across Groups

Deniz Mertkan Gezgin^a , Chung-Ying Lin^{b,c,d}  and Aslı Kartol^e 

^aDepartment of Computer Education and Instructional Technology, Trakya University, Edirne, Türkiye; ^bInstitute of Allied Health Sciences, College of Medicine, National Cheng Kung University, Tainan, Taiwan; ^cBiostatistics Consulting Center, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan; ^dSchool of Nursing, College of Nursing, Kaohsiung Medical University, Kaohsiung, Taiwan; ^eDepartment of Psychological Counseling and Guidance, Trakya University, Edirne, Türkiye

ABSTRACT

Fear of Missing Out (FoMO) has received growing attention among university students; however, Turkish instruments assessing both trait and state FoMO remain limited. This study adapted the Trait-State Fear of Missing Out Scale (T-SFoMOS) into Turkish and evaluated its reliability, validity, and measurement invariance. A total of 614 Turkish undergraduates completed an online survey including the T-SFoMOS, the Bergen Social Media Addiction Scale, and the Positive and Negative Affect Schedule. The Turkish T-SFoMOS showed strong internal consistency ($\alpha = 0.839$ for trait, $\alpha = 0.858$ for state, $\alpha = 0.899$ for total) and good construct validity, supporting a two-factor trait-state structure (TLI = 0.981; SRMR = 0.062). Scalar invariance was established across gender and time spent on social media. Higher T-SFoMOS scores were associated with greater social media addiction and negative affect, supporting concurrent validity. Overall, the Turkish T-SFoMOS appears to be a reliable and valid instrument for assessing trait and state FoMO among Turkish university students.

KEYWORDS

Trait-state FoMO; reliability; validity; measurement invariance; Turkish university students

1. Introduction

The widespread use of social media offers the advantage of enabling people to interact with each other instantly, especially when smartphones become popular for people to use social media (Siaw et al., 2025; Tan, 2023). Nevertheless, its impact on subjective well-being has become a major global issue, prompting current research into the impact of social media on mental health, including problematic social media use (PSMU) (Huang et al., 2025a; Ruckwongpatr et al., 2025; Tung et al., 2025) and fear of missing out (FoMO) (Langlais et al., 2025; Pellegrino et al., 2022; Stirnberg et al., 2024). Although social media may enhance entertainment, such as visual content sharing (Marengo et al., 2018) and social interaction (Chegeni et al., 2022), ample evidence indicates the association between PSMU and negative mental health outcomes (Huang et al., 2025b; Mitropoulou, 2024; Nurmala et al., 2025; Shannon et al., 2022). Indeed, studies have shown that spending excessive amounts of time on social media is associated with an increased risk of mental health problems (Frison & Eggermont, 2016; O'Day & Heimberg, 2021).

A complex interplay of individual characteristics, emotions, thoughts and actions is believed to underlie excessive social media use, which shares similarities with addictive behaviors (Gan et al., 2025; Montag & Markett, 2023). Research suggests that there are three main reasons why people use social media in a problematic way: (i) fear of missing out (FoMO), (ii) seeking approval, and (iii) avoiding uncomfortable things (Panova & Carbonell, 2022). FoMO is defined as a prevalent fear that others are having rewarding experiences that one is not part of and characterized by the desire to stay continually

connected with what others are doing (Przybylski et al., 2013). FoMO is related to a kind of social exclusion; it can turn into a compulsive cycle of checking and interacting, leading to feelings of loneliness and inadequacy by highlighting the experiences and popularity of others and comparing oneself to them (Gupta & Sharma, 2021). When social media use becomes problematic (i.e., PSMU), this tendency can be explained in part by high levels of FoMO (Brailovskaia & Margraf, 2024). Indeed, Servidio et al. (2025) have shown in their studies that FoMO is a significant risk factor for PSMU. Existing studies have shown that FoMO is associated with high levels of depression, anxiety and stress (Alhaj et al., 2024; Sultan Ibrahim et al., 2022), poor sleep quality (Almeida et al., 2023), bedtime procrastination (Flores et al., 2023), alcohol use (Riordan et al., 2021) and low academic performance (Qutishat & Abu Sharour, 2019). Clearly, FoMO negatively affects mental health (Gupta & Sharma, 2021), and intervention studies are needed.

Although FoMO has been defined as a personality trait in previous studies, studies have begun to examine whether this phenomenon is a condition that changes as individuals' experiences change (Maxwell et al., 2022). Recently, FoMO is not a singular concept but a complex one, with two dimensions: a state that can change depending on the situation and a trait related to personality. While the personality trait of FoMO is characterized by jealousy and psychological deprivation, situational FoMO is considered to be less problematic (Wegmann et al., 2017). Recent studies have begun to evaluate the sub-dimensions separately, with the consideration of the two separate dimensions of FoMO as state and trait. In a recent study, Yoosefi et al. (2025) revealed that trait FoMO (a predisposition variable) and state FoMO (a mediator variable) are significantly related to PSMU. Similarly, Servidio et al. (2025) found that State-FoMO mediated the association between trait-FoMO and PSMU. Wang et al. (2025) examined the relationship between problematic use of social networking sites and state and trait FoMO, as well as loneliness. Holte (2023) developed an 8-item, single-dimensional State Fear of Missing Out Inventory (SFoMOI) self-assessment scale to address the single dimension of FoMO separately.

Examining studies on the development and adaptation of FoMO scales, Przybylski et al. (2013) developed a 10-item, single-factor FoMO scale. This scale has since been adapted for use in various cultures, including Türkiye (Gokler et al., 2016), Iran (Chashmi et al., 2023), Indonesia (Kaloeti et al., 2021) and Portugal (Almeida et al., 2024). These cross-cultural adaptations underscore the construct's broad relevance and the need for culturally attuned assessment. Wegmann et al. (2017) introduced a 12-item, two-subscale measure comprising trait and state FoMO (trait-FoMO: 5 items, $\alpha = 0.821$; state-FoMO: 7 items, $\alpha = 0.813$). This scale was later adapted for use in Chinese culture by Li et al. (2020). Moreover, a recent study proposed a brief 3-item FoMO scale that demonstrated measurement invariance across gender (strict invariance) and repeated measurement occasions (13 consecutive weeks and 7 consecutive days in separate diary samples) (Hisham et al., 2025), further highlighting the importance of psychometrically robust and culturally sensitive measures. Furthermore, studies have examined the relationships between this scale and various other variables (Hussain et al., 2024; Servidio et al., 2025; Wan & Zhou, 2025). Although there are existing FoMO measures with unidimensional structure in Turkish (e.g., Przybylski et al., 2013), Wegmann et al. (2017) found that FoMO may be a multifactorial construct. Relying on a one-dimensional measurement may make it more difficult to capture these nuanced differences and to identify which aspects of FoMO are driving maladaptive outcomes, particularly in Türkiye where social expectations, interpersonal sensitivity and digital communication habits can shape how individuals experience FoMO in both personal and situational contexts. Therefore, adapting a two-dimensional measurement that explicitly distinguishes between relatively stable characteristics and context-dependent circumstances provides a more theoretically coherent and culturally more sensitive assessment and is expected to offer greater explanatory power for understanding FoMO in the Turkish context. This multidimensional operationalization is also consistent with recent work conceptualizing FoMO as involving both trait-like predispositions and state-like situational experiences (Li et al., 2020; Wegmann et al., 2017). In this regard, having FoMO measures with multidimensional structure in Turkish is needed. This is noteworthy, as the trait FoMO may contribute to pathological internet addiction. Similarly, Brand et al. (2016) proposed the Interaction of Person-Affect-Cognition-Execution (I-PACE) model, which suggests that internet use disorders arise from the interaction of

personal characteristics, emotional state and cognitive executive functions. When adapting FoMO to this structure, the hypothesis was that examining the state and trait dimensions separately would further the investigation into how they fit within it. It is therefore thought that adapting this two-factor FoMO scale to Turkish culture will contribute to the existing literature on this subject and inform the design of future studies, depending on whether the focus is on the state or personal characteristics (trait) of FoMO.

2. Methods

2.1. Participants

A total of 614 undergraduate students participated in the study. Participants were recruited through convenience sampling. Data were collected during April 2025; a period within the spring semester of the 2024–2025 academic year, at a public university in Edirne, Türkiye. Among 614 participants (mean age 21.95 years with an SD of 1.82), most were females ($N=434$; 70.7%). More than three fourths of the participants were in grades 3 or 4 ($N=482$; 78.5%), and the most used social media app was *Instagram* ($N=417$; 67.9%). Approximately half of the participants used social media for four hours or less per day ($N=286$; 46.6%), while slightly more than half used it for more than four hours daily ($N=328$; 53.4%). Additionally, slightly more than one-fourth were enrolled in a health-related major ($N=159$; 25.9%). Detailed information about the participants' characteristics is presented in [Table 1](#).

2.2. Measures

2.2.1. Translation and adaptation process of the T-SFoMOS into Turkish

The translation and adaptation process of the T-SFoMOS into Turkish commenced with the procurement of formal permission from the original developers of the scale. Following the initiation of correspondence with Dr. Wegmann, a coauthor of the English version, consent was obtained to adapt the instrument for utilization in Turkish. The Turkish version of the T-SFoMOS was then adapted in accordance with international guidelines for cross-cultural adaptation of self-report measures (Beaton et al., 2000; Hambleton et al., 2004). Specifically, a forward–backward translation procedure and expert review were implemented.

Initially, two bilingual researchers in Guidance and Psychological Counseling (GPC) who were proficient in English independently translated all 12 items of the T-SFoMOS into Turkish. Secondly, the research team compared and reconciled these two forward translations into a single preliminary Turkish version, resolving any discrepancies in wording and ensuring semantic and conceptual consistency. Thirdly, the preliminary Turkish version was back-translated into English by two independent bilingual individuals (one researcher and one professional translator with advanced expertise in English language instruction) who were blinded to the original scale. Fourthly, the original English version, the reconciled Turkish version, and the back-translated English versions were collectively reviewed by an expert panel consisting of one GPC researcher and one clinical psychologist. During the course of this expert review, the panel evaluated semantic, idiomatic, experiential, and conceptual equivalence between the original and Turkish versions. Minor wording adjustments were made until full consensus was reached. Consequently, a 12-item, two-factor Turkish version of the T-SFoMOS was finalized and employed in the subsequent psychometric validation.

2.2.2. Trait-State Fear of Missing Out Scale (T-SFoMOS)

The Trait-State Fear of Missing Out Scale (T-SFoMOS) is a 12-item self-report instrument designed to assess two distinct but related dimensions of FoMO: a relatively stable trait component and a more situational, state component. Participants respond to each item using a five-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree), with higher scores indicating greater levels of FoMO. In the original development study, internal consistency was acceptable, with Cronbach's alpha coefficients of 0.82 for the trait subscale and 0.81 for the state subscale (Wegmann et al., 2017). In the current study, based on the Turkish version of the scale, internal reliability indices were found to be high.

Table 1. Participants' characteristics ($N = 614$).

Variable	<i>n</i> (%)
Age ^a	21.95 (1.82)
Gender	
Female	434 (70.7)
Male	180 (29.3)
Grade	
1	44 (7.2)
2	86 (14.0)
3	249 (40.6)
4	233 (37.9)
Missing	2 (0.4)
Most frequently used App	
Google	9 (1.5)
Instagram	417 (67.9)
Pinterest	6 (1.0)
TikTok	39 (6.4)
WhatsApp	50 (8.1)
X	55 (9.0)
YouTube	38 (6.2)
Time on social media use	
0–2 hr Per day	60 (9.8)
2–4 hr Per day	226 (36.8)
4–6 hr Per day	239 (38.9)
6 or More hours per day	89 (14.5)
Study major department	
Social science related	237 (38.6)
Science related	217 (35.3)
Health related	159 (25.9)
Others	1 (0.2)

^aAge reported using mean (SD).

Specifically, Cronbach's alpha values were 0.839 for the trait dimension, 0.858 for the state dimension, and 0.899 for the total scale.

2.2.3. Bergen Social Media Addiction Scale (BSMAS)

The Bergen Social Media Addiction Scale (BSMAS; Andreassen et al., 2016) is a brief, one-dimensional self-report instrument designed to assess PSMU. It comprises six items reflecting the core components of behavioral addiction as conceptualized by Griffiths (2005): salience, mood modification, tolerance, withdrawal, conflict, and relapse. Each item is rated on a 5-point Likert scale ranging from 1 (very rarely) to 5 (very often), with higher scores indicating higher levels of social media addiction. An example item from the scale is: "Have your attempts to stop using social media been unsuccessful?" Psychometric properties of the BSMAS are concluded to be satisfactory by a recent meta-analysis (Bottaro et al., 2025). In this study, the Turkish version of the BSMAS, adapted and validated by Demirci (2019), was used. The internal consistency of the scale in the current sample was high, with a Cronbach's alpha of 0.893. The BSMAS was thus employed to assess the concurrent validity of the Turkish version of the T-SFoMOS.

2.2.4. Positive and Negative Affect Schedule (PANAS)

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) is a 20-item self-report measure designed to assess two mood dimensions: positive affect (PA) and negative affect (NA). Each subscale contains 10 adjectives reflecting emotional states. Participants rate the extent to which they have experienced each emotion on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). Example items include "I feel irritable" and "I feel proud," which represent negative and positive affect, respectively. Prior studies have shown that PANAS is a psychometrically sound measure (e.g., Merz et al., 2013). In this study, the Turkish version of the PANAS, validated by Gencoz (2000; Pires et al., 2013), was used. The internal consistency coefficients in the current sample were 0.78 for the positive affect subscale and .80 for the negative affect subscale, indicating acceptable reliability.

2.3. Procedure

Throughout April 2025, data were collected from university students at a public university located in Edirne, Türkiye. The study was conducted over a one-month period using an online survey distributed on a voluntary basis. A total of 614 undergraduate students participated in the study. Participants were informed about the purpose of the research and provided informed consent online before completing the survey. Initially, they answered demographic questions regarding their age, gender, year of study, daily time spent on social media and preferred social media platforms. They then completed a series of self-report instruments, including the Turkish version of the T-SFoMOS (see [Appendix A](#)), the BSMAS, and the PANAS. Completion of the entire survey took approximately 10 min. Because all participants completed the questionnaire in full, the data from all 614 students were included in the final analysis.

2.4. Data analysis

The participants' characteristics and their item scores on the T-SFoMOS were analyzed using descriptive statistics, including mean (SD) and frequency (percentage). In the item scores, their distributions were evaluated using skewness and kurtosis values, and both absolute values smaller than 2 indicate normal distribution (Hair et al., 2010).

A two-factor model was then tested for the T-SFoMOS using confirmatory factor analysis (CFA) with weighted least squares mean, and variance adjusted (WLSMV) estimator. Several CFA fit indices (including comparative fit index [CFI], Tucker-Lewis index [TLI], root mean square error of approximation [RMSEA], and standardized root mean square residual [SRMR]) were used to evaluate if the two-factor T-SFoMOS is supported. CFI and TLI >0.9 with RMSEA and SRMR <0.08 indicate satisfactory fit to support the tested factor structure (Hair et al., 1995). In addition to CFA, internal consistency was assessed for the two factors in the T-SFoMOS and the entire T-SFoMOS using Cronbach's α and McDonald's ω , of which 0.7 is acceptable (Cheung et al., 2024; Taber, 2018). Meanwhile, factor loadings and corrected item-to-total correlations (CITC) of all T-SFoMOS items were evaluated and values >0.3 indicates acceptable (Tabachnick & Fidell, 2001).

In this study, participants were grouped by gender (female and male) and by daily social network sites use (SNSs) (<4 hr/day and ≥ 4 hr/day). We set ≥ 4 hr/day as a conservative high-intensity threshold for young adults for three reasons. First, EU-level analyses of representative PISA 2022 samples identify >3 hr/day as "excessive" social-media use linked to poorer mental-health outcomes (Bertoni et al., 2025). Second, evidence from a Turkish university sample shows that students reporting >4 hr/day internet/smartphone use have significantly higher FoMO and problematic internet use scores (Aygar et al., 2020) with converging Turkish evidence among pre-service teachers linking platform features/user behaviors to elevated social-media addiction risk (Dagli et al., 2021). Third, global benchmarks indicate that the "typical" user spends almost 2 hr 23 min/day on social media, so ≥ 4 hr/day sits well above normative exposure (Kemp, 2024).

Measurement invariance of the two-factor T-SFoMOS across gender groups (i.e., males vs. females) and across social media time groups (i.e., those spent four hours or fewer per day vs. those spent four hours or more per day) was evaluated using multigroup CFA. In multigroup CFA, three nested models were constructed: configural model that did not constrain any factor loadings or item intercepts across analyzed groups; metric invariance model that constrained factor loadings but not item intercepts across analyzed groups; and scalar invariance model that constrained both factor loadings and item intercepts across analyzed groups (Putnick & Bornstein, 2016). Following commonly used recommendations (Chen, 2007; Cheung & Rensvold, 2002), we considered a change in CFI (Δ CFI) of > -0.010 and a change in RMSEA (Δ RMSEA) of ≤ 0.015 between nested models as evidence that metric and scalar invariance were retained. Moreover, because the T-SFoMOS uses Likert-type scale, the CFAs were estimated using weighted least squares mean, and variance adjusted (WLSMV) estimator. Considering that WLSMV estimator cannot generate χ^2 for comparisons, Satorra-Bentler scaled χ^2 was used for comparing nested models (Satorra & Bentler, 1988, 1994).

Independent *t*-tests with effect size (ES) using Cohen's *d* were then carried out to examine if different gender groups (i.e., males vs. females) and groups with different time spent on social media (i.e., four or fewer daily vs. four or more daily) had different scores on T-SFoMOS (including trait factor, state factor, and total score). When Cohen's *d* at 0.2 indicates small ES, 0.5 medium ES, and 0.8 large ES (Cohen, 1988). Lastly, Pearson correlations were used to examine the concurrent validity of the T-SFoMOS, that whether it is significantly associated with BSMAS total score and negative affect score of PANAS. All analyses were performed using JASP 0.19.3.0.

2.5. Ethics

The study was approved by the Social and Human Sciences Research Ethics Committee of Trakya University in Türkiye (Approval No: 04/51, dated April 9, 2025). All procedures were carried out in accordance with the ethical principles stated in the Declaration of Helsinki, 2013. Prior to participation, all participants were provided with detailed information about the aim and procedure of the study and gave their informed consent electronically via the online survey platform. The ethical approval covered both the translation and psychometric evaluation phases of the study.

3. Results

Regarding the item properties of the T-SFoMOS, all items had acceptable skewness (between -0.40 and 0.77) and kurtosis values (between -1.06 and -0.36), supporting normal distributions of the item scores. In addition, factor loadings and CITC derived from a two-factor structure were larger than 0.3 (0.373 [item 6] and 0.802 [item 10] for loadings; 0.353 [item 6] and 0.746 [item 2] for CITC), suggesting all items contributed substantially to their embedded concepts (Table 2). Moreover, the two-factor structure was supported by excellent fit indices derived from CFA (CFI = 0.985 ; TLI = 0.981 ; RMSEA = 0.055 ; SRMR = 0.062); each factor of the T-SFoMOS and the total T-SFoMOS had satisfactory internal consistency: $\alpha = 0.839$ for trait factor, 0.858 for state factor, and 0.899 for total T-SFoMOS; $\omega = 0.844$ for trait factor, 0.863 for state factor, and 0.900 for total T-SFoMOS.

Measurement invariance findings from the multigroup CFA showed that males and females interpret the T-SFoMOS similarly as the scalar invariance model (CFI = 0.989 ; TLI = 0.989 ; RMSEA = 0.041 ; SRMR = 0.067) had slightly better fit indices than configural model (CFI = 0.989 ; TLI = 0.986 ; RMSEA = 0.045 ; SRMR = 0.067). Specifically, when using fit indices of metric invariance model to deduct those of configural model, the Δ values are: $\Delta\text{CFI} = 0.001$, $\Delta\text{TLI} = 0.003$, $\Delta\text{RMSEA} = -0.003$, and $\Delta\text{SRMR} = 0.001$. When using fit indices of scalar invariance to deduct those of metric invariance model, the Δ values are: $\Delta\text{CFI} = -0.001$, $\Delta\text{TLI} = 0.000$, $\Delta\text{RMSEA} = -0.001$, and $\Delta\text{SRMR} = -0.003$. In addition, participants using social media four hours or fewer per day interpreted the T-SFoMOS similarly to their counterparts who used social media four hours or more per day. Specifically, scalar invariance model across time-use groups (CFI = 0.921 ; TLI = 0.917 ; RMSEA = 0.065 ; SRMR = 0.068) had much better fit than configural model across time-use groups (CFI = 0.882 ; TLI = 0.853 ; RMSEA = 0.087 ; SRMR = 0.068). When using fit indices of metric invariance model to deduct those of configural model, the Δ values are: $\Delta\text{CFI} = 0.042$, $\Delta\text{TLI} = 0.060$, $\Delta\text{RMSEA} = -0.020$, and $\Delta\text{SRMR} = 0.003$. When using fit indices of scalar invariance to deduct those of metric invariance model, the Δ values are: $\Delta\text{CFI} = -0.003$, $\Delta\text{TLI} = 0.004$, $\Delta\text{RMSEA} = -0.002$, and $\Delta\text{SRMR} = -0.003$. Moreover, fit indices in the scalar invariance model were satisfactory (Table 3).

Based on the invariant findings across gender and time spent on social media, score differences in T-SFoMOS were examined between gender and between time spent on social media. Independent *t*-tests showed that females as compared with males had significantly higher scores in trait factor (11.74 ± 4.36 vs. 10.12 ± 4.52 ; $t = 4.15$; $p < 0.001$; Cohen's $d = 0.368$), state factor (19.04 ± 6.03 vs. 16.88 ± 6.33 ; $t = 3.98$; $p < 0.001$; Cohen's $d = 0.353$), and total T-SFoMOS (30.79 ± 9.38 vs. 27.01 ± 10.10 ; $t = 4.44$; $p < 0.001$; Cohen's $d = 0.394$); those used social media four or more hours per day had significantly higher scores in trait factor (10.23 ± 4.06 vs. 12.17 ± 4.61 ; $t = 5.48$; $p < 0.001$; Cohen's $d = 0.444$), state factor (16.55 ± 5.61 vs. 20.03 ± 6.23 ; $t = 7.23$; $p < 0.001$; Cohen's $d = 0.585$), and total T-SFoMOS (26.78 ± 8.84 vs. 32.20 ± 9.79 ; $t = 7.15$; $p < 0.001$; Cohen's $d = 0.579$) (Figure 1).

Table 2. Item properties of the trait-state Fear of missing out scale (T-SFoMOS).

Item #	Mean	SD	Skewness	Kurtosis	Loading ^a	CITC ^b
1	2.26	1.16	0.60	−0.53	0.767	0.732
2	2.08	1.12	0.77	−0.36	0.751	0.746
3	2.40	1.19	0.44	−0.82	0.703	0.675
4	2.19	1.14	0.70	−0.41	0.721	0.625
5	2.34	1.12	0.49	−0.52	0.644	0.450
6	3.37	1.22	−0.40	−0.82	0.373	0.353
7	2.51	1.21	0.30	−0.95	0.651	0.584
8	2.26	1.17	0.60	−0.56	0.792	0.700
9	2.54	1.22	0.29	−0.94	0.745	0.690
10	2.25	1.14	0.59	−0.51	0.802	0.708
11	2.56	1.20	0.33	−0.79	0.785	0.719
12	2.92	1.29	<0.001	−1.06	0.631	0.627

^aFactor loadings were derived using the total sample with a two-factor structure of T-SFoMOS (Items 1–5 belong to Trait factor; items 6–12 belong to State factor).

^bCorrected item-to-total correlations (CITC) were calculated using factors of T-SFoMOS (Items 1–5 belong to Trait factor; items 6–12 belong to State factor).

Cronbach's alpha = 0.839 (Trait); 0.858 (State); 0.899 (Total).

McDonald's omega = 0.844 (Trait); 0.863 (State); 0.900 (Total).

Table 3. Measurement invariance and fit statistics of the trait-state Fear of Missing Out Scale (T-SFoMOS).

	χ^2 (df)/p-Value	$\Delta\chi^2$ (δdf)/p-Value	CFI (δCFI)	TLI (δTLI)	RMSEA (δRMSEA)	SRMR (δSRMR)
All sample	150.455 (53)/<0.001	–	0.985 (–)	0.981 (–)	0.055 (–)	0.062 (–)
Gender invariance						
M0	173.044 (106)/<0.001	–	0.989 (–)	0.986 (–)	0.045 (–)	0.067 (–)
M1	177.990 (116)/<0.001	12.277 (10)/0.27 ^a	0.990 (0.001)	0.989 (0.003)	0.042 (−0.003)	0.068 (0.001)
M2	190.796 (126)/<0.001	21.584 (10)/0.02 ^a	0.989 (−0.001)	0.989 (0.000)	0.041 (−0.001)	0.065 (−0.003)
Time use invariance						
M0	351.772 (106)/<0.001	–	0.882 (–)	0.853 (–)	0.087 (–)	0.068 (–)
M1	274.746 (116)/<0.001	81.323 (10)/<0.001 ^a	0.924 (0.042)	0.913 (0.060)	0.067 (−0.020)	0.071 (0.003)
M2	290.706 (126)/<0.001	19.184 (10)/0.038 ^a	0.921 (−0.003)	0.917 (0.004)	0.065 (−0.002)	0.068 (−0.003)

M0: configural model; M1: metric invariance model; M2: scalar invariance model; CFI: comparative fit index; TLI: Tucker-Lewis index; RMSEA: root mean square error of approximation; SRMR: standardized root mean square residual.

^aBecause the models were fitted using weighted least squares mean, and variance adjusted (WLSMV) estimator, χ^2 tests were conducted using Satorra-Bentler scaled chi-square.

Concurrent validity of the T-SFoMOS (including both factors and the total score) was then supported by the significant Pearson correlations with BSMAS total score ($r = 0.491$ – 0.657 ; $p < 0.001$) and negative affect score in PANAS ($r = 0.376$ – 0.460 ; $p < 0.001$). However, the T-SFoMOS was weakly associated with positive affect score in PANAS ($r = 0.089$ [$p = 0.027$] with state score; -0.017 [$p = 0.677$] with trait score; and 0.049 [$p = 0.225$] with total score). Moreover, age was found to be significantly associated with total score of T-SFoMOS ($r = -0.110$; $p = 0.006$) and trait factor score of T-SFoMOS ($r = -0.156$; $p < 0.001$) (Figure 2).

4. Discussion

The aim of this study was to adapt the T-SFoMOS into a Turkish version and to examine its psychometric properties among a sample of Turkish university students. The findings revealed that all participants were active social media users and that Instagram was the most frequently used social media application. Türkiye has been identified as one of the countries with the highest Instagram usage relative to its population in recent years (We Are Social, 2025). In particular, Instagram Stories and instant reward mechanisms based on public likes and comments are highly attractive to young users (Gezgin & Mihci, 2020). Indeed, Balta et al. (2020) found that FoMO is indirectly associated with phubbing behavior through both direct and problematic Instagram use. Moreover, Stirnberg et al. found that FoMO associates with subsequent problematic smartphone use in a longitudinal study (Stirnberg et al., 2024). These prior findings underscore the intricate relationship between social media applications and individuals' digital behaviors and psychological characteristics. Also, this supports the importance of using valid measures assessing FoMO.

In this study, the CFA results of the Turkish version of T-SFoMOS supported the scale's original two-factor structure, consisting of trait and state factors. The model fit indices (CFI = 0.97; TLI =

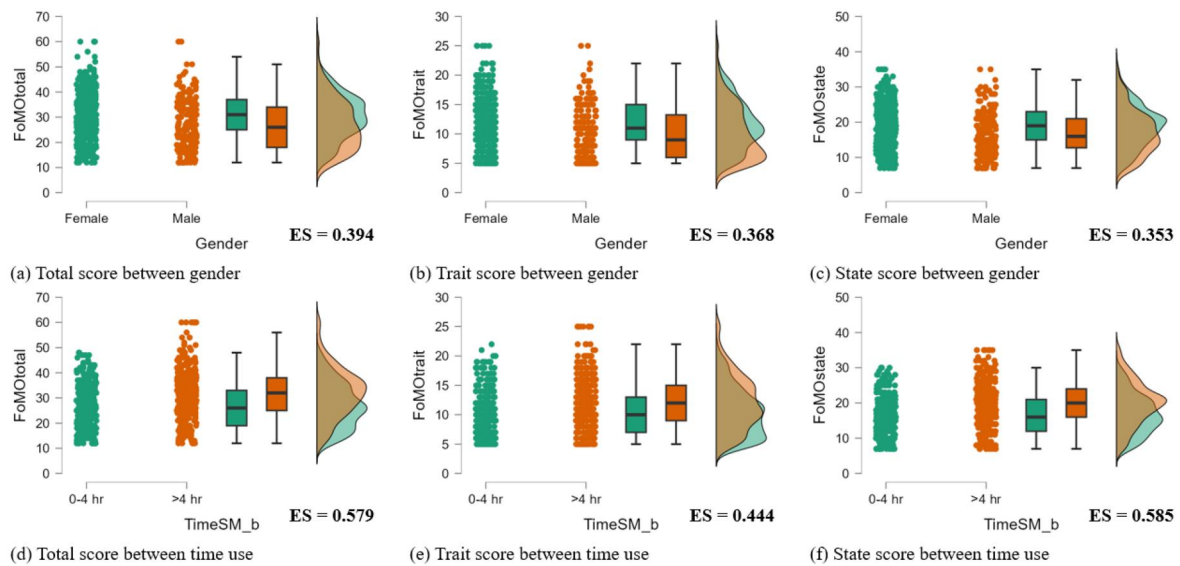


Figure 1. Trait-state Fear of missing out scale (T-SFoMOS) score differences in gender (Figure 1(a-c)) and time on social media (Figure 1(d-f)). Note: All p -values < 0.001 ; ES: effect size using Cohen's d .

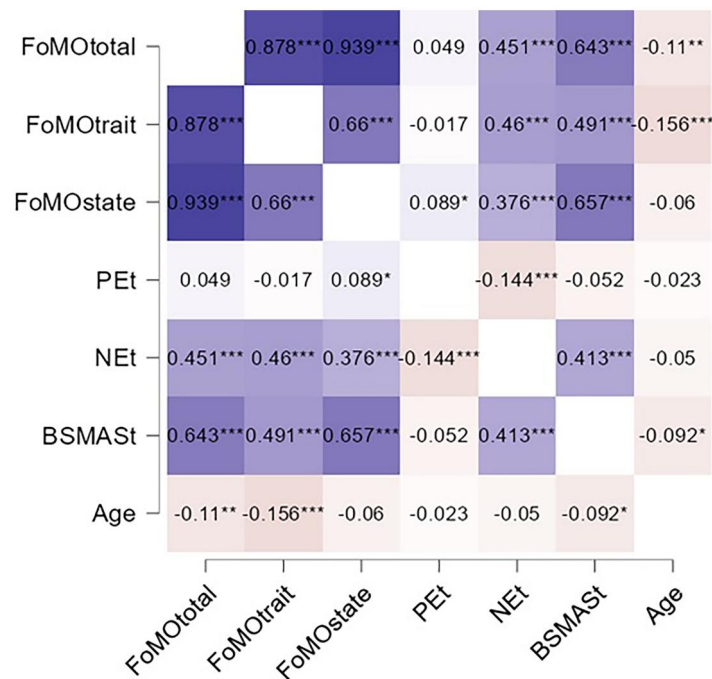


Figure 2. Correlation of trait-state Fear of missing out scale (T-SFoMOS) score with other measures. Note: FoMOtotal: total score of T-SFoMOS; FoMOtrait: trait factor score of T-SFoMOS; FoMOstate: state factor score of T-SFoMOS; PEt: positive affect score of Positive and Negative Affect Scale Short-Form; NEt: negative affect score of Positive and Negative Affect Scale Short-Form; BSMASt: total score of Bergen Social Media Addiction Scale.

0.96; RMSEA = 0.066; SRMR = 0.041) were found to be at a good level, indicating that the measurement model is valid for the sample of Turkish university students. Additionally, the internal consistency coefficients for both the subscales and the total scale are quite high (trait-FoMO: $\alpha = 0.87$; state-FoMO: $\alpha = 0.88$; total scale: $\alpha = 0.91$). These findings are consistent with results obtained in previous studies conducted in different cultural contexts (Li et al., 2020; Veysuei et al., 2023). The scale's measurement invariance analyses revealed that it performed similarly across gender groups and social media usage durations, with invariance achieved at the construct, metric, and scalar levels. This indicates that T-SFoMOS can be reliably compared across different demographic groups.

In the correlation analyses conducted within the scope of the scale's concurrent validity, positive and significant relationships were found between the T-SFoMOS total score and the BSMAS ($r=0.643$, $p<0.001$) and the PANAS Negative Emotion subscale ($r=0.451$, $p<0.001$). However, a low and non-significant relationship was observed with positive emotions ($r=0.049$, $p>0.05$). These results support the notions made by previous literature that FoMO is associated with PSMU (Franchina et al., 2018; Przybylski et al., 2013; Servidio et al., 2022) and negative emotions (Fabris et al., 2020; Li et al., 2020; Lopes et al., 2022; Soner & Yilmaz, 2018). Therefore, the scale is a functional tool for psychological assessments.

Another interesting finding from this study is that both female students (Franchina et al., 2018; Li et al., 2020; Stead & Bibby, 2017) and individuals who use social media for more than four hours a day (Balci & Bal, 2022; Gezgin et al., 2017) had significantly higher levels of both trait and state FoMO. This phenomenon can be attributed to a number of factors. Firstly, female users use social media more than male users for interaction and tend to show stronger emotional responses in this interaction (Dumford et al., 2023). Secondly, female users often demonstrate poorer emotion regulation skills and lower psychological resilience compared to male users (Bangasser & Valentino, 2014; He et al., 2019). Thirdly, female users are more likely to experience anxiety about missing out on social developments (Bloemen & de Coninck, 2020; Zhang et al., 2019).

Along with these assumptions, these findings can also be explained by social comparison theory (Festinger, 1954). The literature on the relationship between social comparison and FoMO supports this (Saritepeci & Kurnaz, 2024; Steinberger & Kim, 2023). Indeed, a study conducted with university students revealed that the strongest predictor of FoMO is social comparison and that women are more prone to social comparison behaviors than men, exhibit higher levels of excessive and problematic social media use, and are perfectionists (Piko et al., 2025). As part of the bidirectional nature of this relationship, increased social media usage also elevates FoMO levels by exposing individuals to content that frequently triggers feelings of exclusion, thereby increasing their tendency toward social comparison (Przybylski et al., 2013; Reer et al., 2019; Tanhan et al., 2022). In a country like Turkey, where the Instagram application is used extensively (Emanet & Pietzcker, 2022), the content and lifestyles presented on such applications may have a high tendency for social comparison. As a result of this comparison, individuals who feel uncomfortable about not having the lifestyle that others have may be inclined to purchase goods or services that can bring them closer to this lifestyle, especially women, in order to overcome this discomfort. This situation can trigger social media usage and FoMO. Indeed, it has been demonstrated that the relationship between social comparison and FoMO can increase social media-based purchasing tendencies, and that this effect is more pronounced among female consumers (Kavak et al., 2021).

Existing FoMO scale adaptation studies in Türkiye are generally single-factor and 10-item in structure. Most of these studies are adaptations of the original FoMO scale developed by Przybylski et al. (2013) into Turkish (Can & Satıcı, 2019; Gokler et al., 2016). Additionally, the scale developed by Zhang et al. (2020), which consists of a two-factor structure comprising a five-item personal FoMO dimension and a four-item social FoMO dimension, has been adapted into Turkish by Celik and Ozkara (2022). However, these studies seem not to encompass a detailed theoretical framework that includes both the trait and state dimensions of FoMO. In this regard, the T-SFoMOS uses a state-trait theory to quantify and distinguish the levels of FoMO in different psychological aspects (Wegmann et al., 2017). That is, the T-SFoMOS may provide additional information than other existing FoMO measures for healthcare providers and researchers to understand FoMO.

Although T-SFoMOS has been used in previous study with some Turkish samples, Balta et al. (2020) simply focused on internal consistency. They did not examine other important psychometric properties, especially using advanced psychometric test (e.g., CFA and measurement invariance), for the T-SFoMOS. Therefore, the prior studies on T-SFoMOS Turkish version do not know how it performs in factor structure validity, measurement invariance, and concurrent validity. In this context, the present study is the first to systematically adapt T-SFoMOS into Turkish and comprehensively conduct validity and reliability analyses. Furthermore, the adaptation of this scale into Turkish will contribute to comparative studies investigating the cross-cultural validity of FoMO and fill an important gap in the field.

Future research should also test the scale on different age groups, cultural contexts, and clinical samples.

4.1. Implications and limitations

Theoretically, the findings support the dual view that FoMO is generally a stable trait and a temporal state. After determining scalar invariance across gender and daily SNSs usage intensity groups (≥ 4 hr/day or < 4 hr/day), the observed mean differences can be interpreted as genuine differences in FoMO rather than effects of the measurement instrument. In practice, it is recommended that trait scores be used for screening and risk classification in university Psychological Counseling and Guidance Centers (PCGCs) and that state scores be used to measure short-term changes and to adapt specific short psychoeducational interventions (e.g., managing social comparison, strengthening digital self-regulation) for university students with particularly high exposure (≥ 4 hr/day).

Moreover, when the study is approached from the perspective of human-computer interaction (HCI), the finding that females have higher levels of FoMO indicates a need for design measures that specifically consider the digital well-being of female users in the field of HCI. Indeed, a previous HCI-based study has detailed how temporary content on social networks, intense notification flows, read receipts, tagging, and group chats can increase FoMO (Alutaybi et al., 2019). Considering these findings, interface modifications are proposed, including flexible settings that enable female users to filter notifications according to importance and source, accessible summary feeds for transient content, explanatory status indicators that provide context to read receipts, and concise psycho-educational prompts that raise FoMO awareness. T-SFoMOS is a useful assessment tool for identifying female users with high FoMO levels in such HCI-focused interventions and for monitoring the impact of design changes on FoMO.

This study has some limitations. First, the sample of the study is limited to undergraduate students studying at only one state university in Türkiye, which limits the generalizability of the findings and reflects a convenience sampling frame. Moreover, the gender imbalance in our study sample (70.7% female) warrants caution when interpreting and generalizing gender-based comparisons, even though scalar measurement invariance was established, particularly when drawing conclusions about males or gender-specific patterns of FoMO and technology use. In addition, there is a risk of respondent bias due to the self-reporting method used to collect data from participants. Finally, the cross-sectional design of the study does not allow for the establishment of cause-and-effect relationships. Future studies should be expanded to include multi-location sample groups with better gender balance in Türkiye and should examine predictive validity and stability using longitudinal or multi-wave designs, ideally across diverse user groups and digital contexts relevant to HCI.

4.2. Conclusions

The Turkish adaptation of T-SFoMOS has been effectively validated as a reliable two-dimensional tool for evaluating both trait and state aspects of FoMO in Turkish university students. Measurement invariance across gender and daily SNSs usage intensity groups (≥ 4 hr/day versus < 4 hr/day) facilitates significant mean comparisons within this cross-sectional framework. The scale's robust psychometric qualities have extensive applications in academic research, monitoring the digital behaviors of youth, developing psychoeducational intervention programs, and detecting risk factors linked to behavioral addiction. These findings offer an empirical foundation for campus screening and intervention strategies; subsequent research might expand upon this by evaluating repeated stability and outcomes. Furthermore, distinguishing between characteristics and circumstances in FoMO (Li et al., 2020) provides a direct empirical basis for theoretical frameworks such as the I-PACE model (Brand et al., 2016). This model highlights the interaction between predispositions, emotional responses and situational triggers in the development of problematic digital engagement. By offering a culturally sensitive and theoretically grounded measurement tool, this study contributes to advancing research on the psychological mechanisms underlying technology use. Future studies could expand upon these findings by investigating long-term stability and outcome patterns in various behavioral contexts.

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Ethical approval

The study was approved by the Social and Human Sciences Research Ethics Committee of Trakya University in Türkiye (Approval No: 04/51, dated April 9, 2025).

Author contributions

CRedit: **Deniz Mertkan Gezgin**: Conceptualization, methodology, investigation, project administration, ethics approval, data collection, writing – original draft, discussion. **Chung-Ying Lin**: Data curation, formal analysis, visualization, writing – review & editing; **Aslı Kartol**: Writing – introduction, literature review, conceptual support.

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ORCID

Deniz Mertkan Gezgin  <http://orcid.org/0000-0003-4688-043X>
 Chung-Ying Lin  <http://orcid.org/0000-0002-2129-4242>
 Aslı Kartol  <http://orcid.org/0000-0001-8127-0560>

Data availability statement

The dataset used in this article can be obtained upon request from the corresponding author(s).

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About the authors

Deniz Mertkan Gezgin is an Associate Professor of Computer Education and Instructional Technology. His research spans human-computer interaction and cyberpsychology, with a particular focus on technology-related addictive behaviors and data-driven analysis of digital usage patterns. He is also recognized for his expertise in nomophobia and the emerging construct of Allessphobia.

Chung-Ying Lin is a Professor at the Institute of Allied Health Sciences, National Cheng Kung University, Tainan, Taiwan. His research interests cover wide spectrum of psychosocial health and health behaviors, including addictive behaviors and stigma issues. He is also an expert in psychometric testing with a strong track record.

Aslı Kartol is an Associate Professor of Psychological Counseling. Her research focuses on positive psychology, technology-related addictions, and student well-being. She conducts empirical studies, develops intervention programs, and collaborates internationally. Dr. Kartol aims to bridge scientific evidence with practical guidance to promote psychological resilience and healthy digital behaviors.

Appendix A. Turkish versions of the Trait-State FoMO Scale (T-SFoMOS)

Items	1	2	3	4	5
1. Başkalarının benden daha keyifli deneyimler yaşadığını düşünmek beni endişelendirir.					
2. Arkadaşlarımın benden daha keyifli deneyimler yaşadığını düşünmek beni endişelendirir.					
3. Arkadaşlarımın bensiz eğlendiğini öğrendiğimde rahatsızlık duyarım.					
4. Arkadaşlarımın ne yaptığını bilmediğimde içimde bir huzursuzluk olur.					
5. İyi vakit geçirdiğimde, bunun ayrıntılarını sosyal ağ sitelerinde paylaşmak benim için önemlidir.					
6. Planlanmış bir etkinliği kaçırmak beni rahatsız eder.					
7. Tatile gittiğimde bile, arkadaşlarımın neler yaptığını sosyal ağ sitelerinden takip etmeye devam ederim.					
8. Sosyal ağ sitelerinde güncel kalamamak beni kaygılandırır.					
9. Sosyal ağ sitelerindeki son gelişmeler (videolar, gönderiler, görseller vb.) hakkında söz sahibi olmak benim için önemlidir.					
10. Hiçbir şeyi kaçırmamak için sürekli çevrimiçi olurum.					
11. Hiçbir şeyi kaçırmamak için sık sık akıllı telefonumu kontrol ederim.					
12. Arkadaşlarımın kullandığı internet dilini anlamak benim için önemlidir.					

Note. Items 1, 2, 3, 4, and 6 represent Trait-FoMO; items 5, 7, 8, 9, 10, 11, and 12 represent State-FoMO. Response options ranged from 1 (Strongly Disagree) to 5 (Strongly Agree).