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Developing a novel parental phubbing scale of mother and father forms for adolescents in Türkiye: A validity and reliability study☆

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ABSTRACT

Parental phubbing occurs when parents interrupt and neglect communication with their child by focusing on their smartphones. This study aimed to develop a comprehensive scale for perceived parental phubbing and examine its psychometric properties. The scale was initially developed based on a review of existing research and essays written by secondary school adolescents aged 10–15 years, who represented the target group. Construct validity was assessed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) on samples of Turkish adolescents (N_{EFA} = 325, N_{CFA}=210). EFA identified a 10-item structure with two factors—"interaction interruptions" and "emotional reactions"—which accounted for a significant portion of the total variance in both the Parental Phubbing Scale-Mother (PPS-M) and Father (PPS-F) Forms. CFA confirmed this structure, with both forms demonstrating a good fit. Criterion validity was evaluated through correlations with the short forms of the Smartphone Addiction Scale and UCLA Loneliness Scale, showing positive correlations. Reliability analysis indicated that both Cronbach's α and McDonald's ω coefficients exceeded 0.70 for both the PPS-MF and PPS-FF. Test-retest reliability coefficients ranged between 0.70 and 0.82 for both forms. In conclusion, the PPS-MF and PPS-FF are valid and reliable instruments for assessing parental phubbing based on adolescents' perceptions.

1. Introduction

The term **"phubbing"** refers to the act of prioritizing a smartphone over face-to-face interactions during social gatherings, thus ignoring others. The word itself is a blend of **"phone"** and **"snub",** emphasizing the preference for smartphone use over engaging with those physically present (Karadağ et al., 2015). This increasingly common behavior can significantly affect the quality of communication and can lead to feelings of isolation and exclusion. A person who engages in this behavior is referred to as the "phubber", while the person who experiences the negative consequences of being ignored is called a **"phubbee."**

Chotpitayasunondh and Douglas (2018) conducted an extensive study on this subject, identifying four key factors associated with phubbing: nomophobia, interpersonal conflict, self-isolation, and an awareness of the problems it causes. On the other hand, being "phubbed" involves three main factors: perceived social norms, the feeling of being ignored, and interpersonal conflict. The passive nature of phubbing can pose a significant threat to the quality of interpersonal relationships (Przybylski et al., 2012). By engaging in phubbing behavior, "**phubbers"** indirectly convey that their smartphones take precedence over the other person, which can lead **"phubbees"** to form a negative impression of their interactions with them. The results of a study conducted by Chotpitayasunondh and Douglas (2018) to better understand the consequences of phubbing on social interactions confirm that experiencing phubbing negatively impacts mood and diminishes the quality of communication and relationships. This occurs because it undermines the fulfillment of basic human needs—such as belonging, self-esteem, meaning-making, and control— subsequently leading to feelings of exclusion and loneliness.

Since phubbing occurs in various settings and social contexts, it is

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categorized as partner phubbing, peer phubbing, boss phubbing, and parental phubbing (Aydoğdu & Koçtürk, 2023; Sayıner & Akbağ, 2023). Parental phubbing refers to the neglect of the parent-child connection when a parent is preoccupied with their phone instead of engaging in communication with their child (Xie & Xie, 2019). As parents increase their use of mobile devices, both verbal and nonverbal communication with their children decreases during interactions. Consequently, the quality of the parent-child relationship deteriorates. Review studies indicate that parental phubbing can directly or indirectly lead to mental and behavioral problems (Akbağ & Sayiner, 2021; Aydoğdu & Koçtürk, 2023). Recent research has examined various specific effects of parental phubbing, particularly concerning internalizing and externalizing behaviors in children. The first behavioral spectrum pertains to internalized symptoms, which include decreased self-esteem, suicidal ideation (Wang & Qiao, 2022), problematic smartphone use (Niu et al., 2020; Wang et al., 2023), mobile phone addiction (Liu et al., 2019; Marini et al., 2023; Xie et al., 2019), loneliness (Geng et al., 2021; Wang, Qiao et al., 2021; Wang, Zhao et al., 2021), and social withdrawal (Wang et al., 2022). The second behavioral spectrum encompasses externalized symptoms, such as learning burnout, effects on parent-child attachment, ego depletion, life satisfaction (He et al., 2022), and aggression (Wang et al., 2022).

On the other hand, parental phubbing is examined in relation to demographic variables such as the child's gender and age. While some studies indicate that girls perceive parental phubbing more intensely than boys (Pancani et al., 2021; Yin et al., 2024), other research findings reveal no significant gender differences (Cheng, 2023; Wang et al., 2023; Zhang et al., 2023). Additionally, there is an ongoing debate regarding how age influences the perception of phubbing. Some researchers propose that children of varying ages could be affected differently by parental phubbing (Hoeve et al., 2009), whereas other studies report no significant age-related differences (Cheng, 2023; Zhang et al., 2023).

1.1. Rationale of the current study

A review of the literature suggests that the negative consequences of phubbing can be explained by several socio-cognitive mechanisms that emerge as a result of this behavior, within the framework of the integrative attention-arousal-attribution theory. This theoretical framework integrates existing theories and perspectives on the negative consequences of phubbing and highlights three socio-cognitive mechanisms that emerge as a result of this behavior. These mechanisms include expectation violation caused by the interruption of anticipated behaviors in social situations, short-term ostracism along with the emotions associated with it, and attentional conflict resulting from the predominance of stimuli other than the primary attentional focus during a conversation (Vanden Abeele, 2020). In other words, phubbing diverts the phubbee's attention to the phone because of the phubber's excessive focus on it during social interaction. This diversion, in turn, activates the phubbee's relational schemas regarding the phone and its usage, which may lead to the interpretation of phubbing as a behavior that violates expectations and/or causes ostracism.

Ostracism in social situations, which is one of the integrative attention-arousal-attribution theory's mechanisms, is typically described as being excluded and ignored, and it often occurs without excessive explanation or overt negative attention (Vanden Abeele, 2020). On the other hand, "temporal need-threat model" suggest that rejection and social exclusion threaten basic human needs such as belonging, self-esteem, and feeling worthy (Williams, 2007). Thus, phubbing associated with parental smartphone use can threaten these basic needs of children and cause emotional reactions due to interruptions in interactions. Indeed, empirical evidence indicates that some automatic reactions emerge as a result of social ostracism. Feeling bad and ignored, feeling invisible and rejected, sadness and anger are among the emotional reactions that are automatically triggered (Hales & Williams, 2021; Williams et al., 2000). Based on the theoretical approaches and models mentioned above, it can be thought that parents are likely to interrupt their communication with their children when they are phubbing, and thus the child feels excluded and reacts in emotional ways.

A comprehensive review by Akbağ and Sayiner (2021) highlights that although parental phubbing represents a fertile area for research, there are not yet enough studies to clarify this complex phenomenon, and further research is needed. This may be attributed to the fact that phubbing is a relatively novel behavioral pattern, while existing measurement tools remain limited and not yet fully specialized. Indeed, the same study suggests that examining parental phubbing within different cultural and intercultural contexts, in relation to various variables, would be feasible through the development of specialized scales. In this context, when examining scale development studies on parental phubbing, several limitations become apparent. The most significant limitation is that existing scales do not measure the perceived phubbing behaviors of mothers and fathers separately. For instance, Aslıyüksek (2022) developed a scale based on children's self-reports of parental phubbing, including items such as "It is a priority for my parents to pay attention to their phone instead of chatting with me" and "When I am speaking to my parents face-to-face, they are often focused on their phone". These items do not differentiate between the experiences with mothers and fathers, potentially leading to confusion among respondents. During the administration of the scale, children may be unsure which parent the items refer to. Furthermore, using plural expressions may not be appropriate in studies involving single-parent families. Therefore, developing separate scale forms for mothers and fathers is crucial when using self-report tools to measure parental phubbing. Such scales would provide more precise and valuable insights for specific studies.

The second limitation pertains to adapting scales designed to measure one form of phubbing (e.g., partner phubbing) for assessing parental phubbing. For example, Pancani et al. (2021) developed a scale to assess maternal and paternal phubbing, which is essentially a modified version of the Partner Phubbing Scale by Roberts and David (2016). Phubbing occurs in a variety of relationship types, including parent-child dynamics, romantic partnerships, and peer interactions, each with its own contextual nuances and dynamics (Sayıner & Akbağ, 2023). Due to these contextual differences, applying measurement items from one relationship type to another may not accurately capture the dynamics of that relationship type. Therefore, when developing a scale to measure parental phubbing, it is crucial to design items that reflect the unique dynamics of the parent-child relationship.

A third limitation involves the use of modified versions of existing scales. Previous studies on parental phubbing, such as those by Aydoğdu and Yaşar (2022), Bai et al. (2020), and Qu et al. (2020), have generally used a modified version of the Generic Scale of Being Phubbed developed by Chotpitayasunondh and Douglas (2018). These modifications typically involve altering scale items and terminology to fit parental contexts, such as replacing "partner" with "parent". However, this approach has raised concerns regarding the construct validity of these scales (Sayıner & Akbağ, 2023).

All these limitations underscore the need for a parental phubbing scale that includes separate forms for mothers and fathers, specifically designed for children's self-reports. Indeed, there is a growing consensus in the literature regarding the necessity of reliable assessment tools to accurately define and measure parental phubbing (Aydoğdu & Koçtürk, 2023; Sayıner & Akbağ, 2023).

1.2. Aim of the current study

This study aims to develop a scale to assess parental phubbing based on children's self-reports and to determine its psychometric properties. Unlike previous approaches, the phubbing levels of mothers and fathers are measured separately. Considering the limitations of existing scales, this scale is specifically designed for the parent-child relationship,

avoiding modification and adaptations of other scales. In addition to measuring phubbing exhibited by mothers and fathers separately, the scale allows data to be collected directly through the phubbees' self-reports. In conclusion, the introduction of a robust scale to measure parental phubbing in its specific context will provide a more accurate understanding of this phenomenon. Additionally, it will enhance our comprehension of the complex dynamics between parental phubbing, its antecedents, and its consequences. Overall, this research sought to answer the following questions:

1. Are the mother and father forms of the Parental Phubbing Scale developed in this study valid and reliable for adolescent samples?
2. Is there a significant difference between perceived mother and father phubbing among adolescents?
3. Does mother and father phubbing differ according to adolescents' demographic characteristics, including gender and age?

2. Method

2.1. Research model

This study employed a quantitative research design and a methodological approach to develop the "Parental Phubbing Scale" and to assess its validity and reliability.

2.2. Participants

This scale development study involved a total of 697 adolescents from Türkiye. Participants were selected through convenience sampling, a non-probability sampling method. The adolescents, aged between 10 and 15 years, were enrolled in the 5th to 8th grades at secondary schools in a provincial center in Western Türkiye. Data were collected from four distinct adolescent groups at different time intervals. The first group, consisting of 325 participants with a mean age of 12.21 ± 1.09 years, underwent exploratory factor analysis (EFA). The second group, comprising 210 participants with an average age of 12.22 ± 1.20 years, was used for confirmatory factor analysis (CFA). The third group, with 124 participants and a mean age of 12.12 ± 1.17 years, was utilized to assess criterion-related validity. The fourth group, consisting of 38 participants with a mean age of 12.61 ± 0.60 years, was examined for test-retest reliability. Gender distribution was as follows: in the EFA group, 173 participants (53.23 %) were girls and 152 (46.77 %) were boys; in the CFA group, 112 participants (53.33 %) were girls and 98 (46.67 %) were boys; in the criterion-related validity group, 63 participants (50.80 %) were girls and 61 (49.20 %) were boys; and in the test-retest reliability group, 15 participants (39.47 %) were girls and 23 (60.53 %) were boys.

2.3. Procedure

Prior to data collection, ethical approval was obtained from the Bursa Uludağ University Social and Human Sciences Research and Publication Ethics Committee (dated April 28, 2023, numbered 2023–04, Decision No: 57). The parents or legal guardians of the adolescent participants were informed about the study through school administrators and counselors. A consent form detailing the study's purpose and scope was distributed to parents by classroom teachers. To ensure the validity of both forms, data was collected from students with both parents. A control question was added to the form to verify that both the mother and father were alive; thus, students with single parents were excluded from the study. Following parental consent, students were informed about the study's purpose during an information meeting led by the second author. At this meeting, students received instructions on completing the Google form, which included the data collection tools. With the assistance of classroom teachers, the researchers delivered the application form to consenting parents' children via WhatsApp, a popular social network in Türkiye. Reminder messages were sent through school WhatsApp groups during the data collection period. Students were first asked to read and accept the informed consent form, which explained the study's purpose, voluntary participation, anonymity, and that their data would only be used for this study. They were also informed of their right to withdraw from the study at any time. Additionally, the informed consent form required students to confirm that they completed the form independently, ensuring that no parents or other individuals intervened in the process. All research procedures adhered to the Declaration of Helsinki.

2.4. Measures

2.4.1. Personal information form (PIF)

The PIF includes questions prepared by the researchers to gather socio-demographic information about the participants, including their age and gender.

2.4.2. Smartphone addiction scale-short version (SAS-SV)

The SAS-SV, originally developed by Kwon et al. (2013) to assess smartphone addiction in adolescents, was adapted to Turkish culture by Şata and Karip (2017). This unidimensional, 10-item, 6-point Likert scale measures smartphone addiction, with higher scores reflecting greater levels of addiction. Confirmatory factor analysis (CFA) supported the unidimensional structure of the 10 items in the Turkish version. The reliability coefficients for the Turkish version were found to be Cronbach's $\alpha = 0.90$ and McDonald's omega $(\omega) = 0.94$. In the present study, the reliability coefficients were Cronbach's $\alpha = 0.88$ and McDonald's $\omega = 0.89$.

2.4.3. Short form of the UCLA loneliness scale (UCLS-SF)

The scale developed by Hays and DiMatteo (1987) was adapted to Turkish culture by Yıldız and Duy (2014). This scale assesses the severity of loneliness from adolescence to adulthood. The original version contained 8 items on a 4-point Likert scale. It is unidimensional, with higher scores indicating greater loneliness. During the adaptation process to Turkish culture, Exploratory Factor Analysis (EFA) identified an item with low factor loading, which was subsequently removed, reducing the scale to 7 items. Reliability analysis revealed a Cronbach's α of 0.74 and a test-retest reliability of 0.84. In the current study, Cronbach's α was 0.70 and McDonald's ω was 0.74.

2.5. Development of the parental phubbing scale-mother (PPS-M) and father (PPS-F) forms

The decision to develop a scale for assessing parental phubbing stemmed from reviews indicating a lack of tools that separately measure maternal and paternal phubbing from the child's perspective (Akbağ & Sayiner, 2021; Aydoğdu & Koçtürk, 2023; Sayıner & Akbağ, 2023). It is believed that existing scales may not fully capture the nuances of parental phubbing, as they are generally adaptations of tools designed for different contexts. To address this gap, a comprehensive literature review was conducted to understand the concept of parental phubbing and its theoretical foundations. Additionally, existing phubbing scales developed in various relationship contexts were examined. Such literature reviews are recommended as a deductive approach to facilitate the item-writing process (DeVellis & Thorpe, 2022). Furthermore, qualitative data collection from the target group or field experts through methods such as focus group interviews, individual interviews, and essay writing is suggested as an inductive approach (Tavşancıl, 2019). In line with this, before starting the item-writing stage, open-ended questions were posed to a group of secondary school students, representing the target group for the scale development process. A total of 70 students, comprising 38 girls and 32 boys aged between 10 and 14 years, were selected using a random cluster sampling method. These students were asked to write an essay in response to the following questions:

"How would you be affected if your mother or father began to show interest in their mobile phone while communicating with you? What would be your initial thoughts and feelings in such a scenario? How would you respond?" The researchers reviewed the students' responses and independently created items by integrating empirical evidence with theoretical and conceptual explanations from the literature, alongside the students' essay responses. Afterward, they convened to collectively review the items, ultimately developing an item pool of 95 items. Throughout this process, the researchers ensured that each item accurately reflected the latent variable—parental phubbing—and remained within the defined conceptual framework, as emphasized by DeVellis (2017). Furthermore, the number of items in the pool was intentionally kept high, as researchers emphasize the importance of including a substantial number of items to ensure the content validity of the scale (DeVellis, 2017; Yurdabakan & Çüm, 2017). The draft scale, consisting of 95 items, was designed to be rated on a 5-point Likert scale, where participants indicated their level of agreement with each item, ranging from "(1) never" to "(5) always". Care was taken to ensure that the Likert scale ratings were clearly separated from the items and that they were compatible with the content of each item.

2.6. Data analysis

In this study, the scale development stages proposed by DeVellis (2017) were followed. No missing data or outliers were detected in the dataset. Before analysis, the data were checked for normality. The content validity of the draft scale was evaluated using Lawshe's (1975) technique, refined by Ayre and Scally (2014). To assess construct validity, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed. Additionally, the average variance extracted (AVE) and composite reliability (CR) values were calculated to determine convergent validity. Criterion-related validity was examined by correlating the scale with the short forms of the UCLA Loneliness Scale (ULS-SF) and the Smartphone Addiction Scale (SAS-SV). For the reliability analysis, Cronbach's alpha (α), McDonald's omega (ω), and test-retest reliability were computed for both the PPS-M and PPS-F forms. In the study, a paired samples *t*-test was conducted to examine whether there was a significant difference between adolescents' perceptions of mother and father phubbing. Furthermore, the Multiple-Indicators Multiple-Causes Modeling (MIMIC) approach, which is a specific form of the structural equation models, was employed to whether perceived mother and father phubbing by adolescents differ according to their gender and age as covariates. This approach is considered a modern alternative to traditional methods such as *t*-tests, ANOVA, or regression analysis. As defined by Jöreskog and Sörbom (1996), a MIMIC model features latent variables that are identified by both endogenous item variables (multiple indicators) and causal exogenous variables, such as demographic factors (multiple causes). In MIMIC modeling, covariates can be both continuous and categorical (Bauer, 2017; Brown, 2015). The literature documents that the enhanced statistical power and ability to work with smaller sample sizes make MIMIC models an optimal alternative to multigroup confirmatory factor analysis (Jöreskog & Goldberger, 1975; Kline, 2023). Additionally, the flexibility of MIMIC models allows for the inclusion of multiple covariates (e.g., gender and age), enabling the simultaneous examination of their interactions (Cheung et al., 2023). In this study, we used the MIMIC modeling approach instead of traditional methods due to these advantages.

The data were analyzed using the statistical software packages SPSS 25.0, AMOS 22.0, and JAMOVI 2.3.26. Exploratory factor analysis (EFA), criterion-related validity, Cronbach's α for reliability, test-retest reliability, and comparisons of mother and father phubbing via paired samples t-test were conducted in SPSS. Confirmatory factor analysis (CFA) and MIMIC model analyses were performed with AMOS. Additionally, average variance extracted (AVE) and composite reliability (CR) values were calculated using a custom-developed software, AVECR 1.0 (Aydoğdu, 2023), specifically designed for this study. McDonald's omega (ω), used for reliability analysis, was calculated with JAMOVI. All results were evaluated at a significance level of 0.05.

3. Results

3.1. Content validity of the scale

3.1.1. Consulting expert opinion

To test content validity, a draft scale with 95 items was reviewed by six field experts with PhDs in psychology, psychological counseling, and guidance, all of whom had studied phubbing. The experts were asked to select one of the following options for each item: "The item should remain on the scale," "The item should be removed from the scale," or "The item should be revised." Based on the experts' recommendations, the draft scale was refined to 45 items by eliminating duplicate items with identical or highly similar wording that the researchers had independently generated. Items proposed for removal because they did not fully reflect the concept were subsequently reviewed. Given that expert opinions are subjective, the "modified Lawshe technique," revised by Ayre and Scally (2014) to recalculate the critical content validity ratio (CVR) values originally developed by Lawshe (1975), was employed to determine the content validity of the scale. This technique provides an objective and reliable method for deciding which items should be retained or removed. It involves calculating content validity ratios (CVRs) using the formula CVR = (NG / [N/2]) - 1, where NG is the number of experts who agreed that the item should be included. The resulting CVRs are then compared to the minimum content validity criterion ($CVR_{critical}$) table, which is standardized based on the number of experts.

When the CVRs for the draft scale were compared to the $CVR_{critical}$ table, the CVR was found to be 1.00 based on the six experts involved (Ayre & Scally, 2014). Thus, 32 items with CVRs below 1.00 were removed. The experts' opinions on the content of the phubbing concept were also considered when removing items. To accurately capture exposure to phubbing, the communication via smartphone must be interrupted, and the individual must be affected by this interruption. For instance, an item stating, "My mother/father never puts her/his phone down, as if she/he would miss something important" was removed because it did not adequately capture the phubbing experience. Upon examining this item, it is evident that how the interaction between the parent and the child is disrupted, and its subsequent impact on the child, remains unclear. To effectively address the phenomenon of "phubbing", it is crucial to consider the child's perspective and the effects of this behavior on them. Ultimately, all items were evaluated from the perspective of the individual experiencing phubbing.

After removing the items, the content validity index (CVI) was calculated by averaging the CVRs, resulting in a CVI of 1.00. Since the $CVR_{critical}$ value is 1.00 at the $\alpha = 0.05$ significance level, a CVI equal to or greater than this value (CVI $\geq$ critical CVR) indicates statistically significant content validity (Lawshe, 1975; Yurdugül, 2005). Based on expert feedback, an additional item was included (Item 9 in the Appendix: "If my mother/father focuses on her/his phone while I'm telling her/him about a problem, I give up on explaining my issue"). The literature indicates that items not originally included in the scale but proposed by experts can be incorporated into the scale (DeVellis, 2017). The draft version, consisting of 13 items including the additional item, was further revised by the researchers and finalized after incorporating the experts' suggestions on the items.

3.1.2. Pilot study

The 13-item draft scale, which was finalized after content validity testing, was reviewed by a Turkish language expert for grammar and item clarity. Based on the expert's recommendations, minor revisions were made, including correcting grammatical errors and punctuation. A pilot study was then conducted with 30 students from the target group.

The students were asked to provide feedback on the clarity of the items and were encouraged to submit written comments or suggestions for improving the wording of any confusing items. This process provided a more comprehensive assessment of item clarity from the participants' perspective. As no negative feedback was received from the students, it was concluded that the items were clear and understandable. Subsequently, validity and reliability analyses were conducted, and the results are presented below.

3.2. Construct validity of the scale

3.2.1. Exploratory factor analysis (EFA)

Before conducting the EFA, it was necessary to ensure that the data met the normality assumption, which is critical for the validity of factor analysis results. To check for normality, skewness and kurtosis values were calculated for the dataset. The skewness values for the mother and father forms ranged from 0.74 to 1.72 and 0.74 to 1.23, respectively. The kurtosis values ranged from −1.16 to 0.91 for the mother form and −1.00 to 0.28 for the father form. According to George and Mallery (2010), skewness and kurtosis values within the range of ±2.00 suggest that the data approximates a normal distribution. As all skewness and kurtosis values fell within this range, the data were confirmed to be normally distributed, thereby meeting the necessary assumption for conducting EFA.

With the normality assumption satisfied, two separate EFAs were conducted for the mother and father forms to determine the factor structure of the draft scale. Principal Component Analysis (PCA) was used as the factor extraction technique. PCA aims to reduce the dataset to a smaller number of core dimensions while retaining the maximum amount of variance (Tabachnick & Fidell, 2019). When multiple factors are identified in EFA, applying rotation is essential to enhance the clarity and interpretability of the results. In this study, the varimax method, an orthogonal rotation method (Field, 2018), was utilized due to its effectiveness in identifying a clear set of independent factors. This method maximizes the differences in factor loadings for each item, thus enhancing the clarity of the factor structure by grouping items under the factors to which they are most strongly related (Tabachnick & Fidell, 2019).

Another assumption required for Exploratory Factor Analysis (EFA) is that the dataset must be sufficient in terms of sample size. According to the literature, a minimum sample size of at least 300 participants is generally considered adequate for EFA (Tabachnick & Fidell, 2019), and this prerequisite was met in this study. To verify whether the dataset met this assumption, the Kaiser-Meyer-Olkin (KMO) test was also conducted for both the mother and father forms of the scale. Additionally, the assumption that the dataset should come from a multivariate normal distribution and be suitable for factor analysis (Field, 2018) was tested using Bartlett's test of sphericity.

The KMO value for the PPS-M was found to be 0.914, and Bartlett's test of sphericity yielded a chi-square value of 1649.250 with 78 degrees of freedom, which was significant ($p < .001$). For the PPS-F form, the KMO value was 0.926, and Bartlett's test of sphericity produced a chi-square value of 2012.281 with 78 degrees of freedom, also significant ($p < .001$). A KMO value above 0.90, as obtained in this study, indicates that the sample size is at a "very good" level for EFA. Furthermore, the significant results from Bartlett's test confirm that the scale items are suitable for factor analysis.

Another assumption of factor and PCA analysis is the communality of the rotated variables. Communalities indicate the shared variance between factors/components and certain variables. A communality value close to 1 means that the item fully represents the factor to which it is related (Huck, 2012). In the literature, for effective factor or principal component analysis, it is suggested that communalities should be 0.50 or greater (Hair et al., 2019). For this reason, the literature advises that items with a communality value below 0.50 should be removed from the scale (Field, 2018). Based on this criterion, items 6 ("If my mother/father is interested in her/his phone when she/he spends time with me, I also turn to my phone"), 9 ("When I'm in contact with my mother/father, I tell her/him to put the phone down and pay attention to me"), and 29 ("If I'm trying to tell her/him something and my mother/father is on the phone, I have to raise my voice") were removed from the scale. The communalities of these items were 0.29, 0.30, and 0.47 for the PPS-M form, and 0.39, 0.33, and 0.32 for the PPS-F form, respectively.

Once the prerequisites and assumptions had been met, a PCA was conducted using varimax rotation as the factor extraction method. The analysis yielded two factors with eigenvalues exceeding or equal to 1. The eigenvalues of these factors were 4.79 and 1.09 for the PPS-M form, and 5.48 and 1.01 for the PPS-F form. As stated by Tabachnick and Fidell (2019), when the number of items is fewer than 40, factors with eigenvalues of 1 or more are considered valid. Additionally, each factor must contribute at least 5% to the total variance (Huck, 2012). The contributions of these two factors to the total variance in the PPS-M form were 47.89 % and 10.92 %, respectively, while in the PPS-F form, they were 54.84 % and 10.18%. The two factors collectively accounted for 58.81 % of the total variance in the PPS-M form and 65.02% in the PPS-F form. In scale development studies, explained variance in multifactorial structures is considered sufficient if it falls between 40 % and 60 % (Tavşancıl, 2019). Therefore, the total variances for both forms are deemed satisfactory.

Another method for determining factor extraction is the scree plot. The analysis of the scree plot revealed that the slope decreased after the second factor, indicating that the contributions of factors beyond the second one to the variance are minimal (See Figs. 1 and 2). In such cases, factor extraction should be halted when the slope decreases significantly (Thompson, 2008). Based on these criteria, the number of factors was determined to be two. In this study, the cutoff point for factor loading values was set at 0.50. Since the factor loading values from EFA did not fall below this threshold and there were no overlapping items, no items were removed.

The factor loadings for the PPS-M form ranged from 0.62 to 0.81 for the first factor and from 0.70 to 0.79 for the second factor, while item-total correlations ranged from 0.43 to 0.77. For the PPS-F form, the factor loadings ranged from 0.70 to 0.83 for the first factor and from 0.71 to 0.78 for the second factor, with item-total correlations varying from 0.64 to 0.78 (See Table 1). In line with the existing literature, item-total correlations exceeding 0.40 are considered satisfactory (Büyüköztürk, 2010; Tavşancıl, 2019). Therefore, the item-total correlation values ($r \geq 0.40$) obtained for the PPS-M and PPS-F forms were

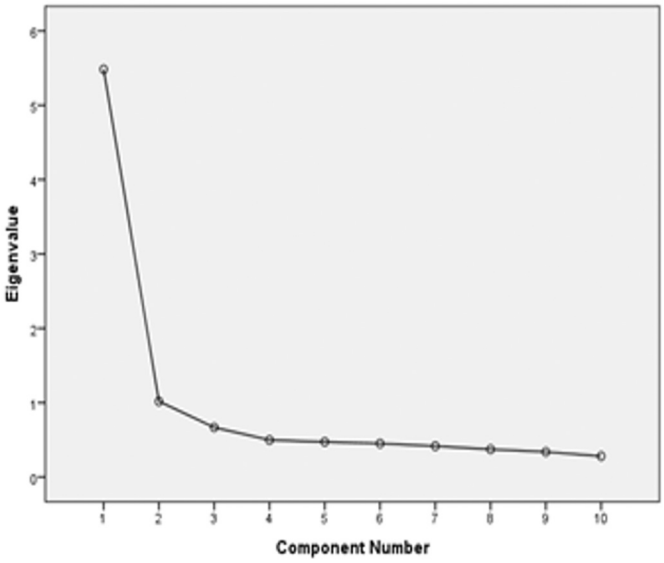

Fig. 1. Scree plot for PPS-MF.

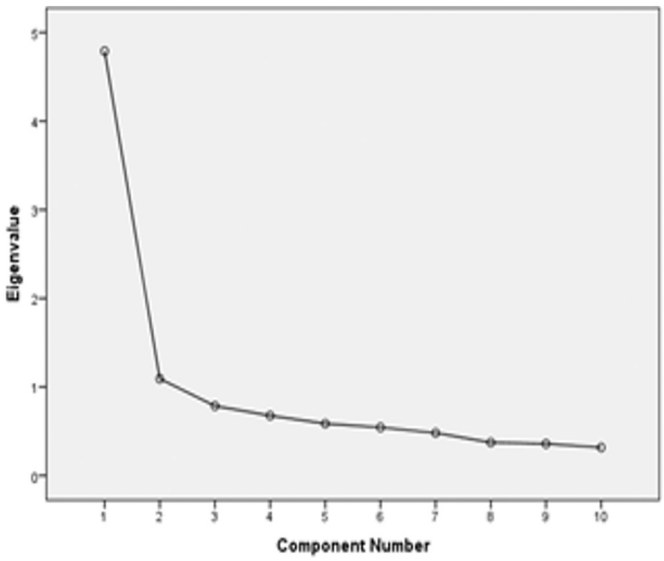

Fig. 2. Scree plot for PPS-FF.

deemed acceptable. This finding indicates that the items of both the PPS-M and PPS-F forms exhibit a strong relationship with their respective dimensions. Moreover, the item contributions to common variance (h^2) ranged from 0.54 to 0.72 (See Table 1). EFA identified a 10-item, two-factor scale: "Interaction Interruptions" (4 items) and "Emotional Reactions" (6 items). The complete scale was labeled the "Parental Phubbing Scale-Mother and Father Forms".

3.2.2. Confirmatory factor analysis (CFA)

The structure of the 10-item, two-factor scales for both the PPS-M and PPS-F forms, derived from EFA, was tested using CFA. Prior to conducting the CFA, skewness and kurtosis values were calculated to verify whether the dataset, consisting of 210 participants, met the normality assumption. The skewness values ranged from 0.66 to 1.39 for the PPS-M form and from 0.62 to 1.05 for the PPS-F form. The kurtosis values ranged from −1.14 to 1.16 for the PPS-M form and from −1.20 to 0.02 for the PPS-F form. These values fall within the ±1.5 range recommended in the literature (Tabachnick & Fidell, 2019), indicating that the dataset is normally distributed. After confirming normality, CFA was conducted for both the mother and father forms of the Parental Phubbing Scale.

The CFA results for the first-level multifactor measurement model of the PPS-M form revealed that the initial fit indices were $\chi^2 = 109.998$, $df = 34$, $\chi^2/df = 3.24$, RMSEA = 0.10, SRMR = 0.06, GFI = 0.90, CFI = 0.91, NFI = 0.86, TLI = 0.88, AGFI = 0.84, and IFI = 0.91. To improve the model fit, modification indices suggested correlating the error variances of items 5 and 6, as well as items 7 and 8 within the second factor. After implementing these modifications, the final goodness-of-fit indices were $\chi^2 = 68.854$, $df = 32$, $\chi^2/df = 2.15$, RMSEA = 0.07, SRMR = 0.05, GFI = 0.94, CFI = 0.96, NFI = 0.92, TLI = 0.94, AGFI = 0.89, and IFI = 0.96. These modifications were made sequentially, one at a time, as recommended in the literature (Field, 2018). Comparing the goodness-of-fit values after these modifications with the goodness-of-fit criteria (See Table 2), the 10-item, two-factor structure of the PPS-M form is deemed acceptable. Therefore, the two-factor structure of the PPS-M form has been confirmed.

The standardized factor loadings of the items ranged from 0.59 to 0.80 (See Fig. 3). Researchers emphasize that the factor loadings obtained from the first-level CFA should be at least 0.30 and, if possible, 0.50 or higher, as low factor loadings can negatively affect model-data fit (Field, 2018; Hair et al., 2019). These findings meet these criteria. When analyzing the factor loadings of the items, the highest factor loading (0.80) was found for item 7 ("If my mother attends to her phone while we're chatting, I abandon saying what I want to say") in the emotional reactions sub-scale. Furthermore, correlation coefficients between factors should not be 0.85 or greater. When correlation coefficients between factors exceed this threshold, it is interpreted that both factors measure the same construct, and one of the factors should be removed from the model (Kline, 2023). As shown in the path diagram, the correlation coefficient between the two sub-scales of the PPS-M form is 0.72, indicating that the two factors measure distinct constructs.

The same process was applied to the PPS-F form, and the CFA results yielded the following fit indices: $\chi^2 = 65.003$, $df = 34$, $\chi^2/df = 1.91$, RMSEA = 0.07, SRMR = 0.04, GFI = 0.94, CFI = 0.97, NFI = 0.94, TLI = 0.96, AGFI = 0.90, and IFI = 0.97. These indices meet the criteria for excellent fit and indicate that the 10-item, two-factor structure of the PPS-F form is well-supported (See Table 2). Therefore, the two-factor model for the PPS-F form has been confirmed.

The item factor loadings for the PPS-F form range from 0.67 to 0.83, exceeding the recommended values (Field, 2018; Hair et al., 2019), similar to the PPS-M form. Among them, the highest factor loading is 0.83 for item 4 ("My father is so preoccupied with his phone that I have to repeat what I want to ask him two or three times) within the interaction interruptions subscale. Additionally, the correlation coefficient between the two subscales of the PPS-F form is 0.76 (See Fig. 4), indicating that the two factors measure distinct constructs independently of

Table 1
Final results of Principal Component Analysis for the PPS-MF and PPS-FF ($N = 325$).

PPS-MF						PPS-FF					
Item no						Item no					
EFA	CFA	Factor 1	Factor 2	h^2	Item Total Correlation	EFA	CFA	Factor 1	Factor 2	h^2	Item Total Correlation
M1	M1	0.81		0.65	0.43	F1	F1	0.83		0.72	0.64
M5	M2	0.66		0.55	0.64	F5	F2	0.74		0.65	0.70
M11	M3	0.62		0.54	0.72	F11	F3	0.70		0.61	0.73
M13	M4	0.65		0.60	0.66	F13	F4	0.72		0.71	0.71
M8	M5		0.70	0.55	0.70	F8	F5		0.71	0.58	0.78
M16	M6		0.73	0.60	0.74	F16	F6		0.74	0.63	0.75
M17	M7		0.73	0.58	0.73	F17	F7		0.75	0.65	0.77
M20	M8		0.79	0.65	0.75	F20	F8		0.73	0.63	0.78
M28	M9		0.72	0.61	0.77	F28	F9		0.78	0.66	0.76
M35	M10		0.73	0.58	0.73	F35	F10		0.78	0.67	0.77
Explained Variance: Factor 1: 47.89%; Factor 2: 10.92% Total: %58.81 Eigenvalues: Factor 1: 4.79 Factor 2: 1.09						Explained Variance: Factor 1: 54,84%; Factor 2: 10.18% Total: %65.02 Eigenvalues: Factor 1: 5.48 Factor 2: 1.02					

Note: PPS-MF = Parental Phubbing Scale-Mother Form; PPS-FF = Parental Phubbing Scale-Father Form.

Table 2
Final CFA fit index values for PPS-MF and PPS-FF.

Goodness of Fit Value	Fit Indexes obtained for PPS-MF	Fit Indexes obtained for PPS-FF	Criteria for Acceptable Fit	Criteria for Perfect Fit
X^2/df	2.15	1.91	$2 \leq \chi^2/df \leq 5$	$0 \leq \chi^2/df \leq 2$
RMSEA	0.07	0.07	$0.05 \leq$ RMSEA$\leq$0.08	$0 \leq$ RMSEA$\leq$0.05
SRMR	0.05	0.04	$0.05 \leq$ sRMR$\leq$0.10	$0 \leq$ sRMR$\leq$0.05
GFI	0.94	0.94	$0.80 \leq$ GFI $\leq$ 0.95	$0.95 \leq$ GFI $\leq$ 1.00
AGFI	0.89	0.90	$0.85 \leq$ AGFI$\leq$0.90	$0.90 \leq$ AGFI$\leq$1.00
CFI	0.96	0.97	$0.95 \leq$ CFI $\leq$ 0.97	$0.97 \leq$ CFI $\leq$ 1.00
NFI	0.92	0.94	$0.90 \leq$ NFI $\leq$ 0.95	$0.95 \leq$ NFI $\leq$ 1.00
IFI	0.96	0.97	$0.90 \leq$ IFI $\leq$ 0.95	$0.95 \leq$ IFI $\leq$ 1.00
TLI	0.94	0.96	$0.90 \leq$ TLI $\leq$ 0.95	$0.95 \leq$ TLI $\leq$ 1.00

Note: Adapted from Schermelleh-Engel et al. (2003); Tabachnick and Fidell (2019); PPS-MF = Parental Phubbing Scale-Mother Form; PPS-FF = Parental Phubbing Scale-Father Form.

each other.

As recommended in the literature, a second-level CFA should be conducted to assess whether the multidimensional structure confirmed in the first-level CFA converges into a more comprehensive factor, thereby justifying the use of the scale's total score. However, as Kline (2023) suggests, this analysis is only applicable to structures with at least three factors, so we have chosen not to perform a second-level CFA for the mother and father forms of the PPS developed in this study.

3.3. Convergent validity

To evaluate the convergent validity of the PPS-M and PPS-F forms using CFA, we calculated the Average Variance Extracted (AVE) and Composite Reliability (CR) values. For the PPS-M form, the AVE values were 0.46 for the interaction interruptions sub-scale and 0.55 for the emotional reactions sub-scale. The CR values, which reflect the composite reliability of the scale, were 0.76 for the interaction interruptions sub-scale and 0.86 for the emotional reactions sub-scale. To ensure convergent validity, CR scores are expected to be higher than AVE scores, with the criteria of CR $\geq$ 0.70 and AVE $\geq$ 0.50 also needing to be met (Fornell & Larcker, 1981). The AVE value for the interaction interruptions dimension of the PPS-M form is slightly below the ideal value of 0.50, but it is close enough to be acceptable. According to the literature, when the CR value exceeds 0.70, even if the AVE value

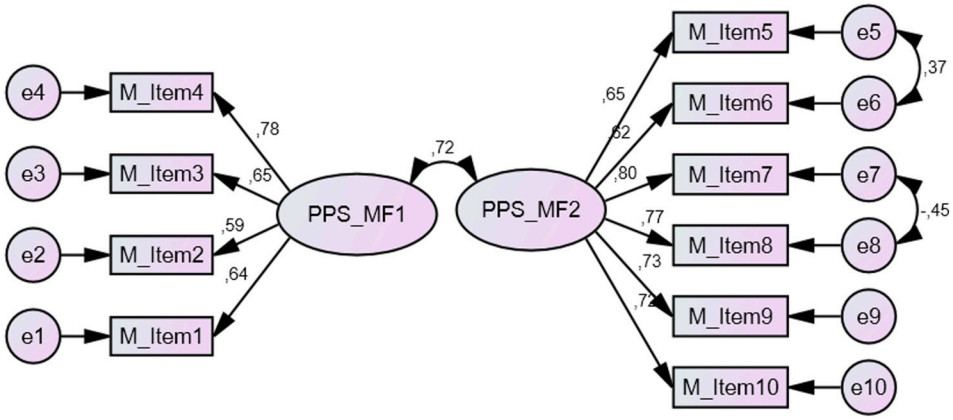

Fig. 3. CFA path diagram of PPS-MF's measurement model.

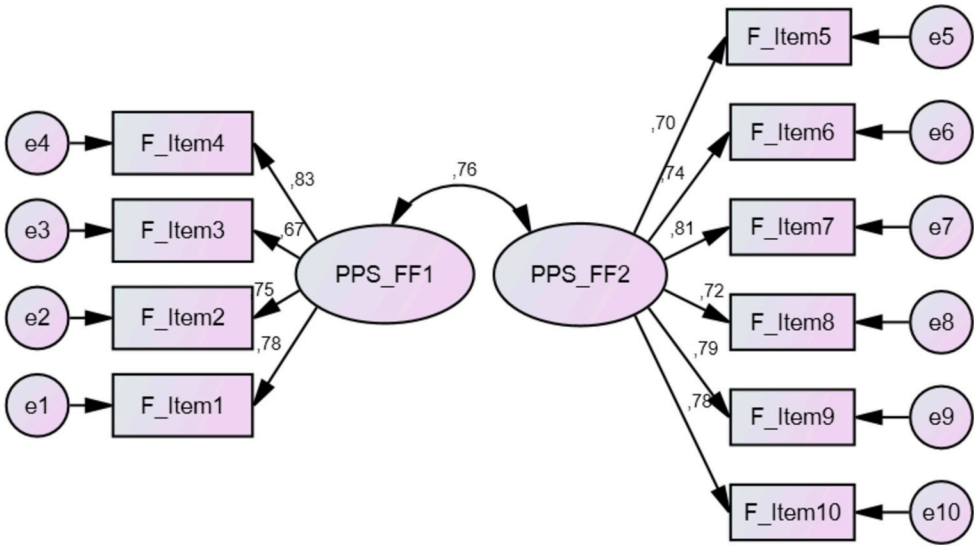

Fig. 4. CFA path diagram of PPS-FF's measurement model.

remains below 0.50 (e.g., 0.40), it is still sufficient to establish convergent validity, as long as all CR values are greater than the AVE values. Additionally, lower AVE values can be accepted for newly developed scales (Fornell & Larcker, 1981; Hair et al., 2019). Therefore, the convergent validity of the PPS-M form is considered satisfactory. Next, the AVE values calculated for the convergent validity of the PPS-F form were 0.58 for the interaction interruptions sub-scale and 0.57 for the emotional reactions sub-scale, while the CR values were 0.84 and 0.89, respectively. With AVE values exceeding 0.50, CR values surpassing 0.70, and all CR values being higher than their corresponding AVE values, convergent validity was confirmed for the PPS-F form.

In conclusion, the convergent validity analysis for both the PPS-M and PPS-F forms demonstrated that the items were consistently related to each other and their respective factors. This provides further evidence supporting the construct validity of the scale, as convergent validity is a key indicator of construct validity (Gregory, 2007).

3.4. Criterion-related validity

To assess the criterion-related validity of the PPS-M and PPS-F forms, they were correlated with the UCLA Loneliness Scale Short Form (ULS-SF) and the Smartphone Addiction Scale-Short Version (SAS-SV) for adolescents using the Pearson Product-Moment Correlation Coefficient (See Table 3).

The results showed significant positive correlations between the total PPS-M and the SAS-SV ($r = 0.32$, $p < .001$) and ULS-SF ($r = 0.20$, $p < .05$). Both sub-scales of the PPS-M form were positively correlated with the SAS-SV (interaction interruptions, $r = 0.41$, $p < .001$; emotional reactions, $r = 0.23$, $p < .05$) and ULS-SF (interaction interruptions, $r = 0.19$, $p < .05$; emotional reactions, $r = 0.18$, $p < .05$). The PPS-F total score was positively correlated with the SAS-SV ($r = 0.30$, $p < .001$) and ULS-SF ($r = 0.20$, $p < .05$). The emotional reactions sub-scale of the PPS-F form showed a significant positive correlation with the SAS-SV ($r = 0.23$, $p < .001$) but not with the ULS-SF ($r = 0.13$, $p > .05$). The interaction interruptions sub-scale of the PPS-F form was positively correlated with the SAS-SV ($r = 0.32$, $p < .001$) and ULS-SF ($r = 0.25$, $p < .05$). As Robinson (2018) asserts, to ensure criterion-related validity of a newly developed scale, the correlation coefficient between two scales should be $r \geq 0.30$ and not fall below 0.20. The findings obtained from this study align with these established criteria. Additionally, the effect size of correlation coefficients was examined. The criteria for effect size are as follows: 0.10 for a small effect size, 0.30 for a medium effect size, 0.50 for a large effect size, and 0.70 or above for a very large effect size (Cohen, 1988). Cohen's d scores, calculated to determine effect size, generally indicated medium and large effect sizes (See Table 3). Our results align broadly with these criteria, providing sufficient evidence for the criterion-related validity of the scale.

3.5. Reliability analyses

The internal consistency of the Parental Phubbing Scale was assessed using Cronbach's α and McDonald's ω. Cronbach's α coefficients for the total scale and sub-scales of the mother (PPS-M) and father (PPS-F) forms were calculated using two study groups: 325 participants for exploratory factor analysis (EFA) and 210 participants for confirmatory factor analysis (CFA). McDonald's ω reliability coefficient was computed only for the CFA group. McDonald's ω, which is considered a stronger predictor of reliability in multidimensional scale structures, is recommended for reliability analysis by researchers (Deng & Chan, 2017).

Cronbach's α for the PPS-MF and PPS-FF ranged from 0.73 to 0.91, while McDonald's ω ranged from 0.76 to 0.91 (See Table 4). Both coefficients exceeded the 0.60 threshold, which is considered acceptable for newly developed scales (George & Mallery, 2010). Additionally, it is expected that McDonald's ω and Cronbach's α values will be close to each other in reliability analyses (Deng & Chan, 2017). As indicated, these reliability coefficients for the total and sub-scales of both the PPS-M and PPS-F forms are indeed similar.

Measured over a two-week interval, the test-retest reliability coefficients for the Parental Phubbing Scale were 0.82 for the total PPS-M form, 0.70 for the interaction interruptions sub-scale, and 0.73 for the emotional reactions sub-scale. For the PPS-F form, the coefficients were 0.81 for the total scale, 0.70 for the interaction interruptions sub-scale, and 0.77 for the emotional reactions sub-scale (See Table 4). These values meet the 0.70 stability criterion, indicating that both forms of the scale are stable over time (DeVellis, 2017; Tavşancıl, 2019). This provides satisfactory evidence for the reliability of both the PPS-M and PPS-F forms.

3.6. Comparison of mother and father phubbing

This study also examined the differences in phubbing behavior between mothers and fathers. The results of the paired samples *t*-test revealed a significant difference between the total and sub-scale mean scores of perceived phubbing behavior, with fathers scoring higher than mothers.

The effect size of the difference between the two groups was evaluated using the formula proposed by Cohen (1988). The obtained value of Cohen's d was ≤0.50, indicating that the effect size was small (See Table 5).

3.7. Multiple indicators multiple causes (MIMIC) modeling

Finally, we investigated whether certain demographics influenced the latent factor of mother and father phubbing as perceived by adolescents. Multiple Indicators Multiple Causes (MIMIC) modeling (Schumacker & Lomax, 2004) was used to test the impact of gender and age as covariates. In this study, gender was transformed into a dummy variable, coded as "girls = 0" (the reference group) and "boys = 1". Since the participants' ages did not vary widely, the age variable was added to the model as a continuous variable. Figures showing the effects of gender and age in the MIMIC models are provided in the supplementary material (See Supp. Material 1 and Supp. Material 2).

The results of the MIMIC model indicated a satisfactory fit for the PPS-MF ($\chi^2 = 100.088$, $df = 49$, $p < .001$, RMSEA = 0.07, CFI = 0.94,

Table 3
Results of criterion-related validity for PPS-MF and PPS-MF ($N = 124$).

	ULS-SF	SAS-SV
PPS-MF (Total)	0.32** (0.68)	0.20*(0.41)
Interaction Interruptions	0.41** (0.90)	0.19* (0.39)
Emotional Reactions	0.23* (0.47)	0.18* (0.37)
PPS-FF (Total)	0.30**(0.63)	0.20*(0.41)
Interaction Interruptions	0.32**(0.68)	0.25* (0.52)
Emotional Reactions	0.23**(0.47)	0.13 (0.27)

Note: Cohen's *d* values indicating the effect size associated with Pearson *r* values are provided in parentheses; PPS-MF = Parental Phubbing Scale-Mother Form; PPS-FF = Parental Phubbing Scale-Father Form; ULS-SF = Short Form of the UCLA Loneliness Scale; SAS-SV = Smartphone Addiction Scale-Short Version.

Table 4
Cronbach's α, McDonald's ω ve test-retest reliability coefficients.

	EFA ($N = 325$)	CFA ($N = 210$)		Test-retest ($N = 38$)
	α	α	ω	r
PPS-MF (Total)	0.88	0.88	0.88	0.82
Interaction Interruptions	0.73	0.75	0.76	0.70
Emotional Reactions	0.86	0.86	0.87	0.73
PPS-FF (Total)	0.91	0.91	0.91	0.81
Interaction Interruptions	0.83	0.84	0.85	0.70
Emotional Reactions	0.89	0.89	0.89	0.77

Note: PPS-MF = Parental Phubbing Scale-Mother Form; PPS-FF = Parental Phubbing Scale-Father Form.

Table 5
Results of paired samples t-test for differences between percieved mother and father phubbing ($N = 535$).

	Group	N	M	SD	df	t	Cohen's d
Phubbing Behavior (Total)	PPS-MF	535	2.00	0.93	534	−4.471***	0.19
	PPS-FF		2.14	1.06			
Interaction Interruptions	PPS-MF	535	1.81	0.86	534	−6.426***	0.28
	PPS-FF		2.06	1.09			
Emotional Reactions	PPS-MF	535	2.14	1.13	534	−1.999*	0.09
	PPS-FF		2.19	1.19			

Note: PPS-MF = Parental Phubbing Scale-Mother Form; PPS-FF = Parental Phubbing Scale-Father Form, *$p < .05$, **$p < .01$, ***$p < .001$.

GFI = 0.92, AGFI = 0.88, TLI = 0.92, IFI = 0.94, SRMR = 0.05). The MIMIC model for PPS-FF demonstrated an almost perfect fit ($\chi^2 = 83.866$, $df = 51$, $p = .003$, RMSEA = 0.06, CFI = 0.97, GFI = 0.94, AGFI = 0.90, TLI = 0.96, IFI = 0.97, SRMR = 0.04).

The MIMIC model results revealed that adolescents' perceptions of phubbing behavior from both mothers and fathers differed by gender. Specifically, girls reported higher levels of interaction interruption with both parents ($\beta_{mother} = -0.208$**, $\beta_{father} = -0.151$*) and stronger emotional reactions to parental phubbing ($\beta_{mother} = -0.188$**, $\beta_{father} = -0.185$**) compared to boys. Consequently, girls perceived higher levels of phubbing from their parents than boys did. In contrast, age, the other covariate, was not a significant factor in adolescents' perceptions of parental phubbing (See Table 6).

4. Conclusion and discussion

This study developed the self-report PPS-M and PPS-F scales to assess parental phubbing experienced by adolescents. The scale items are rated on a 5-point Likert-type scale from "never" (1) to "always" (5). Each form of the PPS has a two-factor structure—interaction interruptions and emotional reactions—comprising 10 items in total. We concluded that the Parental Phubbing Scale-Mother (PPS-M) and Father (PPS-F) Forms are valid and reliable instruments for Turkish adolescents aged 10 to 15.

A review of existing parental phubbing scales reveals similarities and differences compared to the scale developed in this study. Some researchers (Aydoğdu & Yaşar, 2022; Bai et al., 2020; Qu et al., 2020) have used the Generic Scale of Being Phubbed developed by Chotpitayasunondh and Douglas (2018), modifying its items by replacing "others" with "mother" or "father". Pancani et al. (2021) adapted the Partner Phubbing Scale, originally developed by Roberts and David (2016), to create a unidimensional parental phubbing scale. According to our literature review, these scales have been widely used in studies of parental phubbing. However, given the unique dynamics of the parent-child relationship and the significant impact of phubbing on children, it was deemed necessary to develop a scale specifically tailored to this context.

The newly developed scale features two subdimensions: interaction interruptions and emotional reactions. The interaction interruptions dimension refers to instances where a parent's focus on their phone disrupts the conversation with their child (e.g., Item 2: "When conversing with my mother/father, she/he is so engrossed in her/his phone that I feel as though I am speaking to myself", Item 4: "My mother/father is so preoccupied with her/his phone that I have to repeat what I want to ask her/him two or three times"). This behavior can make the child feel neglected, worthless, or excluded. This dimension overlaps with the "feeling of neglect" dimension in Chotpitayasunondh and Douglas' (2018) scale (i.e., "Others would rather take care of their phones than talk to me"). Similarly, the Partner Phubbing Scale by Pancani et al. (2021) includes items with a similar construct (e.g., "During leisure time we spend together, my mother/father pays more attention to her/his smartphone than to me"). However, their scale did not include any items addressing the effect of phubbing behavior on the phubbee.

On the other hand, the emotional reactions subscale captures the child's emotional response to parental phubbing (e.g., Item 8: "I get angry when I see my mother/father attending to their phone while I am talking to them about an important matter," Item 9: "If my mother/father focuses on their phone while I am explaining a problem, I give up on sharing my issue"). This dimension partially aligns with the "interpersonal conflict" dimension in Chotpitayasunondh and Douglas' (2018) scale (e.g., "Others use their phones even though they know it irritates me"). While phubbing behavior generally leads to conflict in interpersonal relationships, it may evoke stronger emotional reactions in children due to the unique dynamics of the parent-child relationship. In cultures where children often view their parents as authority figures rather than equals, they may express emotional reactions instead of engaging in conflict. The literature indicates that social exclusion caused by smartphone use can trigger emotional responses such as feelings of worthlessness, anger, and exclusion (Hales & Williams, 2021; Williams et al., 2000). This further emphasizes the need for phubbing scales tailored to specific relationship contexts.

Furthermore, considering the distinct dynamics of mothers' and fathers' relationships with their children, creating separate forms for mothers and fathers enhances the scale's functionality and provides more detailed insights into the subject. This unique aspect distinguishes the scale from other similar instruments. In developing the scale, particularly during the creation of the item pool, involving adolescents—those directly affected by phubbing—was essential in shaping the framework of the measured construct. In conclusion, the Parental Phubbing Scale-Mother and Father Forms, with its two dimensions assessing both the occurrence of the behavior and its impact on the child, aligns with theoretical perspectives in the literature and offers a complementary and original contribution to the assessment of parental

Table 6
Results of MIMIC model by gender and age as covariates for PPS-MF and PPS-FF ($N = 210$).

	PPS-MF			PPS-FF		
Covariate: Gender	B	SE	β	B	SE	β
Factor 1: Interaction interruptions	−0.259	0.099	**−0.208****	−0.297	0.147	**−0.151***
Factor 2: Emotional reactions	−0.376	0.146	**−0.188****	−0.391	0.155	**−0.185****
Covariate: Age						
Factor 1: Interaction interruptions	−0.036	0.059	−0.044	−0.044	0.061	−0.053
Factor 2: Emotional reactions	−0.020	0.040	−0.038	−0.024	0.064	−0.027

Notes: PPS-MF = Parental Phubbing Scale-Mother Form; PPS-FF = Parental Phubbing Scale-Father Form; Standardized estimates (β), standart errors (SE) and unstandardized estimates (B) were reported. *$p < .05$, **$p < .01$.

phubbing behavior.

On the other hand, the fact that adolescents in our study perceived higher levels of phubbing from their fathers compared to their mothers supports our view that the dynamics of parents' relationships with their children may differ. Pancani et al. (2021) also found that the impact of phubbing on social disconnection was stronger for maternal phubbing than for paternal phubbing, suggesting that maternal phubbing may be more problematic for children. However, the difference in research findings could be attributed to cultural differences in the roles of parents in child-rearing. Although mothers in Turkish culture are still more actively involved in raising children, the increasing participation of women in the workforce has led fathers to take on more responsibilities in caring for and educating their children, resulting in them spending more time with their children. Thus, the evolution of the paternal role from a distant approach to one of greater involvement in the child's life (Ünal & Kök, 2015) may have increased children's expectations of their fathers. In another study, it was found that children perceive the mother as the caregiver and the father as the provider who works to support the family, with children understanding parental roles through the lens of traditional gender roles (Aytekin et al., 2016). Based on these findings, children's exposure to phubbing behavior during the limited time they spend with their fathers may lead them to perceive more phubbing from their fathers and react more negatively toward them. Therefore, to shed more light on this issue, current studies using qualitative research methods across different cultures are needed.

Finally, the results of the MIMIC model, which assessed the effects of gender and age as common variables on adolescents' perceptions of parental phubbing, reveal that girls are more likely to perceive both maternal and paternal phubbing than boys. This finding suggests that girls are more sensitive to their parents' phubbing compared to boys. While this result is consistent with some existing studies (Pancani et al., 2021; Yin et al., 2024), it contrasts with other research indicating that perceived parental phubbing does not differ by the adolescent's gender (Cheng, 2023; Wang et al., 2023; Zhang et al., 2023). Since this study focused on scale development, no detailed analysis was conducted on whether girls or boys individually perceive their mothers or fathers as greater phubbers. Further research may elucidate the gender effect in this context. Additionally, as Al-Saggaf (2022), who has conducted extensive research on phubbing, suggests, it would be useful to investigate whether the effect of parental phubbing is more intense on girls or boys, and what kinds of behavioral and relationship problems it might reveal. Moreover, the finding that perceived parental phubbing does not significantly differ by age aligns with some literature (Cheng, 2023; Zhang et al., 2023). This result may be attributed to the narrow age range of participants and the fact that this age range covers adolescence, a specific developmental period. Therefore, it would be worthwhile to explore how children in early childhood and late adolescence perceive parental phubbing and its effects through comparative studies.

In conclusion, with growing national and international interest in phubbing behavior and the need to explore its antecedents and effects across different relationship contexts, scale development studies are crucial. The 5-point Likert-type Parental Phubbing Scale-Mother and Father Forms, comprising 10 items and two dimensions specifically developed for the parent-child relationship, is expected to significantly contribute to research on phubbing, particularly within Turkish culture. Additionally, adapting the scale for use in cross-cultural research could provide valuable insights into different cultural contexts. The scale could also be utilized in retrospective studies by modifying its items. Moreover, the literature indicates that interruptions in contact within parent-child relationships can hinder the fulfillment of basic relational needs (Erskine, 1998), which may negatively impact individuals' psychological well-being (Akbağ & Ümmet, 2018;Erskine, 1998; Muscatello et al., 2020) and their interpersonal relationships in adulthood (Erskine, 1998; Muscatello et al., 2020). Therefore, investigating how phubbing, as a form of contact interruption, affects individuals' later lives could be a valuable area for future research.

5. Limitations of the study and recommendations

This study has several limitations. Firstly, since it focused on secondary school students aged 10 to 15, the findings can only be generalized to this specific age group. The results may not apply to younger children or older adolescents, highlighting the need for further research to explore parental phubbing behaviors across different developmental stages. Future studies should adapt and test the scales for various age groups to determine how developmental stages influence perceptions of parental phubbing. Several studies have shown that problematic digital technology use by parents leads to increased interruptions in mother–-child and father–child interactions, negatively impacts communication, and predicts behavioral problems in children. Researchers, such as McDaniel and Radesky (2018), have emphasized the importance of longitudinal studies to further investigate these issues. Consequently, modifying the scale for different developmental periods may shed light on how these patterns emerge and evolve throughout childhood and adolescence.

Another limitation is that the study focused on a group of secondary school students from a city center in the Western region of Turkey, with data collected using a convenience sampling method. Convenience sampling selects participants based on their availability and proximity to the researcher, rather than through random selection from the entire population. As a result, the sample may lack sufficient diversity in terms of socio-economic status and parental education. Additionally, the findings may not be generalizable to other regions or populations. Future studies should employ random sampling methods and apply the scale to larger, more diverse samples to enhance the validity and reliability of the results.

Ethical statement

This research was conducted with the approval of Uludağ University Social and Human Sciences Ethics Committee with the decision dated 12.01.2021 and numbered 2021/191.

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CRediT authorship contribution statement

Müge Akbağ: Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Fuat Aydoğdu:** Writing – original draft, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Amelia Rizzo:** Writing – review & editing, Writing – original draft, Resources.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendices. Supplementary data

Supplementary data to this article can be found online at https://doi.

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Data availability

Data will be made available on request.

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