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Validity and reliability of the Pica, ARFID and Rumination Disorder Interview-ARFID Questionnaire (PARDI-AR-Q) in Turkish adolescents

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Abstract

Purpose Although global awareness of avoidant/restrictive food intake disorder (ARFID) is increasing, non-Western countries remain underrepresented in the research literature. The Pica, ARFID, and Rumination Disorder Interview-ARFID Questionnaire (PARDI-AR-Q), one of the most extensively validated instruments with strong psychometric properties, is widely used to assess ARFID in both clinical and non-clinical pediatric populations. However, to date, no study has evaluated its reliability and validity among adolescents in Turkey. Therefore, this study aimed to investigate the validity and reliability of the Turkish version of the PARDI-AR-Q in an adolescent sample.

Method The sample comprised 483 adolescents aged 12–18 years, Participants completed a sociodemographic and clinical data form, the PARDI-AR-Q, the Nine-Item Avoidant/Restrictive Food Intake Disorder Screen (NIAS), the Food Neophobia Scale (FNS), the Eating Disorder Examination-Questionnaire Short (EDE-QS), and the Revised Child Anxiety and Depression Scale-Child version (RCADS-CV) on an online platform.

Results The mean age of the participants was 15.1 years (SD = 1.9). Of these participants, 170 (35.2%) were male and 313 (64.8%) were female. The PARDI-AR-Q showed good to excellent internal consistency, with a well-fitting four-factor structure, including severity of impact (α = 0.955), sensory-based avoidance (α = 0.96), concern about aversive consequences (α = 0.965), and lack of interest (α = 0.848). Test–retest analyses further supported the reliability of the scale. Each PARDI-AR-Q subscale correlated most highly with its conceptually matched NIAS subscale, whereas non-target subscales demonstrated minimal or no associations, supporting both its convergent and discriminant validity. In addition, the PARDI-AR-Q subscales were primarily unrelated to eating attitudes related to weight and shape (EDE-QS), which also provides evidence for its discriminant validity.

Conclusion These findings demonstrate that the Turkish version of the PARDI-AR-Q is a reliable and valid instrument for assessing ARFID symptoms in community samples of Turkish adolescents. The Turkish version of the PARDI-AR-Q may contribute to the identification of ARFID-related symptom patterns in adolescents; however, its clinical utility

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for early detection should be further established through studies conducted in clinical samples using diagnostic interviews.

Plain English summary

Avoidant/Restrictive Food Intake Disorder (ARFID) is a eating disorder that can affect individuals across the lifespan, including children, adolescents, and adults, by limiting the amount or variety of food they eat. Early identification is important, yet many countries, including Turkey, lack reliable tools to assess ARFID in young people. The PARDI-AR-Q is a widely used questionnaire that helps identify different reasons why a young person may avoid food, such as sensitivity to taste or texture, fear of choking or vomiting, or a general lack of interest in eating. In this study, we tested the Turkish version of the PARDI-AR-Q in more than 400 adolescents aged 12–18. We wanted to understand whether the questionnaire works well, measures what it is supposed to measure, and gives consistent results over time. Our findings showed that the Turkish PARDI-AR-Q is accurate, reliable, and easy for adolescents to complete. Each part of the questionnaire clearly matched the eating difficulty it was designed to measure, and other problems like anxiety, depression, or concerns about weight and shape did not influence it. Overall, this study shows that the Turkish PARDI-AR-Q is a valuable tool for spotting early signs of ARFID in adolescents. This may help families, teachers, and healthcare professionals support young people who struggle with eating before their problems become more serious.

Keywords Pica, ARFID, Rumination disorder, PARDI-AR-Q, Adolescents, Validity, Reliability

Introduction

Avoidant/restrictive food intake disorder (ARFID) is a clinically recognised eating disorder marked by avoidant or restrictive eating patterns, such as limited dietary variety or reduced intake, which are not driven by body image concerns. Individuals with ARFID typically exhibit one or more of three primary behavioral patterns: limited interest in eating or low appetite, avoidance based on the sensory characteristics of food such as texture, taste, or appearance (often referred to as selective or neophobic eating), and fear of negative consequences associated with eating, including choking, vomiting, or abdominal discomfort [1]. These patterns represent the core mechanisms underlying ARFID and form the basis for its three prototypical clinical presentations, which may occur individually or in combination [2, 3].

Restrictive eating disorders are the most prevalent type of eating disorders in children and adolescents and may persist across the lifespan [2]. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), they are classified into three categories: Anorexia Nervosa–Restrictive type (AN-R), Atypical Anorexia Nervosa (AN-A), and ARFID [1]. Although these disorders share common features such as markedly limited food intake and consequent weight loss or growth retardation, their underlying etiologies and clinical presentations differ substantially [4]. Compared with other restrictive eating disorders, ARFID is characterized by an earlier age of onset, a higher prevalence in males or an equal sex distribution [5], a longer duration of illness before diagnosis, greater medical comorbidity [6], and a higher frequency of comorbid anxiety and neurodevelopmental disorders, whereas depressive disorders are less common [7]. Therefore, examining the similarities and differences in clinical manifestations across restrictive eating disorders, as well as identifying symptom profiles relevant to patients with selective eating, may provide a better understanding of the core symptomatology underlying these conditions.

Following its initial introduction as a formal diagnostic category in the DSM-5 [1], interest in ARFID has grown rapidly across both clinical and research settings, leading to increased recognition, more frequent case identification, and a more comprehensive understanding of its clinical presentation [8]. In parallel with this growing awareness, the need for reliable and valid assessment tools has become increasingly apparent. Several structured interviews have been developed or adapted to evaluate ARFID-related symptoms, including the Eating Disorders Assessment for DSM-5 (EDA-5) [9], the Pica, ARFID and Rumination Disorder Interview (PARDI) [10], and the Structured Clinical Interview for DSM-5 (SCID-5) [11]. Although useful, these interviews are not specifically tailored to ARFID and are often limited by time and resource constraints. In response, a number of self-report measures have been introduced to facilitate assessment, such as the Food Neophobia Scale FNS [12], the Eating Disturbances in Youth Questionnaire (EDY-Q) [13], the Nine Item ARFID Screen (NIAS) [14], and the more recently developed PARDI–ARFID Questionnaire (PARDI-AR-Q) [15]. Among these, the NIAS and PARDI-AR-Q stand out as the most extensively validated instruments, demonstrating strong psychometric properties and offering practical advantages in both clinical and research contexts.

Although global awareness of ARFID is increasing, countries outside of the West remain underrepresented in the research literature, with only a few notable

contributions from non-Western countries, including Melisse et al. [16] in the Middle East, two studies from Asia [17, 18] and two from the Levant region [Lebanon] [19, 20]. While the Turkish versions of the NIAS-Parent and NIAS-Self Report scales have demonstrated validity and reliability [21, 22], the PARDI-AR-Q has not yet been validated in Turkish. This highlights the need for culturally and linguistically adapted assessment tools for ARFID and underscores the importance of evaluating their concurrent validity and region-specific clinical features. Given ARFID's earlier age of onset compared to other eating disorders, developing cross-culturally valid tools for use in adolescents is particularly important, as this period marks a heightened vulnerability to eating and feeding disorders, enabling early identification and intervention for those at risk [8, 23].

Therefore, this study aimed to validate the Turkish version of the PARDI-AR-Q in a community sample of adolescents. We hypothesized that the Turkish version of the PARDI-AR-Q would: (1) replicate the three-factor structure observed in the original version among adolescents from a community sample, (2) demonstrate robust psychometric properties, including factor structure, reliability, convergent validity, discriminant validity and known-groups (hypothesis-testing) validity, (3) exhibit correlation patterns between the PARDI-AR-Q subscales and the NIAS self-report subscales that are similarly observed with eating disorder symptoms related to weight/shape, anxiety, and depressive symptoms.

Methods

Participants

This study comprised a sample of adolescents aged 12–18 years, recruited between January 30, 2025, and June 30, 2025. The inclusion criteria for the study were: being between the ages of 12 and 18, having sufficient proficiency in Turkish, and agreeing to participate. Individuals unwilling to provide informed consent or with insufficient Turkish proficiency were also excluded. Participants who met the inclusion criteria were recruited on a rolling basis, without gender restriction. Data were collected anonymously using a community-based convenience and snowball sampling approach combined. Participants were recruited via social media platforms and the first author's professional and personal network. Initial participants were asked to share the survey link with their acquaintances, who were encouraged to share it further. The initial sample included 534 adolescents. However, data from 51 participants (9.5%) were excluded because they had ≥ 5% missing data on the study measures. Ultimately, the final sample comprised 483 adolescents.

Procedure

Permission to adapt the scale for Turkish adolescents was obtained from the scale developer. Then, XXX Hospital Non-Invasive Clinical Research Ethics Committee approved the study protocol (January 29, 2024/No: AEŞH-BADEK-2025-0068). By the principles of the Declaration of Helsinki, all parents and children were informed about the study, and consent forms were signed. In the first stage, the scale was independently translated into Turkish by two Turkish psychiatrists who were proficient in English. Following the consensus reached after discussion between the authors and translators, this version was back-translated into English by a bilingual translator with no prior knowledge of the scale. The scale's developer reviewed the back-translated version, and minor revisions were made to improve clarity and prevent ambiguity. Subsequently, a pilot study was conducted to assess the comprehensibility of the Turkish version, and the scale was finalized.

Study participants were recruited through online channels, including social media platforms (X, Instagram, Facebook, and LinkedIn) and WhatsApp groups, and data were collected using SurveyMonkey, a web-based survey platform. At the beginning of the survey, an electronic informed consent form was presented to ensure voluntary participation. Informed consent was obtained from both adolescents and their parents by having them tick a box. No payment was made to participants. In the survey, adolescents were asked to complete a sociodemographic and clinical data form designed by the researchers. They also completed the PARDI-AR-Q, NIAS, FNS, the short form of the Eating Disorder Examination-Questionnaire (EDE-QS), and the Revised Children's Anxiety and Depression Scale–Child Version (RCADS-CV). Socioeconomic status (SES) was assessed using the Hollingshead–Redlich Scale (HRS) [24], which classifies individuals' social status based on their educational attainment and occupational level.

Measurements

PARDI–ARFID Questionnaire (PARDI-AR-Q)

The PARDI-AR-Q [15] is a 32-item self-report measure adapted from the PARDI. The first five items collect demographic and anthropometric information for calculating BMI or BMI percentile. Sixteen dichotomous and free-response items evaluate DSM-5 ARFID diagnostic criteria, including eating difficulties, low weight or faltering growth, nutritional deficiency, supplement dependence, and psychosocial impairment, with multiple items per criterion to ensure coverage. The final 11 items are rated on a 7-point Likert scale (0–6) to yield dimensional scores for the three ARFID profiles—sensory-based avoidance, low appetite/lack of interest, and fear of aversive consequences—as well as a severity-of-impact index.

The severity score is the mean of items 22 and 23, with any non-zero response indicating impairment, while subscale scores are derived from three relevant items. Cronbach's α was high: sensory-based avoidance (α = 0.94 full sample; 0.89 ARFID; 0.40 HC), aversive consequences (α = 0.92 full; 0.93 ARFID; 0.40 HC), and lack of interest (α = 0.84 full; 0.83 ARFID; 0.30 HC) in the original study.

Nine-item avoidant/restrictive food intake disorder screen (NIAS)

The NIAS, developed by Zickgraf and Ellis [14], is a brief self-report tool assessing avoidant/restrictive eating across picky eating, low appetite, and fear of aversive consequences. The scale consists of nine items rated on a 6-point Likert scale from 0 (strongly disagree) to 5 (strongly agree). Items 1–3 represent picky eating, items 4–6 represent appetite, and items 7–9 represent fear, with subscale scores calculated by summing the corresponding items, each ranging from 0 to 15. The total score, therefore, ranges from 0 to 45, with higher scores reflecting greater severity of ARFID-related symptoms. According to proposed thresholds, participants are considered to meet ARFID criteria if they score ≥ 10 on picky eating or fear, or ≥ 9 on appetite [25]. The Turkish adolescent validation was conducted by Kaşak et al. [22]. Cronbach's α was 0.90 in the original study [14] and 0.76 in this sample, with strong subscale consistency (picky eating α = 0.88; appetite α = 0.93; fear α = 0.86).

Food neophobia scale (FNS)

The FNS, initially developed by Pliner and Hobden [12], is a 10-item self-report measure designed to assess reluctance or refusal to try unfamiliar foods. Items are rated on a 7-point Likert scale ranging from 'strongly disagree' to 'strongly agree,' with several items reverse-coded (1, 4, 6, 9, and 10). Total scores range from 10 to 70, with higher values indicating greater food neophobia. While initially validated for adult populations, the scale has also been applied to adolescents [26], and its Turkish adaptation in adolescents was conducted by Yazıcı et al. [27]. In the present study, the FNS was used to examine convergent validity with the PARDI-AR-Q sensory-based avoidance subscale. Internal consistency in our sample was acceptable (Cronbach's α = 0.73).

Eating Disorder Examination-Questionnaire Short (EDE-QS)

The EDE-QS [28] is a 12-item abbreviated form of the original 36-item EDE-Q, developed by Gideon et al. [29] to assess core eating disorder symptoms. This single-factor scale measures the frequency of symptoms associated with anorexia nervosa, bulimia nervosa, and other specified or unspecified eating disorders over the past week. Items are scored on a 4-point scale (0 = not at all/0 days to 3 = markedly/6–7 days), yielding a total score of 0–36, with higher scores indicating greater symptom severity. In this study, the EDE-QS was administered to evaluate divergent validity with the PARDI-AR-Q by including a measure of disordered eating outside ARFID. Internal consistency was excellent, with Cronbach's α reported as 0.91 in the original validation [29] and 0.90 in the present sample. The validity and reliability study of the Turkish version of this scale was conducted by Esin et al. [30].

The Revised Child Anxiety and Depression Scale-Child version (RCADS)

RCADS, developed by Chorpita et al. [31], is an instrument designed to assess symptoms of depressive and anxiety disorders in children and adolescents. The 47-item questionnaire uses a four-point Likert scale (0 = never to 3 = always) and includes six subscales: separation anxiety disorder (SPAD), social anxiety disorder (SAD), generalized anxiety disorder (GAD), panic disorder (PD), obsessive-compulsive disorder (OCD), and major depressive disorder (MDD). Subscale scores are calculated by summing the relevant items and then converted to standardized T-scores using gender- and grade-specific norms. The Turkish version has been translated and validated in a clinical adolescent sample [32]. In the present study, the RCADS was administered to examine associations between the PARDI-AR-Q subscales and symptoms of anxiety and depression. Reported internal consistency for the RCADS ranges from 0.73 to 0.91 across subscales in the original validation [32], while Cronbach's α for the total anxiety and depression score in our sample was excellent (α = 0.96).

Statistical analyses

All statistical analyses were performed in IBM SPSS Statistics (Version 28). The literature on confirmatory factor analysis suggests that the sample size should be at least ten times the number of items and include a minimum of 200 participants [33, 34]. The sample of 483 participants in the present study exceeds these recommendations. In addition, the minimum sample size of 100 participants required for reliability analyses was also satisfied. For test–retest analyses, a minimum of 30 participants is considered sufficient [35]; accordingly, follow-up data were obtained from an adequate number of participants (n = 51). Taken together, these criteria indicate that the sample size was sufficient to yield valid and reliable results. Prior to analysis, distributions were inspected (histograms, Q–Q plots), and normality was evaluated via Kolmogorov-Smirnoff tests and skewness/kurtosis. Given the ordinal nature of item responses and departures from normality, nonparametric procedures and rank-based correlations were preferred where appropriate. Descriptive statistics were computed for all sociodemographic

and clinical variables (means, standard deviations [SD], and frequencies/percentages, as applicable).

Internal consistency of total and subscale scores of the scales was assessed using Cronbach's alpha (α), interpreted as acceptable (≥ 0.70), good (≥ 0.80), or excellent (≥ 0.90). Test–retest reliability was evaluated in a subsample ($n = 51$) using the intraclass correlation coefficient (ICC) from a two-way random-effects, consistency model with single measures, with thresholds of < 0.50 poor, 0.50–0.75 moderate, 0.75–0.90 good, and > 0.90 excellent reliability.

Construct validity was examined with exploratory factor analysis (EFA) on the PARDI-AR-Q item set (Items 22–32). Suitability for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. EFA was conducted on a polychoric correlation matrix using principal axis factoring and oblique rotation (oblimin) to allow correlated factors. Factor retention considered eigenvalues, the scree plot, and conceptual interpretability; standardized loadings ≥ 0.30 were treated as salient, and cross-loadings were flagged when loadings on two factors were ≥ 0.30 with a difference < 0.20.

Convergent and discriminant validity were evaluated using Spearman's rank-order correlations (ρ) between PARDI-AR-Q subscales and external measures: NIAS (Total and subscales), EDE-Q-S Total, FNS Total, and RCADS-CV subscales/totals. Correlations were interpreted using conventional guidelines (|ρ| ≈ 0.10 small, 0.30 moderate, 0.50 large). Known-groups (hypothesis-testing) validity was tested by comparing PARDI-AR-Q subscales across NIAS screening thresholds—Picky Eating (≥ 10 vs. < 10), Low Appetite (≥ 9 vs. < 9), and Fear (≥ 10 vs. < 10)—using Mann–Whitney U tests. The significance level was set at $p < .05$ (two-tailed) for all analyses.

Results

Sociodemographic characteristics

A total of 483 adolescents participated in the study (mean age = 15.1 years, SD = 1.9; 64.8% female). Most resided in urban areas (95.9%) and lived in nuclear families (76.4%); 11.6% reported parental divorce, and 1.9% had lost a parent. The mean school grade level was 9.8 (SD = 2.0), and grade repetition was relatively uncommon (7.2% repeated at least once). Parental education was relatively high, with 71.4% of mothers and 73.1% of fathers having completed high school or university, while the mean socioeconomic status score was 3.7 (SD = 0.8). Chronic physical illness was reported by 13.6% of participants, with 3.7% indicating that it affected their daily functioning. Regarding mental health history, 44.1% had at least one prior psychiatric referral (24.2% were currently in treatment), 29.6% were using psychiatric medication, and 36.0% reported a family history of psychiatric disorder. The mean BMI was 22.0 (SD = 4.3) (see Table 1).

Reliability of the PARDI-AR-Q

Internal consistency (Cronbach's α) was excellent for most PARDI-AR-Q subscales (see Table 2) —Severity of Impact (α = 0.955), Sensory-Based Avoidance (α = 0.960), Concern About Aversive Consequences (α = 0.965) —and good for Lack of Interest (α = 0.848). In the retest subsample ($n = 51$), average-measures ICCs from a two-way mixed-effects, consistency model indicated strong temporal stability across subscales: Concern About Aversive Consequences showed the highest reproducibility (ICC = 0.960, 95% CI [0.941, 0.975]), with Sensory-Based Avoidance and Severity of Impact close behind (both ≈ 0.92; 95% CIs roughly 0.88–0.95). Lack of Interest was somewhat lower yet still solid (ICC = 0.868, 95% CI [0.802, 0.917]). Using conventional benchmarks (≥ 0.90 = excellent; 0.75–0.90 = good), these findings support excellent stability for: Concern About Aversive Consequences, Sensory-Based Avoidance, and Severity of Impact, and good stability for Lack of Interest; all tests were highly significant ($p < .001$).

Construct validity: EFA of the PARDI-AR-Q

Sampling adequacy was adequate (KMO = 0.700), and Bartlett's test of sphericity indicated that the correlation matrix was factorable, $\chi^2(55) = 5119.714$, $p < .001$. An exploratory factor analysis yielded a four-factor solution that explained 89.2% of the total variance (Factor 1 = 27.9%, Factor 2 = 26.4%, Factor 3 = 19.2%, Factor 4 = 15.7%). As shown in Table 3, Items 24–26 loaded strongly on Sensory-Based Avoidance (Factor 1; λ = 0.811–0.836), Items 30–32 on Concern About Aversive Consequences (Factor 2; λ = 0.756–0.812), Items 27–29 on Lack of Interest (Factor 3; λ = 0.632–0.662), and Items 22–23 on Severity of Impact (Factor 4; λ = 0.793–0.822). Cross-loadings were generally small to moderate (the largest absolute cross-loading ≈ was 0.47 on Factor 2 for the Lack of Interest items), supporting an interpretable simple structure aligned with the theorized subscales (see Table 3).

Convergent and discriminant validity of the PARDI-AR-Q

Convergent patterns were strong and domain-specific (see Table 4). As hypothesized, each PARDI-AR-Q subscale correlated most highly with its conceptually matched NIAS subscale: Sensory-Based Avoidance with NIAS Picky Eating (ρ = 0.806, $p < .01$), Lack of Interest with NIAS Low Appetite (ρ = 0.847, $p < .01$), and Concern About Aversive Consequences with NIAS Fear (ρ = 0.751, $p < .01$). Additionally, the PARDI Sensory-Based Avoidance subscale showed a significant positive association with Food Neophobia (ρ = 0.189,

Table 1 Demographic and clinical characteristics of the sample ($N = 483$)

Variable		*n* (%) or mean (SD)
Age (years), mean (SD)		15.1 (1.9)
Gender, n (%)	Female	313 (64.8)
	Male	170 (35.2)
School grade, mean (SD)		9.8 (2.0)
Place of residence, n (%)	Rural	20 (4.1)
	Urban	463 (95.9)
Family structure, n (%)	Nuclear Family	369 (76.4)
	Extended Family	49 (10.1)
	Divorced parents	56 (11.6)
	Loss of a parent	9 (1.9)
Mother's education level, n (%)	Illiterate	7 (1.4)
	Primary School	82 (17.0)
	Middle School	47 (9.7)
	High School	158 (32.7)
	University	187 (38.7)
	Unknown	2 (0.4)
Father's education level, n (%)	Illiterate	1 (0.2)
	Primary School	55 (11.4)
	Middle School	70 (14.5)
	High School	140 (29.0)
	University	213 (44.1)
	Unknown	4 (0.8)
Mother's occupation, n (%)	Unemployed	33 (6.8)
	Housewife	268 (55.5)
	Public sector employee	107 (22.2)
	Private sector employee	48 (9.9)
	Self-employed	25 (5.2)
	Unknown	2 (0.4)
Father's occupation, n (%)	Unemployed	39 (8.1)
	Public sector employee	146 (30.2)
	Private sector employee	142 (29.4)
	Self-employed	145 (30.0)
	Unknown	11 (2.3)
Socioeconomic status, mean (SD)		3.7 (0.8)
Chronic physical illness, n (%)	None	417 (86.3)
	Present but does not affect daily life	48 (9.9)
	Present and affects daily life	18 (3.7)
Previous psychiatric referral, n (%)	None	270 (55.9)
	Once	96 (19.9)
	Ongoing psychiatric care	117 (24.2)
Family history of psychiatric disorder, n (%)	None	309 (64.0)
	Few family members	157 (32.5)
	Multiple family members	15 (3.1)
	Unknown	2 (0.4)
BMI, mean (SD)		22.0 (4.3)
BMI percentile, mean (SD)		59.1 (30.7)

Socioeconomic status was classified according to the Hollingshead-Redlich Scale (HRS)

SD: standard deviation; BMI: body mass index

$p < .01$). The PARDI Severity of Impact showed small positive relations with NIAS Total ($\rho = 0.169$, $p < .01$) and with global eating-pathology (EDE-Q-S Total; $\rho = 0.271$, $p < .01$), In contrast, the other PARDI-AR-Q subscales showed no significant correlations with the EDE-Q-S total score, $p > .05$.

Discriminant validity was supported by near-zero or negligible correlations between PARDI subscales and non-target NIAS domains (e.g., Lack of Interest with NIAS Picky Eating, $\rho = 0.016$, ns; Concern About Aversive Consequences with NIAS Low Appetite, $\rho = -0.091$, $p < .05$, small. Furthermore, all four PARDI-AR-Q subscales were positively associated with at least one RCADS internalizing domain, displaying distinct correlation patterns across anxiety and depression dimensions. Specifically, PARDI-Severity of Impact demonstrated small-to-moderate positive relationships with all RCADS subscales, as well as with the total depression and total anxiety scores. In contrast, PARDI-Sensory-Based Avoidance exhibited small but significant positive correlations with the MDD and OCD subscales, whereas PARDI-Lack of Interest showed a small yet specific association with the GAD subscale. Finally, PARDI-Concern About Aversive Consequences was positively correlated with both GAD and the total anxiety score.

Known-groups (hypothesis-testing) validity of the PARDI-AR-Q

To evaluate construct validity via hypothesis-consistent group differences, PARDI-AR-Q subscales were compared across NIAS screening thresholds using Mann–Whitney U tests (See Table 5). NIAS Picky Eating (≥ 10 vs. < 10); As predicted, the Sensory-Based Avoidance subscale was markedly higher in the elevated Picky Eating group ($M = 3.27$ vs. 0.62), $Z = -15.359$, $p < .001$. A small increase was observed for Severity of Impact ($M = 1.26$ vs. 1.06), $Z = -2.145$, $p = .032$. Lack of Interest was slightly lower in the elevated group ($M = 1.49$ vs. 1.74), $Z = -1.983$, $p = .047$, and Concern About Aversive Consequences did not differ, $Z = -0.850$, $p = .395$. NIAS Low Appetite (≥ 9 vs. < 9); The elevated Low Appetite group showed a very large difference on Lack of Interest ($M = 3.82$ vs. 0.96), $Z = -14.550$, $p < .001$, and a small increase on Severity of Impact ($M = 1.43$ vs. 1.04), $Z = -2.951$, $p = .003$. Sensory-Based Avoidance and Concern About Aversive Consequences did not differ (both $p \geq .284$). NIAS Fear (≥ 10 vs. < 10); As hypothesized, Concern About Aversive Consequences was much higher in the elevated Fear group ($M = 3.68$ vs. 0.67), $Z = -11.123$, $p < .001$. Other PARDI-AR-Q subscales were unchanged (all $p \geq .637$).

Table 2 Descriptive statistics, internal consistency, and intraclass correlation coefficients for the measures (*N* = 483)

		The Sample (*N* = 483)					Test-retest group (*N* = 51)
		Mean	SD	Min	Max	Cronbach's alpha	ICC (95% CI)
PARDI-AR-Q	Severity Of Impact	1.13	1.53	0.00	6.00	0.955	0.919 (0.876-0.950)
	Sensory Based Avoidance	1.58	1.75	0.00	6.00	0.960	0.922 (0.884-0.951)
	Lack Of Interest	1.65	1.65	0.00	6.00	0.848	0.868 (0.802-0.917)
	Concern About Aversive Consequences	1.03	1.37	0.00	6.00	0.965	0.960 (0.941-0.975)
NIAS	Total	20.55	6.64	9.00	44.00	0.759	-
	Picky Eating	8.85	4.29	3.00	18.00	0.879	-
	Fear	6.42	3.66	3.00	18.00	0.858	-
	Low Apetite	5.28	3.60	3.00	18.00	0.933	-
EDE-Q-S-Total		7.28	7.39	0.00	34.00	0.904	-
FNS-Total		27.55	6.33	11.00	50.00	0.736	-
RCADS-CV	Separation Anxiety Disorder	53.35	11.84	33.64	80.00	-	-
	Social Anxiety Disorder	47.49	13.39	24.20	78.90	-	-
	Generalized Anxiety Disorder	49.99	12.18	29.28	80.00	-	-
	Panic Disorder	57.22	14.89	36.01	80.00	-	-
	Obsessive-Compulsive Disorder	52.88	12.60	33.40	80.00	-	-
	Major Depressive Disorder	55.25	16.19	28.97	80.00	-	-
	Total Anxiety	52.71	14.67	26.50	80.00	-	-
	Total Anxiety & Depression	53.64	15.35	25.56	80.00	0.964	-

SD: standard deviation; Min: minimum; Max: maximum; IQR: interquartile range; ICC: intraclass correlation coefficient; CI: confidence interval; PARDI-AR-Q: Pica, Avoidant/Restrictive Food Intake Disorder, and Rumination Disorder Interview—ARFID—Questionnaire; NIAS: Nine-Item ARFID Screen; EDE-Q-S: Eating Disorder Examination—Questionnaire (Short Form); FNS: Food Neophobia Scale; RCADS-CV: Revised Child Anxiety and Depression Scale-Child Version

Table 3 Factor loadings for the four-factor solution *(Items 22–32)*

		Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalue (variance explained)		27.9%	26.4%	19.2%	15.7%
Severity of Impact	Item 22	0.332	−0.226	0.411	**0.793**
	Item 23	0.329	−0.188	0.371	**0.822**
Sensory based avoidance	Item 24	**0.811**	0.333	0.324	−0.241
	Item 25	**0.836**	0.324	0.279	−0.243
	Item 26	**0.815**	0.314	0.266	−0.282
Lack of interest	Item 27	−0.272	−0.463	**0.662**	−0.254
	Item 28	−0.267	−0.441	**0.632**	−0.276
	Item 29	−0.307	−0.465	**0.637**	−0.250
Concern about aversive consequences	Item 30	−0.442	**0.756**	0.355	0.099
	Item 31	−0.442	**0.806**	0.311	0.116
	Item 32	−0.439	**0.812**	0.300	0.070

Factor labels correspond to the highest loadings

Discussion

This study examined the psychometric properties of the Turkish version of the PARDI-AR-Q and explored the associations between its subscales and eating disorder symptoms related to weight and shape, anxiety, and depressive symptoms in a sample of Turkish adolescents aged 12–18 years. EFA supported a structure comprising three core ARFID symptom dimensions—sensory-based avoidance, lack of interest, and concern about aversive consequences—along with a distinct severity index reflecting functional impairment. The Turkish PARDI-AR-Q also showed good to excellent internal consistency and test–retest reliability. The known-groups validity analysis showed that each subscale correlated most strongly with its theoretically corresponding NIAS subscale: Sensory-Based Avoidance with NIAS-Picky Eating, Lack of Interest with NIAS-Low Appetite, and Concern About Aversive Consequences with NIAS-Fear. In contrast, non-target subscales demonstrated minimal or no associations. This provides strong evidence for both convergent and discriminant validity.

In the original study [15], the researchers examined participants aged 14–40 and noted that validity and reliability data were unavailable for individuals under 14 years of age. They also noted that a parent-report version was being developed for this age group. The present study, however, focused on a more homogeneous age range —limited to adolescence —and used a self-report format. This design provides direct, unique evidence on the psychometric properties of the scale in adolescents. Furthermore, the relatively low reliability coefficients of the PARDI-AR-Q subscales in the healthy control group in the original study were interpreted as reflecting the participants' very low levels of psychiatric symptoms, rather than as a limitation of the scale's ability to detect ARFID symptoms in non-clinical individuals. The authors recommended that future research include community samples that represent a broader spectrum of psychopathology. In line with this recommendation, the current study was conducted with a relatively large, community-based sample and represents the first

Table 4 Correlation matrix of PARDI-AR-Q subscales, NIAS, EDE-Q-S, FNS, and R-CADS-CV

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PARDI-AR-Q	1. Severity Of Impact	1																	
	2. Sensory Based Avoidance	0.244**	1																
	3. Lack Of Interest	0.105*	−0.111*	1															
	4. Concern About Aversive Consequences	−0.141**	−0.076	−0.075	1														
NIAS	5. Total	**0.169****	**0.506****	**0.393****	**0.343****	1													
	6. Picky Eating	**0.236****	**0.806****	0.016	0.012	0.703**	1												
	7. Low Apetite	**0.145****	0.045	**0.847****	−0.091*	0.508**	0.117**	1											
	8. Fear	−0.067	−0.087	−0.136**	**0.751****	0.382**	0.011	−0.162**	1										
9. EDE-Q-S-Total		**0.271****	0.011	0.089	0.004	0.055	0.020	0.079	−0.024	1									
10. FNS-Total		0.077	**0.189****	0.063	−0.034	0.035	**0.162****	0.060	−0.049	0.094*	1								
R-CADS-CV	11. SAD	**0.122****	0.018	−0.003	0.013	0.049	0.061	−0.027	0.020	0.326**	0.169**	1							
	12. SPD	**0.122****	0.050	0.086	0.013	0.074	0.068	0.063	−0.032	0.553**	0.073	0.508**	1						
	13. GAD	**0.116***	0.060	**0.112***	**0.123***	**0.116***	**0.102***	**0.097***	**0.105***	**0.401****	**0.140****	**0.494****	**0.627****	1					
	14. PD	**0.091***	0.045	0.034	0.025	0.067	**0.091***	0.009	0.025	0.414**	0.122**	0.470**	0.617**	0.706**	1				
	15. OCD	**0.167****	**0.183***	0.080	0.014	**0.108***	**0.134****	0.038	0.017	0.422**	0.039	0.478**	0.635**	0.691**	0.705**	1			
	16. MDD	**0.150****	**0.099***	0.082	0.077	0.084	**0.123****	0.061	−0.048	0.451**	0.128**	0.373**	0.561**	0.622**	0.694**	0.687**	1		
	17. TA	**0.150****	0.061	0.082	**0.112***	**0.099***	**0.106***	0.050	0.111*	0.529**	0.118**	0.643**	0.849**	0.842**	0.864**	0.851**	0.730**	1	
	18. TAD	**0.151****	0.076	0.087	−0.029	**0.099***	**0.119****	0.055	−0.006	0.522**	0.126**	0.594**	0.802**	0.826**	0.866**	0.855**	0.855**	0.974**	1

Boldface values indicate statistically significant correlations

Entries are spearman correlation coefficients

PARDI-AR-Q: Pica, Avoidant/Restrictive Food Intake Disorder, and Rumination Disorder Interview—ARFID—Questionnaire; NIAS: Nine-Item ARFID Screen; Picky Eating; EDE-Q-S: Eating Disorder Examination–Questionnaire (Short Form); FNS = Food Neophobia Scale; R-CADS-CV: Revised Child Anxiety and Depression Scale—Child Version; SAD: Separation Anxiety Disorder; SPD: Social Phobia Disorder; GAD: Generalized Anxiety Disorder; PD: Panic Disorder; OCD: Obsessive–Compulsive Disorder; MDD: Major Depressive Disorder; TA: Total Anxiety; TAD: Total Anxiety and Depression. $p < .05$ (*), $p < .01$ (**), two-tailed

comprehensive evaluation of the PARDI-AR-Q's validity and reliability among Turkish adolescents. This study contributes to the cross-cultural validation of the PARDI-AR-Q by providing evidence from a Turkish adolescent sample, thereby broadening the scale's relevance for international research.

The EFA identified a four-factor structure—sensory-based avoidance, concern about aversive consequences, lack of interest, and severity of impact—which together accounted for 89.2% of the total variance. The high proportion of explained variance and the coherent pattern of factor loadings provide strong support for the construct validity of the Turkish PARDI-AR-Q. Although Bryant-Waugh et al. [15] reported a preference for a three-factor structure due to marginal increases in explained variance when severity items were separated, our findings from a community-based sample suggest that severity-related items may constitute a separate and internally coherent dimension. These findings indicate that the subscales capture distinct yet interrelated core symptom profiles of ARFID, as defined in the DSM-5, consistent with the original instrument and prior research [15, 36]. From a clinical perspective, the Severity of Impact domain reflects the broader psychosocial and functional consequences of restrictive eating, including interference with daily functioning. The Sensory-Based Avoidance factor comprises items describing avoidance behaviors driven by sensory characteristics of food, such as texture or smell. In contrast, the Lack of Interest dimension represents a generally reduced drive to eat and poor appetite, corresponding to the "lack of interest in eating" presentation. Finally, Concern About Aversive Consequences captures fear-based avoidance stemming from anticipated negative outcomes of eating, such as choking or vomiting. Collectively, these domains align closely with the DSM-5 conceptualization of ARFID and support the multidimensional structure of the scale.

The reliability analysis of the Turkish version of the PARDI-AR-Q demonstrated good to excellent internal consistency and test–retest reliability. Cronbach's α coefficients for the subscales were 0.96 for sensory-based avoidance, 0.965 for concern about aversive consequences, and 0.848 for lack of interest. These values are highly consistent with those reported in the original study for the whole sample (0.94, 0.92, and 0.84, respectively). Additional reliability analyses conducted in this study showed strong correlations between the initial and retest administrations of the PARDI-AR-Q subscales. Although test–retest reliability was not assessed in the original study, the present study's test–retest analysis demonstrated that scale responses were highly stable and consistent over time. The present findings further support the robust psychometric characteristics of the Turkish version of the PARDI-AR-Q among adolescents.

The hypothesis-testing known-groups analysis revealed that the PARDI-AR-Q distinguishes between the three core ARFID phenotypes, as theoretically expected. Furthermore, participants with higher scores on the relevant NIAS subscales also showed higher scores on the corresponding PARDI-AR-Q subscales, indicating that the two instruments consistently capture the same construct. This pattern provides strong evidence of convergent validity for the PARDI-AR-Q. Consistent with our hypothesis, the Sensory-Based Avoidance subscale of the PARDI-AR-Q was significantly higher among participants with elevated NIAS Picky Eating scores and showed a strong correlation with those scores. Similar patterns were observed for the Low Appetite ↔ Lack of Interest and Fear ↔ Concern About Aversive Consequences subscale pairs. On the other hand, in a commentary article, Mulkens emphasized that the PARDI-AR-Q provides more detailed information, as it includes nuanced items that help distinguish ARFID from eating disorders centered on weight and body shape concerns. In this regard, she recommended that the PARDI-AR-Q be preferred over the NIAS, or that both psychometric tools be applied together when there is sufficient time [37]. Furthermore, the absence of significant associations between the EDE-Q—an instrument primarily designed to assess eating disorder psychopathology related to weight and shape concerns—and the PARDI-AR-Q subscales provides preliminary evidence for the discriminant validity of the scale. This pattern of findings is consistent with the conceptualization of ARFID as a condition characterized by eating-related avoidance that is not primarily driven by weight or shape concerns. However, these results should be interpreted with caution, as conclusions regarding diagnostic differentiation and clinical implications require confirmation through studies incorporating structured diagnostic interviews and clinically characterized samples.

The observed pattern of associations between the PARDI-AR-Q subscales and RCADS domains provides important insight into the emotional and psychopathological correlates of ARFID symptom dimensions. Consistent with prior literature demonstrating high rates of psychiatric comorbidity in ARFID—reported to range between 57% and 95% [5, 38], with anxiety disorders being the most prevalent [5, 7] —our findings further support a close association between ARFID-related symptoms and internalizing psychopathology. Notably, all four PARDI-AR-Q subscales showed positive associations with at least one RCADS internalizing domain, suggesting that different ARFID symptom dimensions may be differentially related to anxiety and depressive symptomatology. This pattern is in line with previous evidence indicating elevated anxiety symptoms among individuals with specific ARFID presentations, such as

Table 5 Group comparisons on PARDI-AR-Q Subscales by NIAS picky eating, low appetite, and fear thresholds

		NIAS- picky eating				NIAS- Low Appetite				NIAS- Fear			
		< 10 (*N* = 309)	≥ 10 (*N* = 174)	Z	*p*	< 9 (*N* = 367)	≥ 9 (*N* = 116)	Z	*p*	< 10 (*N* = 424)	≥ 10 (*N* = 59)	Z	*p*
		Mean (SD)				Mean (SD)				Mean (SD)			
PARDI-AR-Q	Severity Of Impact	1.06 (1.53)	1.26 (1.54)	-2.145	**0.032**	1.04 (1.52)	1.43 (1.56)	-2.951	**0.003**	1.15 (1.57)	1.06 (1.24)	−0.322	0.748
	Sensory based avoidance	0.62 (0.89)	3.27 (1.62)	-15.359	**< 0.001**	1.65 (1.85)	1.34 (1.39)	−0.773	0.439	1.59 (1.76)	1.48 (1.72)	−0.472	0.637
	Lack of interest	1.74 (1.68)	1.49 (1.60)	-1.983	**0.047**	0.96 (1.01)	3.82 (1.39)	-14.550	**< 0.001**	1.66 (1.69)	1.55 (1.35)	−0.076	0.939
	Concern about aversive consequences	1.03 (1.39)	1.05 (1.36)	−0.850	0.395	1.07 (1.41)	0.92 (1.26)	-1.071	0.284	0.67 (0.77)	3.68 (1.81)	-11.123	**< 0.001**

Boldface values indicate statistical significance at the p < .05 level

Values are mean (SD). Columns present groups defined by NIAS subscale thresholds as shown in the headers (Picky Eating: < 10 vs. ≥ 10; Low Appetite: < 9 vs. ≥ 9; Fear: < 10 vs. ≥ 10). Z and p refer to the two-tailed Mann–Whitney U test statistic and exact p value comparing each pair

PARDI-AR-Q: Pica, Avoidant/Restrictive Food Intake Disorder, and Rumination Disorder Interview—ARFID—Questionnaire; NIAS: Nine-Item ARFID Screen; SD = standard deviation

picky eating and fear of aversive consequences [39]. From a theoretical perspective, avoidance behaviors characteristic of these presentations have been conceptualized as anxiety-maintaining processes [40], whereby food avoidance may temporarily reduce distress through negative reinforcement. Taken together, these findings underscore the heterogeneity of ARFID and highlight the importance of considering comorbid internalizing symptoms when evaluating ARFID symptom profiles within a multidimensional framework.

Our findings should be interpreted in light of certain limitations. Data were collected through a web-based survey using community-based convenience and a snowball sampling methods, which may have limited the generalizability of the findings due to potential selection bias and limited representativeness. In addition, formal attention check procedures were not incorporated into the online survey methodology, which may have influenced the overall quality of responses. Notably, the sample primarily consisted of adolescents living in urban areas with internet access, which may not fully represent the broader adolescent population. Although the data were collected from a community sample, a considerable proportion of participants reported a history of psychiatric referral, suggesting that the sample may include individuals with relatively higher levels of psychopathology than the general adolescent population. The findings should therefore be interpreted with caution. Additionally, the present study did not involve a formal psychiatric evaluation, a structured diagnostic interview to assess ARFID, or a healthy control group. As a result, the sensitivity, specificity, positive predictive value, negative predictive value, and overall diagnostic validity of the PARDI-AR-Q could not be evaluated. Consequently, no conclusions can be drawn regarding cut-off scores, screening accuracy, or the clinical utility of the instrument for diagnostic or case-finding purposes. Finally, the study relied solely on adolescents' self-reports collected at a single time point without additional information from parents or teachers; therefore, the findings may be influenced by social desirability bias. Given these considerations, future research should investigate the diagnostic validity of the PARDI-AR-Q by incorporating both formal psychiatric evaluations and structured diagnostic interviews specific to ARFID. The inclusion of healthy control groups would provide stronger evidence of the scale's ability to differentiate between clinical and non-clinical populations. In addition, recruiting participants from diverse socioeconomic and residential backgrounds would also enhance the generalizability of the findings. Ultimately, longitudinal studies could clarify how ARFID symptoms evolve over time, providing a better understanding of the PARDI-AR-Q's sensitivity to these changes.

Despite its limitations, this study has several notable strengths. This study extends the cross-cultural validation literature of the PARDI-AR-Q by providing evidence from a Turkish adolescent sample. Using a relatively large and homogeneous sample of adolescents allowed for a more accurate examination of age-specific psychometric properties. Using a community-based sample also strengthened the study design by enabling the inclusion of individuals with varying levels of psychopathology. Furthermore, employing a multistage psychometric approach increased the robustness of the findings. Although snowball sampling has certain limitations in terms of representativeness, it also offers a practical means of reaching undiagnosed or hard-to-reach at-risk groups who might otherwise remain outside the scope of research.

Conclusion

This study provides the first validation of the PARDI-AR-Q among Turkish adolescents, demonstrating strong reliability, factor structure, and validity consistent with the original version. The Turkish PARDI-AR-Q effectively captured the three key ARFID dimensions—sensory-based avoidance, fear of aversive consequences, and lack of interest—indicating its robustness for assessing ARFID symptoms in community settings. Although these findings suggest that the tool may facilitate the recognition of ARFID symptoms among adolescents who might otherwise remain unrecognized, its role in early identification and clinical decision-making requires confirmation in clinically diagnosed samples using structured diagnostic interviews. Future studies should extend validation efforts to clinical and more diverse populations to examine diagnostic accuracy and cultural applicability. Developing culturally adapted and linguistically sensitive diagnostic tools will enhance cross-cultural comparability and accuracy in identifying ARFID. Additionally, expanding mixed-methods research across non-Western and low-resource contexts could elucidate cultural variations in symptom presentation. Raising awareness and training healthcare professionals about the cultural expressions of ARFID may further support timely recognition and appropriate referral. Overall, the current findings underscore the importance of culturally informed assessment strategies and establish the Turkish PARDI-AR-Q as a valid and reliable measure that can meaningfully contribute to global ARFID research and clinical practice.

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Author contributions
Yusuf Selman Çelik : conceptualization, data curation, formal analysis, investigation, methodology, writing – original draft. Hande Günal Okumuş: data curation, formal analysis, investigation, writing – original draft. Makbule Esen Öksüzoğlu : data curation, formal analysis, investigation, methodology Meryem Kaşak : data curation, formal analysis, investigation. Görkem Solgun: data curation, formal analysis. Rachel Bryant-Waugh: formal analysis, writing – review and editing. Hakan Öğütlü: conceptualization, methodology, supervision, writing – review and editing.

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Data availability
The datasets analyzed in the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
The Ethics Committee of Ankara Etlik City Hospital approved the study (January 29, 2024 / No: AEŞH-BADEK-2025-0068). By the principles of the Declaration of Helsinki, all parents and children were informed about the study, and consent forms were signed.

Competing interests
The authors declare no competing interests.

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