

Psychometric evaluation of the Turkish version of anticipated effects of food scale (AEFS): a Rasch analysis study

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Received 28 January 2026

Revised 3 April 2026

Accepted 14 May 2026

Abstract

Purpose – The purpose of this study was to translate, culturally adapt, and psychometrically validate the Anticipated Effects of Food Scale (AEFS) for use in Türkiye.

Design/methodology/approach – A total of 742 adults completed an online survey including the AEFS, Palatable Eating Motives Scale (PEMS), and Eating Expectancy Inventory (EEI). The adaptation followed international guidelines for translation and test adaptation. Psychometric analyses included content validity, Exploratory Factor Analysis (EFA), Rasch modeling (Rating Scale Model), internal consistency (Cronbach's α , McDonald's ω), test–retest reliability (ICC), and convergent validity.

Findings – Content validity indices ranged from 0.88 to 1.00 ($S-CVI = 0.94$). EFA confirmed the original two-factor structure (positive and negative emotional expectancies). Rasch analysis identified cultural and statistical misfit in the items “Ashamed” and “Worried,” which were removed. The final 29-item version demonstrated excellent item fit (Infit/Outfit MNSQ 0.54–1.46), adequate unidimensionality, high person-separation reliability (>0.88), strong internal consistency ($\alpha=0.927-0.969$; $\omega=0.927-0.970$), and moderate-to-high test–retest reliability (ICC = 0.783–0.833). AEFS subscales showed theoretically meaningful positive correlations with PEMS and EEI, supporting convergent validity.

Originality/value – This is the first validation of the AEFS in the Turkish context and one of the few studies to apply Rasch modeling to expectancy-based eating measures. The refined Turkish AEFS provides a culturally robust and psychometrically strong tool for assessing emotional expectancies toward food. It offers valuable applications for research, clinical assessment, and interventions targeting expectancy-driven eating behaviors in Türkiye.

Keywords Food expectancies, Emotional eating, Psychometrics, Rasch analysis, Scale adaptation, Turkish population

Paper type Research article

1. Introduction

Eating behaviors that are incongruent with physiological hunger cues are prevalent among a substantial proportion of adults (Lowe and Butryn, 2007; Racine *et al.*, 2019). Rather than responding to energy requirements (physiological hunger), these individuals tend to consume food in reaction to emotional or environmental triggers. This phenomenon encompasses behaviors that have been referred to in the literature as hedonic hunger, emotional eating, binge eating, and “food addiction,” and is strongly associated with the overconsumption of highly



processed foods designed for maximal sensory appeal (Schulte *et al.*, 2015). Such patterns of excessive intake of highly processed foods or insufficient intake of minimally processed food like fruit and vegetables have been linked to increased risks for obesity, metabolic syndrome, type 2 diabetes, and depression (Tsenkova *et al.*, 2011). In Türkiye, the rise in highly processed food consumption has paralleled the increasing prevalence of metabolic diseases, intensifying public health concerns. National statistics indicate that 36.9% of Turkish adults are overweight and 32.2% are obese (Republic of Türkiye Ministry of Health, 2019; World Health Organization, 2022). Despite the clear health implications, the psychological mechanisms underlying these eating behaviors remain underexplored, underscoring a public health need to identify modifiable cognitive targets for intervention (Burr *et al.*, 2023).

Among these mechanisms, emotional expectancies, or the anticipated emotional outcomes of a behavior, stand out as a theoretically robust and empirically supported construct that has demonstrable relevance to both substance use and eating behaviors (Cummings *et al.*, 2020; Morean *et al.*, 2012; Scott-Sheldon *et al.*, 2012). In substance use research, increased positive emotional expectancies (e.g. relaxation or sociability) regarding substances are consistently associated with higher levels of consumption both for initiation and maintenance of use (Morean *et al.*, 2012). Crucially, these expectancies are malleable through intervention, with brief interventions shown to reduce substance use by successfully modifying expectancies (Scott-Sheldon *et al.*, 2012). The accurate assessment of such expectancies in relation to food is therefore critical for the development of effective dietary interventions.

Early instruments designed to assess expectancies related to eating behavior, such as the Eating Expectancy Inventory, did not differentiate by food type or positive vs. negative emotional valence (Hohlstein *et al.*, 1998). Addressing these limitations, Cummings *et al.* (2020) developed the Anticipated Effects of Food Scale (AEFS), adapted from the alcohol expectancy framework. The AEFS assesses both positive and negative emotional expectancies associated separately with high processed (HPFs) and minimally processed foods (MPFs). In its initial validation, the AEFS demonstrated excellent reliability and strong associations with food addiction symptoms.

The scale's focus on HPFs is particularly relevant given the propensity of these foods to trigger maladaptive eating behaviors. Foods high in sugar and fat has been shown to hyperactivate brain reward circuits and over-ingestion of these foods are associated with clinical outcomes such as elevated body mass index (BMI) and weight-loss treatment resistance (DiFeliceantonio *et al.*, 2018; Meule and Gearhardt, 2014). Moreover, withdrawal-like symptoms reported following the restriction of such foods suggest neurobiological parallels with addictive substances, reinforcing the clinical importance of focusing on HPFs (Schulte *et al.*, 2018).

Food holds distinct emotional and cultural meanings across regions. In Türkiye, nutrient-rich traditional foods (e.g. tarhana, yogurt, olive oil) coexist with increasingly Westernized dietary patterns (Li and Lai, 2021). Such cultural dynamics may shape food-related emotional expectancies in ways not fully captured by existing measures (Rexiti and Cobanoglu, 2017). The neurobiological reward response to HPFs is universal, whereas the cognitive anticipation of these effects is culturally constructed. In individualistic Western cultures, eating behavior is frequently contextualized within a framework of personal responsibility and diet culture, where the consumption of high-calorie foods often elicits anticipations of moral failure or profound "ashamed" (Burr *et al.*, 2023). On the other hand, Turkish culture is based on collectivism, where food is the main way to show hospitality, make friends, and settle disagreements. In Türkiye, declining offered food may be regarded as disrespectful, potentially transforming the nature of negative expectancies, possibly reducing the emotional response of "ashamed" in this context. Furthermore, Türkiye is currently navigating a rapid nutrition transition where traditional Mediterranean eating habits coexist with modern obesogenic environments (Li and Lai, 2021), creating a unique psychological landscape for food expectancies that likely differs from established Western models. To address this gap, the current study aims to adapt the AEFS into Turkish and evaluate its psychometric properties. A

culturally valid Turkish AEFS will support expectancy-driven eating behavior research and interventions in a non-Western context, while also illuminating cross-cultural variation to inform global health strategies.

Accordingly, the study has two primary objectives: (1) to translate and culturally adapt the AEFS into Turkish, and (2) to examine its psychometric properties, including factor structure, internal consistency, convergent validity, and test–retest reliability in an adult sample from the general Turkish population. To achieve this, we use Rasch analysis beyond traditional validation methods to provide a more rigorous evaluation of item-level fit and cross-group measurement invariance, which are crucial for robust cross-cultural adaptations (Renger and Smolarski, 2020). It is hypothesized that the original two-factor structure (positive and negative emotional expectancies) will be confirmed that subscales will demonstrate high reliability, and that scores will show meaningful associations with related constructs such as expectancies measured on the Eating Expectancy Inventory (Hohlstein *et al.*, 1998) and motives to eat HPF for hedonic reasons (Boggiano, 2016).

2. Method

The study followed the *Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)* guidelines (von Elm *et al.*, 2007).

2.1 Participants

Data were collected between April and June 2025 through an online questionnaire administered via Google Forms. Participants were recruited using a snowball sampling technique. Eligible participants were adults who did not report any chronic physical or psychological disorders, were not pregnant or breastfeeding, and voluntarily agreed to take part in the study after providing informed consent. Participants included volunteers who approved of the online informed consent form presented on the first page of the questionnaire. The study abided by the Declaration of Helsinki and ethical approval was granted by the Non-Interventional Clinical Research Ethics Committee of XXX (Date: XXX, Approval No: XXX).

Two distinct samples were used for the psychometric evaluation. 742 participants who finished the full questionnaire at one point in time, including questions regarding sociodemographic information, made up the main study sample. Internal consistency, convergent validity, Rasch analysis, and exploratory factor analysis (EFA) were all performed using the data from this sample. A distinct test-retest reliability sample of forty participants was gathered, apart from the main sample, to evaluate temporal stability. These participants, in contrast to the main sample, only completed the AEFS twice and no questions regarding sociodemographic information, separated by two weeks.

For the main study sample, the participants' mean age was 24.7 years (SD = 8.5), and their mean BMI was 23.5 kg/m² (SD = 4.4). Of the main study sample, 539 participants (72.6%) were female and 203 (27.4%) were male. Regarding marital status, 579 participants (78.0%) were single, 153 (20.6%) were married, and 10 participants (1.4%) preferred not to disclose their marital status. In terms of education level, 650 participants (87.6%) held an associate's or bachelor's degree, 78 (10.5%) held a postgraduate degree, and 14 (1.9%) reported primary or secondary education. Based on BMI classification, 73 participants (9.8%) were underweight, 438 (59.0%) were within the normal range, 181 (24.4%) were overweight, and 50 (6.8%) were obese (see Table 1).

2.2 Procedure

To adapt the AEFS into Turkish, permission to use and translate the original instrument was obtained from the corresponding author of the original study (Cummings *et al.*, 2020), via e-mail. The data for the present study were collected through a web-based survey administered

Table 1. Participants' characteristics (n = 742)

Variables	n (%)
Age (years) ^a	24.7 ± 8.5
BMI (kg/m ²) ^a	23.5 ± 4.4
<i>Gender</i>	
Female	539 (72.6)
Male	203 (27.4)
<i>Marital status</i>	
Single	579 (78.0)
Married	153 (20.6)
Prefer not to say	10 (1.4)
<i>Education level</i>	
Primary/secondary school	14 (1.9)
High school	–
Associate's degree/Bachelor's degree	650 (87.6)
Postgraduate degree	78 (10.5)
<i>BMI group</i>	
Underweight	73 (9.8)
Normal	438 (59.0)
Overweight	181 (24.4)
Obese	50 (6.8)
Note(s) ^a Mean±SD, BMI: Body mass index	

online. The scale's psychometric characteristics were examined in line with the cross-cultural adaptation standards for self-report measures outlined by the World Health Organization (WHO, 2020) and the International Test Commission (ITC, 2018).

The language validity of the Turkish version of the AEFS was established in the first stage of the adaptation process. Following the cross-cultural adaptation guidelines of Prieto (1992), the original English version of the AEFS was independently translated into Turkish by five bilingual researchers proficient in both languages. A standard forward-backward translation procedure was employed to ensure conceptual and linguistic equivalence. The initial Turkish translations were compared and consolidated into a single version, which was then back-translated into English by two independent bilingual translators who were native Turkish speakers and had not seen the original instrument. The translated and back-translated versions were compared to identify and resolve discrepancies in meaning or phrasing. A sworn translator subsequently confirmed the linguistic accuracy and cultural appropriateness of both versions. To evaluate clarity and comprehensibility, the preliminary Turkish version was pilot-tested with 30 adults, and all items were found to be clear and culturally relevant.

In the second stage, the psychometric evaluation of the Turkish version of the AEFS was conducted. The scale consisted of 62 items and two factors, and the required sample size was determined based on the methodological recommendation that the number of participants for Exploratory Factor Analysis (EFA) should be at least five to ten times the number of items (62 items × 5–10 = 310–620 participants) (DeVellis and Thorpe, 2021; Osborne and Costello, 2004). Accordingly, data were collected from 742 adults. Rasch analysis (Rating Scale Model) was conducted to evaluate resulting factor structure.

2.3 Measures

The questionnaire administered to adults for Study 1 included questions on socio-demographic characteristics, the AEFS, the Palatable Eating Motives Scale (PEMS), and the Eating

Expectancy Inventory (EEI). Additionally, participants provided self-reported anthropometric data, including height and weight.

2.3.1 Anticipated effects of food scale (AEFS). The AEFS was originally developed by Cummings *et al.* (2020) to assess individuals' positive (15 items) and negative (16 items) expectancies regarding both HPF and MPF consumption. Thus, the AEFS consists of 62 items grouped into two subscales for each food type: Positive and Negative Expectancies for HPFs and MPFs. Participants rate each item on a 6-point Likert scale, ranging from 1 (Definitely not) to 6 (Definitely). Higher scores in each subscale reflect stronger expectancy beliefs corresponding to that domain. The scale does not include a specific cut-off point for interpretation (Cummings *et al.*, 2020). The Turkish adaptation of the AEFS was conducted within the scope of the present study.

2.3.2 Palatable Eating Motives Scale (PEMS). The PEMS developed by Boggiano (2016) and adapted into Turkish as the T-PEMS by And *et al.* (2018), measures individuals' motives for consuming palatable foods and beverages. The scale contains 20 items rated on a 5-point Likert scale (1 = Never/Almost never, 5 = Almost always/Always) and assesses four distinct motivational domains: coping, reward enhancement, social, and conformity motives. Scores for each domain are computed by averaging the relevant items, and a total score is obtained by summing the subscale means. Higher scores indicate a greater tendency to eat palatable foods for non-homeostatic (non-hunger-driven) reasons. In previous studies, Cronbach's α coefficients for the Turkish version ranged from 0.81 to 0.90 (And *et al.*, 2018).

2.3.3 Eating Expectancy Inventory (EEI). The EEI developed by Hohlstein *et al.* (1998) and adapted into Turkish by Yurtsever and Sütçü (2021), was designed to evaluate broader expectancies associated with eating behavior. The instrument includes 34 items rated on a 7-point Likert scale, ranging from 1 (Strongly disagree) to 7 (Strongly agree). It measures five expectancy domains: distress reduction, reward enhancement, negative affect regulation, perceived loss of control, and cognitive competence. Higher scores in each subscale indicate stronger eating-related expectancies within that domain. The internal consistency coefficients of the Turkish version ranged between 0.75 and 0.95 (Yurtsever and Sütçü, 2021).

2.3.4 Anthropometric measurements. Previous studies have reported associations between food-related emotional expectancies and BMI (Cummings *et al.*, 2020). Therefore, participants' anthropometric data were collected in the present study. Information on body weight and height was obtained through self-reports, and BMI was calculated by dividing body weight (kg) by height squared (m^2). The obtained BMI values were classified according to the World Health Organization (WHO, 2020) criteria: participants with a BMI below 18.50 kg/m^2 were categorized as underweight, those with a BMI between $18.50\text{--}24.99 \text{ kg/m}^2$ as normal weight, $25.00\text{--}29.99 \text{ kg/m}^2$ as overweight, and 30.00 kg/m^2 or higher as obesity.

2.4 Data analyses

Data analyses were conducted using IBM SPSS Statistics 27.0. Descriptive statistics, including mean, standard deviation, frequency, and percentage, were calculated. The results were evaluated at a 95% confidence interval with a significance level of $p < 0.05$. Fit indices and p -values were reported to three decimal places to ensure higher precision in reporting.

2.4.1 Reliability and validity. The Davis Technique was used to assess the content validity of the AEFS. The experts selected for evaluating content validity included faculty members with expertise in various relevant fields: nutrition and dietetics ($n = 3$), psychiatric nursing ($n = 3$), and food engineering ($n = 2$). Both the original scale and the Turkish-translated version of the scale were sent to the experts, accompanied by a cover letter detailing the research, and the experts were asked to rate each item based on comprehensibility and scope. Items were rated on a scale from 1 to 4, where 1 = very appropriate, 2 = appropriate, 3 = needs little change (as suggested), and 4 = needs much change (as suggested). To calculate the content validity index for each item, the number of experts who rated each item as 1 or 2 was divided by the total number of experts. A comprehensibility score of 0.8 or above was accepted

as the criterion for content validity. Experts were also invited to provide feedback on any items they deemed inappropriate for inclusion. Based on their suggestions, adjustments were made to the Turkish version of the AEFS to ensure the language validity of the scale (Davis, 1992). According to the opinions of eight experts for the AEFS, the item-coverage validity index ranged between 0.88 and 1.00. The scale-coverage validity index was found to be 0.94.

The internal consistency and reliability of the scale were assessed using the Cronbach's α coefficient and McDonald's ω . A Cronbach's α value of 0.39 indicates low reliability, values between 0.40 and 0.59 suggest moderate reliability, values between 0.60 and 0.79 reflect good reliability, and values between 0.80 and 1.00 represent high reliability (Prion and Haerling, 2014). To assess test-retest reliability, the scale was re-administered to 40 participants apart from samples with a two-week interval, and the ICC was calculated. ICC values between 0.50 and 0.75 indicate moderate reliability, while values between 0.75 and 0.90 suggest high reliability (Koo and Li, 2016).

The number of factors was determined based on the scree plot and clinical considerations regarding the factor structure. EFA was performed using the mean and variance-adjusted weighted least squares estimator. Items with factor loadings greater than 0.40 were considered salient. The Kaiser-Meyer-Olkin (KMO) coefficient was used to assess the adequacy of the sample size, and Bartlett's test of sphericity was conducted. A KMO value of ≥ 0.60 and a significant result from Bartlett's test ($p < 0.05$) were considered acceptable (Streiner *et al.*, 2015). To assess the relevance of the scale's items, factor loadings and corrected item-total correlations were analyzed (Dimitrov, 2014).

After confirming the appropriateness of the scale for factor analysis, construct validity and the factor structure of the scale were evaluated using EFA with oblique (promax) rotation and principal component analysis. To assess the psychometric properties of the AEFS within a more rigorous framework, Rasch modeling grounded in Item Response Theory (IRT) was selected. For the Rasch analysis, the subsamples were recombined ($n = 742$) to maximize the statistical power and precision of item parameter estimate. Given the multi-category structure of the Likert-type items, analyses were performed utilizing the Rating Scale Model. The snowIRT module in Jamovi 2.6.44 was used for conducting Rasch analyses (Seol, 2025). The analysis involved separate evaluations of each subscale; the "HPFs Expectancies" and "MPFs Expectancies" subscales were assessed using unidimensional Rasch models. Item difficulty measures, standard error, infit, and outfit mean square (MnSq) statistics were reported for each item, with an acceptable fit limit established at a range of 0.5–1.5 (Linacre, 2012). The model's reliability was evaluated through the Rasch person separation reliability coefficient. The Mean Absolute Deviation of Q3 (MADaQ3) statistic was employed to assess model-data fit, with lower values indicating greater local independence. The Partial Credit Model and Rasch Subscale Model were compared for the subscales, with the most suitable model identified through information criteria, including the Akaike Information Criterion AIC, the Bayesian Information Criterion BIC, and Consistent AIC (CAIC) (Robitzsch *et al.*, 2022). Person-Item Maps (Wright Maps) were developed to assess the scale's targeting performance. The graphs assessed the scale's capacity to represent different levels of emotional expectancy by aligning item difficulty levels with participants' latent trait distributions on a common logit metric (Wright and Masters, 1982).

To evaluate measurement invariance across BMI categories (Normal/Underweight vs. Overweight/Obese), ordinal Differential Item Functioning (DIF) analyses were performed using ordinal logistic regression (vglm). Additionally, an attempt was made to perform DIF for gender; however, the models did not converge due to a rank deficiency (zero-cell problem) caused by the expected floor effect of extreme-negative emotion items in a non-clinical sample.

3. Results

The Bartlett's sphericity test ($\chi^2 = 41430.9, p < 0.001$) confirmed the suitability of the dataset for factor analysis, and the KMO measure was 0.943 (see [Supplementary file 1](#)). Initial

diagnostic metrics indicated that the item “Ashamed” had inadequate fit statistics (Infit/Outfit MNSQ >1.5) in both the HPFs-Negative and MPFs-Negative subscales, suggesting that this item did not consistently align with the underlying expectancy construct (see [Supplementary file 2](#)). As a result, “Ashamed” was removed. Subsequently, examination of the MPFs-Negative subscale showed that the item “Worried” had an Outfit MNSQ value below 0.50, indicating potential item redundancy or conceptual overlap with adjacent items rather than substantive misfit (see [Supplementary file 2](#)). A stepwise elimination procedure showed that removing “Worried” reduced local dependence and improved the fit of the remaining items, whereas removing “Irritable” did not yield a comparable improvement. Consequently, “Worried” was omitted. To maintain comparability across food-type subscales, “Worried” was also removed from the corresponding HPFs-Negative subscale; thus, the emotional descriptors removed from the final Turkish AEFS were “Ashamed” and “Worried” across both food categories.

Factor loadings ranged from 0.552 to 0.916 for MPFs expectancies and ranged from 0.410 to 0.886 for HPFs expectancies for an initial study (see [Supplementary file 1](#)). After the Rasch analysis, the Bartlett’s sphericity test ($\chi^2 = 37934.3, p < 0.001$) confirmed the suitability of the dataset for factor analysis, and the KMO measure was 0.941. Factor loadings ranged from 0.551 to 0.910 for MPFs expectancies and ranged from 0.412 to 0.833 for HPFs expectancies ([Table 2](#)). The final 29-item structure exhibited strong fit ([Table 3](#)) and high reliability ([Table 4](#)). To further evaluate the scale’s convergent and discriminant validity, Average Variance Extracted (AVE) values were calculated from the standardized factor loadings. The AVE values for MPFs-Negative, MPFs-Positive, and HPFs-Negative were 0.697, 0.505, and 0.568, respectively, all exceeding the recommended 0.50 threshold. The AVE for HPFs-Positive was 0.457. To evaluate measurement invariance, ordinal Differential Item Functioning (DIF) analyses were performed across gender and BMI categories. The ordinal DIF models for gender across all subscales did not converge due to rank deficiency (zero-cell problem), which reflects the expected floor effect of extreme emotional items (e.g. “depressed”) in a non-clinical, healthy sample. However, models across BMI categories (Normal/Underweight vs. Overweight/Obese) successfully converged and revealed robust measurement invariance. As presented in [Table 2](#), 54 out of 58 item parameters demonstrated no significant DIF (adjusted $p > 0.05$). The minor DIF observed in only four items (<10%) is considered negligible in IRT literature, confirming that the Turkish AEFS functions fairly across different BMI groups.

The item fit indices for the two subscales of the AEFS are displayed in [Table 3](#). After the item reduction process, the psychometric properties of the final version, comprising 29 items (14 negative and 15 positive expectancies), were analyzed using the Rasch model. The analytical results indicated that all items showed Infit and Outfit MNSQ values ranging from 0.50 to 1.50, which is the standard reference range for effective measurement. In the HPFs subscale, Outfit MNSQ values varied from 0.678 (“Irritable”) to 1.458 (“Regretful”), but in the MPFs subscale, the values ranged from 0.536 (“Irritable”) to 1.437 (“Excited”). It was concluded that, especially in the MPFs-Negative subscale, the “Irritable” item (Outfit = 0.536) was near the lower threshold yet remained within an acceptable range, resolving the issue of local dependence among items.

[Table 4](#) shows the overall fit statistics for the Rasch model. The Person-to-Person reliability coefficients were found to be 0.888 (Negative) and 0.916 (Positive) for the HPFs sub-dimensions, and 0.869 (Negative) and 0.906 (Positive) for the MPFs sub-dimensions. These values demonstrate that all sub-dimensions of the scale possess significant discriminative power and great internal consistency in differentiating participants based on their expectancies levels. Additionally, the obtained low MADAQ3 values (0.097–0.221) confirm that the data meet the fundamental requirements of the Rasch model and that the sub-dimensions show a homogeneous structure. The relationship between item difficulty factors and the distribution of participants’ skill levels is illustrated through the Wright Maps shown in [Figure 1](#). An examination of the maps indicates that, following the exclusion of the items “Ashamed” and

Table 2. Factor structure of the Turkish version AEFS

Items	HPFs	Component loadings		DIF for BMI (adj. <i>p</i>)	MPFs	Component loadings		DIF for BMI (adj. <i>p</i>)
		Factor 1	Factor 2			Factor 1	Factor 2	
2	Content		0.651	0.624	Content		0.661	0.624
3	Disgusting	0.661		0.293	Disgusting	0.756		0.474
4	Energized		0.718	0.516	Energized		0.742	0.516
5	Frustrated	0.710		0.557	Frustrated	0.765		0.523
6	Happy		0.713	0.624	Happy		0.733	0.624
7	Sluggish	0.695		0.003	Sluggish	0.728		0.033
8	Relieved		0.736	0.516	Relieved		0.835	0.516
9	Down	0.754		0.489	Down	0.849		0.566
10	Glad		0.741	0.624	Glad		0.745	0.624
11	Lazy	0.705		0.293	Lazy	0.843		0.103
12	Proud		0.638	0.076	Proud		0.752	0.076
13	Deprived	0.728		0.610	Deprived	0.830		0.795
14	Cheerful		0.780	0.624	Cheerful		0.794	0.624
15	Bored	0.815		0.383	Bored	0.786		0.033
16	Comforted		0.670	0.516	Comforted		0.703	0.516
17	Tired	0.744		0.383	Tired	0.837		0.103
18	Refreshed		0.784	0.516	Refreshed		0.781	0.516
20	Relaxed		0.717	0.813	Relaxed		0.656	0.813
21	Depressed	0.817		0.426	Depressed	0.896		0.324
22	Calm		0.651	0.857	Calm		0.707	0.857
23	Afraid	0.794		0.213	Afraid	0.884		0.811
24	Excited		0.633	0.624	Excited		0.551	0.624
25	Anxious	0.832		0.532	Anxious	0.886		0.442
26	Alert		0.412	0.857	Alert		0.614	0.857
27	Irritable	0.833		0.383	Irritable	0.910		0.033
28	Soothed		0.614	0.624	Soothed		0.656	0.624
29	Regretful	0.707		0.815	Regretful	0.890		0.267
30	Focused		0.593	0.516	Focused		0.675	0.516
31	Numb	0.733		0.815	Numb	0.800		0.795
AVE		0.568	0.457			0.697	0.505	
Eigenvalue		3.82	7.03			14.21	10.65	
Explained variance (%)		5.87	11.40			23.89	17.62	

Note(s): **AEFS:** Anticipated Effects of Food Scale, **Factor 1:** Negative Expectancies of HPFs and MPFs, **Factor 2:** Positive Expectancies of HPFs and MPFs **DIF:** Differential Item Functioning, **BMI:** Body Mass Index, **AVE:** Average Variance Extracted; Ordinal DIF across gender could not be computed due to full-rank model limitations (zero-cell problem) caused by floor effects

“Worried”, the residual items thoroughly included participants’ anticipation levels (on the logit scale), signifying effective targeting.

Figure 1 display the Rasch person-item maps, demonstrating that the item positions for both AEFS subscales correspond with the latent trait levels of the participants. The HPFs subscale (A) indicates that the items were distributed roughly within the -2 to $+2$ logits range, with most participants positioned within this range. The subscale for MPFs (B) demonstrated a comparable distribution, with items evenly distributed, especially regarding their ability to predict moderate emotional expectancies.

Table 5 presents the internal reliability of the Turkish version of the AEFS. The internal consistency of each subscale, as indicated by Cronbach’s α coefficients, ranged from 0.927 to 0.969, and McDonald’s ω coefficients ranged from 0.927 to 0.970, demonstrating the reliability of the scale. Specifically, the Cronbach’s α coefficients were 0.947 for Negative

Table 3. Infit and Outfit MnSq scores of AEFS subfactor

Subfactor	Expectancies	Item	Measure	SE	Infit	Outfit		
	Negative	Disgusting	1.81	0.0466	1.210	1.443		
		Frustrated	1.60	0.0451	1.163	1.216		
		Sluggish	1.58	0.0449	1.013	1.293		
		Down	1.49	0.0443	0.887	0.983		
		Lazy	1.02	0.0416	1.364	1.338		
		Deprived	1.63	0.0453	0.928	0.991		
		Bored	1.50	0.0444	0.756	0.699		
		Tired	1.18	0.0425	1.039	1.073		
		Depressed	1.45	0.0441	0.876	0.922		
		Afraid	1.80	0.0465	0.818	0.788		
		Anxious	1.52	0.0445	0.779	0.761		
		Irritable	1.67	0.0455	0.804	0.678		
		Regretful	0.92	0.0411	1.390	1.458		
		Numb	1.42	0.0439	1.170	1.164		
		Content	-0.53	0.0367	1.085	1.070		
		Energized	-0.12	0.0360	0.890	0.901		
	Positive	Happy	-0.64	0.0370	0.881	0.843		
		Relieved	0.07	0.0359	0.934	0.936		
		Glad	-0.35	0.0363	0.849	0.827		
		Proud	0.87	0.0368	1.033	1.049		
		Cheerful	-0.26	0.0362	0.797	0.772		
		Comforted	0.33	0.0359	1.121	1.125		
		Refreshed	0.54	0.0360	0.839	0.812		
		Relaxed	0.54	0.0360	0.898	0.898		
		Calm	0.26	0.0358	1.019	1.053		
		Excited	0.65	0.0362	1.049	1.037		
		Alert	0.99	0.0372	1.374	1.445		
		Soothed	0.46	0.0359	1.217	1.215		
		Focused	0.81	0.0366	1.099	1.099		
		Minimally processed foods	Negative	Disgusting	3.62	0.0632	1.118	1.267
				Frustrated	3.19	0.0601	1.467	1.391
				Sluggish	2.77	0.0574	1.476	1.297
Down	3.00			0.0588	0.886	0.779		
Lazy	3.27			0.0606	0.832	0.666		
Deprived	2.98			0.0587	0.956	0.950		
Bored	2.80			0.0576	1.109	1.029		
Tired	3.12			0.0596	0.854	0.782		
Depressed	3.15			0.0598	0.704	0.616		
Afraid	3.38			0.0614	0.831	0.687		
Anxious	3.21			0.0602	0.761	0.690		
Irritable	3.39			0.0615	0.725	0.536		
Regretful	3.40			0.0616	0.829	0.779		
Numb	3.11			0.0595	1.232	0.957		
Content	-0.88			0.0374	0.986	0.934		
Energized	-0.69			0.0363	0.888	0.863		
Positive	Happy		-0.79	0.0369	0.776	0.724		
	Relieved		-0.54	0.0355	0.670	0.608		
	Glad		-0.65	0.0360	0.854	0.801		
	Proud		-0.33	0.0346	1.029	0.941		
	Cheerful		-0.63	0.0359	0.698	0.631		
	Comforted		0.10	0.0336	1.061	1.030		
	Refreshed		-0.57	0.0356	0.824	0.737		
	Relaxed		0.12	0.0335	1.175	1.212		
	Calm		-0.21	0.0342	0.924	0.924		
	Excited		0.48	0.0338	1.353	1.437		
	Alert		0.40	0.0336	1.337	1.406		
	Soothed		0.15	0.0335	1.214	1.234		
	Focused		0.29	0.0335	1.205	1.190		

Table 4. Rasch model fit summary for both subscales

Subscale	Expectancies	Person reliability	MADaQ3	p
High processed foods	Negative	0.888	0.097	< 0.001
	Positive	0.916	0.179	< 0.001
Minimally processed foods	Negative	0.869	0.133	< 0.001
	Positive	0.906	0.221	< 0.001

Note(s): *Lower MADaQ3 indicates better local independence

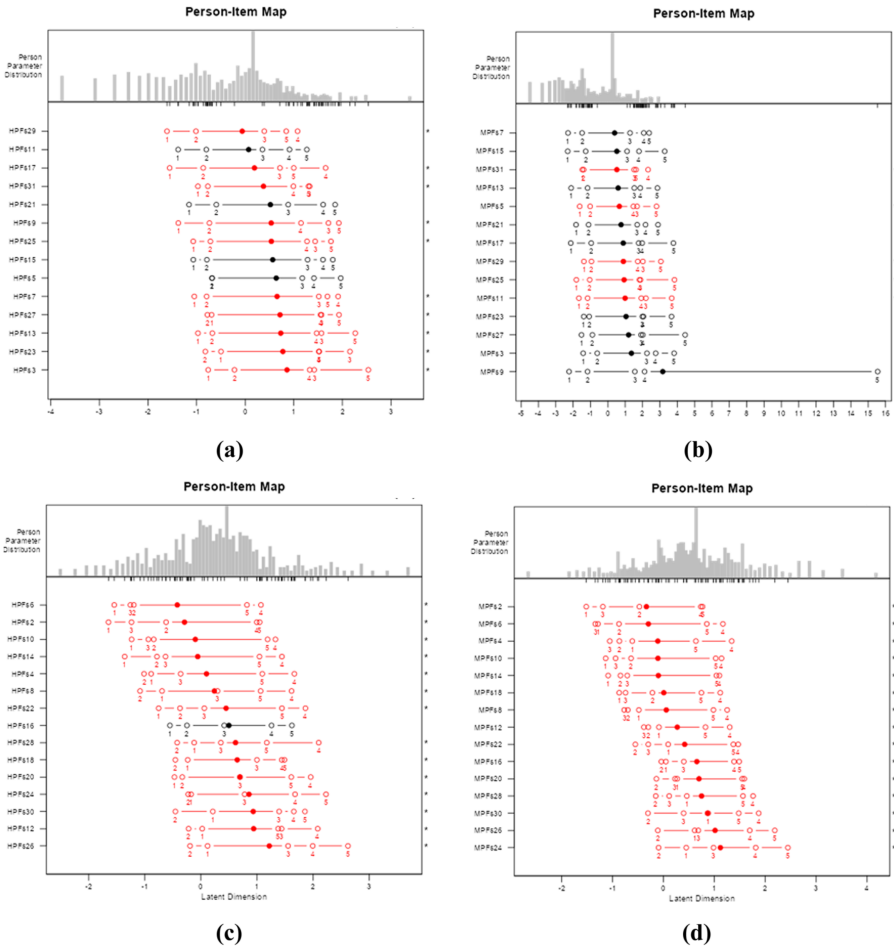


Figure 1. Person-Item Maps (Wright Maps) illustrating the distribution of item difficulty and person measures across the AEFS subscales. (a) High Processed Foods - Negative Expectancies; (b) Minimally Processed Foods - Negative Expectancies; (c) High Processed Foods - Positive Expectancies; (d) Minimally Processed Foods - Positive Expectancies. The upper panel in both maps illustrates the distribution of participants' latent trait (θ) levels. The lower panel displays the positions of item difficulty (red dots) alongside the distribution of response category thresholds. The comparable ranges of the person and item distributions suggest that the scale-item targeting is satisfactory

Table 5. Internal reliability of the Turkish version of the AEFS

Factor	Subfactor	Items	α coefficient	McDonald's Ω	Mean	SD	Item-total correlation	α if item deleted
HPFs	1	Disgusting	0.947	0.949	1.13	1.2	0.657	0.945
		Frustrated			1.26	1.3	0.700	0.944
		Sluggish			1.28	1.2	0.694	0.944
		Down			1.34	1.2	0.744	0.943
		Lazy			1.68	1.5	0.681	0.945
		Deprived			1.25	1.1	0.733	0.943
		Bored			1.33	1.2	0.803	0.942
		Tired			1.56	1.3	0.725	0.944
		Depressed			1.37	1.3	0.777	0.942
		Afraid			1.13	1.2	0.773	0.943
		Anxious			1.32	1.3	0.802	0.942
		Irritable			1.22	1.2	0.793	0.942
		Regretful			1.76	1.5	0.662	0.946
		Numb			1.38	1.4	0.715	0.944
HPFs	2	Content	0.937	0.940	4.57	1.3	0.644	0.934
		Energized			4.38	1.4	0.694	0.933
		Happy			4.49	1.3	0.694	0.933
		Relieved			4.23	1.4	0.799	0.930
		Glad			4.34	1.3	0.691	0.933
		Proud			4.00	1.6	0.733	0.931
		Cheerful			4.32	1.4	0.758	0.931
		Comforted			3.49	1.7	0.702	0.932
		Refreshed			4.26	1.5	0.769	0.931
		Relaxed			3.47	1.7	0.662	0.934
		Calm			3.85	1.5	0.720	0.932
		Excited			3.04	1.6	0.551	0.936
		Alert			3.13	1.6	0.591	0.936
		Soothed			3.43	1.7	0.643	0.934
Focused	3.26	1.7	0.658	0.934				
MPFs	1	Disgusting	0.969	0.970	0.77	1.0	0.750	0.968
		Frustrated			0.92	1.2	0.741	0.968
		Sluggish			1.09	1.2	0.720	0.969
		Down			1.00	1.1	0.829	0.967
		Lazy			0.89	1.1	0.844	0.966
		Deprived			1.00	1.1	0.829	0.967
		Bored			1.07	1.2	0.801	0.967
		Tired			0.95	1.2	0.837	0.967
		Depressed			0.94	1.1	0.882	0.966
		Afraid			0.94	1.1	0.852	0.966
		Anxious			0.85	1.1	0.865	0.966
		Irritable			0.92	1.1	0.873	0.966
		Regretful			0.85	1.1	0.860	0.966
		Numb			0.95	1.1	0.794	0.967
MPFs	2	Content	0.927	0.927	4.10	1.3	0.584	0.924
		Energized			3.68	1.4	0.684	0.921
		Happy			4.20	1.3	0.645	0.922
		Relieved			3.48	1.4	0.688	0.921
		Glad			3.91	1.3	0.686	0.921
		Proud			2.65	1.4	0.643	0.922
		Cheerful			3.82	1.4	0.721	0.920
		Comforted			3.20	1.5	0.663	0.922
		Refreshed			2.99	1.5	0.767	0.918
		Relaxed			2.99	1.4	0.694	0.921
		Calm			3.28	1.4	0.650	0.922
		Excited			2.87	1.4	0.642	0.922
		Alert			2.54	1.3	0.448	0.927
		Soothed			3.07	1.5	0.604	0.923
Focused	2.71	1.4	0.627	0.923				

Note(s): AEFS: Anticipated Effects of Food Scale, **HPFs:** High processed foods, **MPFs:** Minimally processed foods

Expectancies-HPFs, 0.937 for Positive Expectancies HPFs, 0.969 for Negative Expectancies MPFs, and 0.927 for Positive Expectancies MPFs.

Table 6 presents the results of the time-invariance analysis for the Turkish version of the AEFS. The test-retest reliability had ICC values ranging from 0.783 to 0.833, with all coefficients being statistically significant at $p < 0.001$. Specifically, ICC values were 0.833 for Negative Expectancies-HPFs, 0.809 for Positive Expectancies-HPFs, 0.783 for Negative Expectancies-MPFs, and 0.786 for Positive Expectancies-MPFs.

Figure 2 presents the correlation matrix between the AEFS subscales, demographic variables, and the PEMS and EEI subscales. HPFs-Positive scores showed a moderate positive association with the PEMS-Total score ($r = 0.414$), and statistically significant correlations with the EEI sub-dimensions, ranging from $r = 0.161$ to $r = 0.282$. The correlations between the MPFs sub-dimensions (Negative and Positive) and the PEMS and EEI sub-dimensions were either statistically significant with small effect sizes or not statistically significant. BMI values showed a small but statistically significant positive correlation with HPFs-Negative scores ($r = 0.151$), whereas correlations with the other AEFS subscales were small and not statistically significant ($r = -0.028$ to 0.051).

4. Discussion

The present study aimed to translate, culturally adapt, and psychometrically validate the Turkish version of the AEFS. Through a combination of classical and modern measurement approaches, the findings provide compelling evidence that the Turkish AEFS is a reliable and culturally appropriate tool for assessing emotional expectancies associated with minimally processed and highly processed foods. Given the growing public health concern surrounding emotional eating and the increasing availability of HPF in Türkiye, the availability of such an instrument fills a notable methodological gap and supports future investigations into expectancy-driven eating behavior. Emotional expectancies, defined as beliefs regarding the emotional outcomes of eating, may represent a central cognitive mechanism underlying hedonic eating, food addiction symptoms, and maladaptive consumption patterns (Cummings *et al.*, 2020; Burr *et al.*, 2023).

4.1 Cross-cultural adaptation and content validity

The adaptation process followed internationally accepted guidelines for translation and test adaptation, incorporating forward-backward translation, expert review, and pilot testing (WHO, 2020; ITC, 2018). The high item-level and scale-level content validity indices indicate that the emotional constructs embedded in the scale retained conceptual clarity and cultural resonance. This is particularly crucial for affect-related constructs, as the symbolic and emotional meanings of food differ across sociocultural contexts (Desmet and Schifferstein, 2008; Kryś *et al.*, 2021). Consistent with previous observations on cultural variations in food-related emotions, evaluative terms such as relieved, calm, ashamed, or regretful were deemed

Table 6. Time-invariance analysis

AEFS		ICC	95% confidence interval		p
			Lower	Upper	
HPFs	Factor 1	0.833	0.685	0.912	< 0.001
	Factor 2	0.809	0.639	0.889	< 0.001
MPFs	Factor 1	0.783	0.590	0.885	< 0.001
	Factor 2	0.786	0.596	0.887	< 0.001

Note(s): ICC: Intraclass Correlation Coefficient, **AEFS:** Anticipated Effects of Food Scale, **HPFs:** High processed foods, **MPFs:** Minimally processed foods

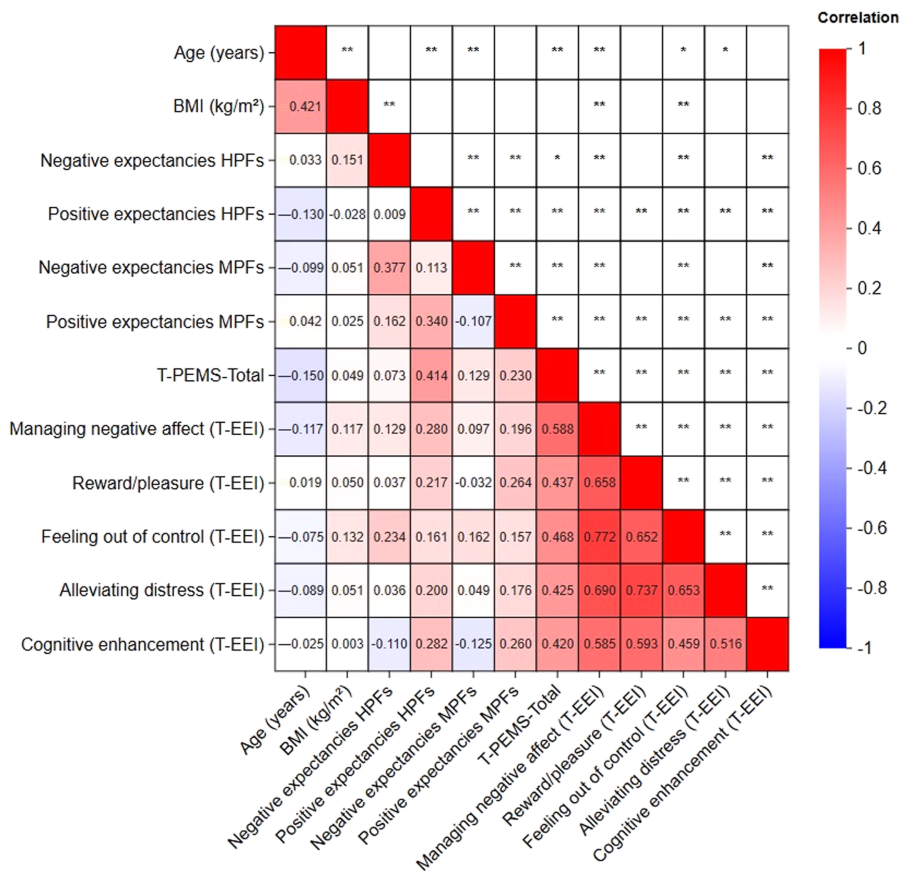


Figure 2. Correlation matrix between the AEFS subscales, demographic variables, and the PEMS and EEI subscales. **AEFS:** Anticipated Effects of Food Scale, **PEMS:** Palatable Eating Motives Scale, **EEI:** Eating Expectancy Inventory. **Correlation is significant at the 0.01 level, *Correlation is significant at the 0.05 level

both linguistically and conceptually appropriate for Turkish respondents. Thus, the results affirm that the adapted AEFS adequately reflects culturally relevant emotional associations and preserves the theoretical intent of the original instrument.

4.2 Construct validity

The EFA supported the hypothesized two-factor solution, demonstrating strong factor loadings across items for both MPF and HPF expectancies. These results confirm the adequacy of the dataset and the stability of the underlying structure in the Turkish cultural context. Emotional descriptors such as depressed, worried, relieved, and energized aligned cleanly with the conceptual domains proposed in expectancy theory. The AVE values for MPFs-Negative, MPFs-Positive, and HPFs-Negative were 0.697, 0.505, and 0.568, respectively, all exceeding the recommended 0.50 threshold. The AVE for HPFs-Positive was 0.457. However, according to [Fornell and Larcker \(1981\)](#), convergent validity is established if the construct’s reliability exceeds 0.60. Given that the Cronbach’s α and McDonald’s Ω values for the HPFs-Positive subscale were 0.937 and 0.940, respectively, the convergent validity of all sub-dimensions is confirmed.

4.2.1 Rasch modeling: strengthening construct validity at the item level. The Rasch analyses offered strong support for the psychometric soundness of the AEFS at the item level. To ensure item refinement was empirically driven rather than post hoc, item removal was primarily based on Rasch misfit statistics. Specifically, the item “Ashamed” exhibited statistical misfit across both the HPF and MPF domains, providing direct empirical justification for its exclusion. Interpreting this finding culturally, while “Ashamed” is a core component of food-related guilt in Western literature, in the Turkish context it may be perceived as a much heavier, morally laden emotion than “Regretful” (Rexiti and Cobanoglu, 2017). Participants probably made a clear distinction between feeling “Regretful” after eating (which was kept) and feeling “Ashamed”, which is why the latter didn’t fit.

Similarly, the removal of the item “Worried” initially stemmed from its empirical misfit within the MPFs subscale, which highlights a linguistic nuance. In Turkish, the terms meaning “Worried” (“endişelenmiş”) and “Anxious” (“kaygılanmış”) are sometimes used interchangeably to denote a sense of unease, leading to statistical redundancy. However, the subsequent removal of “Worried” from the HPFs subscale was a strict methodological decision rather than a purely statistical one. In Rasch measurement theory, comparing logit scores across different sub-dimensions requires parallel test forms. Retaining “Worried” in the HPFs subscale while removing it from the MPFs subscale would have compromised structural comparability. Thus, this symmetric removal ensures that an individual’s HPF expectancy scores remain directly comparable against their MPF expectancy scores.

Importantly, regarding content validity, the exclusion of these items does not compromise the scale’s theoretical coverage; the negative expectancy domains remain robustly represented. Maintaining “Anxious”, “Irritable”, and “Regretful” allowed us to capture the distinctive features of negative activation without overloading respondents, thereby enhancing the scale’s measurement efficiency and cross-dimensional invariance. Furthermore, the wide logit range (up to +16 logits) observed in the MPFs-Negative Wright Map is not indicative of poor targeting but rather reflects an expected floor effect. It is naturally “difficult” for a healthy, non-clinical sample to anticipate extreme negative emotions after consuming MPFs.

4.3 Reliability, temporal stability, and internal consistency

Internal consistency estimates were exceptionally high across two subscales. These coefficients exceed the recommended thresholds for newly adapted affective measures and reflect strong item homogeneity within each domain. The corrected item–total correlations were consistently high, demonstrating strong item discrimination, reinforcing the interpretation that items contribute meaningfully and discriminatively to their respective subdomains. Temporal stability, assessed via test–retest reliability over a two-week interval, yielded high ICC values, indicating moderate to high stability. This level of consistency aligns with expectancy theory, which conceptualizes expectancies as learned cognitive patterns that remain relatively stable in the absence of significant behavioral or environmental changes (Goldman *et al.*, 1999).

4.4 Convergent validity and theoretical alignment with hedonic eating models

The results of the correlation analyses provide significant evidence for the construct validity of the scale. The significant correlations between the positive expectancies regarding the HPFs subscale and the PEMS-Total score, as well as the EEI subdimensions, substantiate the theoretical basis of the scale. This aligns with studies indicating that individuals consume HPFs with anticipations of “reward”, “pleasure”, and “emotional control” rather than physical hunger (Rouhani *et al.*, 2025; Meule and Gearhardt, 2014; Renger and Smolarski, 2020). On the other hand, the finding that the sub-dimensions of MPFs showed weak, inconsistent, or nonsignificant associations with hedonic eating and loss of control demonstrates the scale’s discriminant validity. Furthermore, the relatively weak or inconsistent correlations observed between the MPFs subscales and the PEMS/EEI are theoretically sound. Given that the PEMS

and EEI primarily assess reward-driven and emotionally compensatory eating behaviors typically associated with highly palatable foods, it is conceptually expected that expectancies regarding MPFs would not strongly align with these constructs. The scale effectively differentiates between expectancies for healthful foods and hedonic eating impulses.

This study found only a small significant correlation between BMI and AEFS scores, specifically for HPFs-Negative, whereas correlations with the other AEFS subscales were not statistically significant, contrasting with previous findings (Cummings *et al.*, 2020). This absence of association can be attributed to two key factors. The primary and methodologically significant factor is the range restriction observed in the BMI distribution of our sample. The sample consisted mostly of young adults, most of whom were of normal weight. The relatively small percentage of overweight and obesity limits the statistical variance required to identify significant correlations related to overweight and obesity. The observation that individuals with normal weight may possess increased emotional expectancies related to food, such as using eating as a means to reduce anxiety, indicates that these expectancies could serve not only as a result of obesity but also as a potential precursor risk factor or a distinct psychological characteristic.

4.5 Implications for research, clinical practice, and public health

The validated Turkish AEFS holds several methodological and applied implications. First, it provides researchers with a culturally sensitive measure that can advance the study of hedonic and emotional eating in Türkiye. Second, the instrument may support the development of expectancy-focused interventions, such as expectancy modification or expectancy challenge strategies, commonly used in addiction research and potentially adaptable to maladaptive eating patterns (Scott-Sheldon *et al.*, 2012). Third, the scale offers opportunities for public health applications, such as identifying population subgroups that endorse heightened positive expectancies toward highly processed foods, thereby informing targeted nutritional messaging. Finally, the availability of a validated Turkish version enables cross-cultural comparative studies, facilitating global research into expectancy-driven components of eating behavior.

4.6 Strengths and limitations

Among the study's strengths are its large sample size, rigorous adherence to established adaptation protocols, and the combination of classical and modern psychometric frameworks. The use of both EFA and Rasch modeling strengthened the construct validation process, while the inclusion of convergent measures provided additional theoretical grounding. Nonetheless, limitations remain. In the small independent sample used for test-retest reliability, we asked these participants to generate a unique pseudonym to score the scale items at two time points (two weeks apart). Due to this pseudonym-based matching procedure designed to ensure anonymity, we did not collect detailed sociodemographic data for this subgroup; hence, it is not presented in the manuscript. The reliance on self-reported anthropometric data may introduce measurement bias. Importantly, the main sample was predominantly young, female, and highly educated, which limits the generalizability of the findings to the broader Turkish population. Furthermore, the exclusion of individuals with diagnosed physical or psychological disorders limits the immediate applicability of the scale in clinical contexts where emotional eating is particularly relevant. Future studies should aim to validate the AEFS in more demographically diverse and clinical samples.

5. Conclusion

This study provides strong evidence that the Turkish version of the AEFS is a reliable, valid, and culturally appropriate tool for assessing emotional expectancies toward minimally and highly processed foods. Rasch analyses confirmed the structural coherence, item fit, and

measurement precision of the adapted scale. The high internal consistency, temporal stability, and meaningful associations with hedonic eating motives and expectancy-related constructs further highlight its theoretical and practical relevance. Given the rising prevalence of emotional and highly processed food consumption in Türkiye, the Turkish AEFS offers a valuable instrument for future research, clinical assessment, and public health strategies targeting expectancy-driven eating behaviors.

Supplementary material 1

Table A1. Initial factor structure of the Turkish version AEFS

Items	HPFs	Component loadings		MPFs	Component loadings	
		Factor 1	Factor 2		Factor 1	Factor 2
1	Ashamed	0.581		Ashamed	0.643	
2	Content		0.650	Content		0.663
3	Disgusting	0.669		Disgusting	0.758	
4	Energized		0.719	Energized		0.744
5	Frustrated	0.731		Frustrated	0.763	
6	Happy		0.712	Happy		0.735
7	Sluggish	0.690		Sluggish	0.727	
8	Relieved		0.734	Relieved		0.834
9	Down	0.751		Down	0.838	
10	Glad		0.740	Glad		0.748
11	Lazy	0.704		Lazy	0.837	
12	Proud		0.637	Proud		0.749
13	Deprived	0.719		Deprived	0.826	
14	Cheerful		0.778	Cheerful		0.796
15	Bored	0.804		Bored	0.772	
16	Comforted		0.672	Comforted		0.701
17	Tired	0.748		Tired	0.833	
18	Refreshed		0.784	Refreshed		0.781
19	Worried	0.886		Worried	0.916	
20	Relaxed		0.718	Relaxed		0.654
21	Depressed	0.829		Depressed	0.900	
22	Calm		0.651	Calm		0.705
23	Afraid	0.789		Afraid	0.886	
24	Excited		0.633	Excited		0.552
25	Anxious	0.833		Anxious	0.886	
26	Alert		0.410	Alert		0.612
27	Irritable	0.827		Irritable	0.908	
28	Soothed		0.616	Soothed		0.652
29	Regretful	0.722		Regretful	0.888	
30	Focused		0.592	Focused		0.674
31	Numb	0.730		Numb	0.804	
	Eigenvalue	7.46	4.03		15.83	10.70
	Explained variance (%)	12.30	6.49		25.53	17.26

Note(s): Based on subsequent Rasch analysis, items “Ashamed” and “Worried” were removed from the final scale structure due to misfit and redundancy

Table A2. Initial Infit and Outfit MnSq scores of AEFS subfactor

Subfactor	Expectancies	Item	Measure	SE	Infit	Outfit
High processed foods	Negative	Ashamed	2.00	0.0047	1.660	1.570
		Disgusting	1.86	0.0462	1.168	1.364
		Frustrated	1.65	0.0448	1.098	1.160
		Sluggish	1.63	0.0446	1.012	1.366
		Down	1.54	0.0440	0.888	0.996
		Lazy	1.08	0.0414	1.378	1.374
		Deprived	1.68	0.0450	0.935	1.033
		Bored	1.55	0.0441	0.768	0.715
		Tired	1.24	0.0422	1.049	1.119
		Worried	1.47	0.0436	0.722	0.735
		Depressed	1.50	0.0436	0.846	0.856
		Afraid	1.50	0.0438	0.722	0.735
		Anxious	1.85	0.0462	0.821	0.784
		Irritable	1.57	0.0442	0.764	0.739
		Regretful	0.98	0.0409	1.359	1.454
	Numb	1.48	0.0437	1.170	1.240	
	Positive	Content	-0.53	0.0367	1.085	1.070
		Energized	-0.12	0.0360	0.890	0.901
		Happy	-0.64	0.0370	0.881	0.843
		Relieved	0.07	0.0359	0.934	0.936
		Glad	-0.35	0.0363	0.849	0.827
		Proud	0.87	0.0368	1.033	1.049
		Cheerful	-0.26	0.0362	0.797	0.772
		Comforted	0.33	0.0359	1.121	1.125
		Refreshed	0.54	0.0360	0.839	0.812
		Relaxed	0.54	0.0360	0.898	0.898
		Calm	0.26	0.0358	1.019	1.053
		Excited	0.65	0.0362	1.049	1.037
		Alert	0.99	0.0372	1.374	1.445
		Soothed	0.46	0.0359	1.217	1.215
Focused		0.81	0.0366	1.099	1.099	
Minimally processed foods	Negative	Ashamed	4.01	0.0658	2.045	2.891
		Disgusting	3.57	0.0621	1.128	1.230
		Frustrated	3.15	0.0591	1.435	1.415
		Sluggish	2.74	0.0565	1.439	1.306
		Down	2.96	0.0579	0.881	0.787
		Lazy	3.22	0.0596	0.828	0.676
		Deprived	2.95	0.0578	0.947	0.917
		Bored	2.77	0.0567	1.126	1.049
		Tired	3.08	0.0587	0.839	0.760
		Worried	3.26	0.0599	0.600	0.442
		Depressed	3.11	0.0589	0.662	0.611
		Afraid	3.33	0.0604	0.794	0.690
		Anxious	3.16	0.0592	0.726	0.690
		Irritable	3.34	0.0605	0.694	0.526
		Regretful	3.35	0.0606	0.790	0.693
	Numb	3.06	0.0586	1.179	0.924	
	Positive	Content	-0.88	0.0374	0.986	0.934
		Energized	-0.69	0.0363	0.888	0.863
		Happy	-0.79	0.0369	0.776	0.724
		Relieved	-0.54	0.0355	0.670	0.608
		Glad	-0.65	0.0360	0.854	0.801
		Proud	-0.33	0.0346	1.029	0.941
		Cheerful	-0.63	0.0359	0.698	0.631
		Comforted	0.10	0.0336	1.061	1.030
		Refreshed	-0.57	0.0356	0.824	0.737
		Relaxed	0.12	0.0335	1.175	1.212
		Calm	-0.21	0.0342	0.924	0.924
		Excited	0.48	0.0338	1.353	1.437
		Alert	0.40	0.0336	1.337	1.406
		Soothed	0.15	0.0335	1.214	1.234
Focused		0.29	0.0335	1.205	1.190	

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