

Short version of the Odor Awareness Scale (OAS-6): Turkish validity and reliability study

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Abstract

Odor awareness is currently trending topic, and significant measurement tools have recently been developed in this field. The Odor Awareness Scale Short Form (OAS-6) is one of these assessment instruments. To promote research on olfaction in Türkiye, there is a need to adapt this scale into Turkish. Thus, we aimed to adapt the OAS-6 into Turkish and test its validity and reliability. This study was designed as cross-sectional study. Data were collected online using convenience sampling between 19 September and 31 October 2025. The adaptation process of OAS-6 involved content validity, exploratory (EFA) and confirmatory factor analysis (CFA), validity evidence, and test–retest with 2-week intervals analysis. These analyses were conducted using JASP and p value set at $p < 0.05$. All stages of the study adhered to the Helsinki Declaration. The study was completed with 450 participants (60% female). Ages ranged from 18 to 63 years ($M = 26.2$, $SD = 11.4$). EFA revealed a unidimensional structure explaining 47.1% of the total variance, while CFA confirmed an acceptable model fit ($\chi^2/df = 1.56$, $RMSEA = 0.027$, $CFI = 0.975$, $TLI = 0.958$, $SRMR = 0.041$). Additionally, the scale's internal consistency proved to be good (McDonald's $\omega = 0.811$; Cronbach's $\alpha = 0.807$). This study suggests that the Turkish version of the OAS-6 has acceptable validity and reliability as a unidimensional instrument within the Turkish cultural context. The scale may be useful for research and clinical settings where subjective odor perception is relevant (e.g., psychology, neurology, psychiatry, otorhinolaryngology, public health). Beyond clinical applications, the scale offers potential for humanities and social sciences research, including studies on attention, emotion, social interaction, and cultural differences in sensory awareness. Its concise six-item format reduces respondent burden and administrative time, making it adaptable to various data collection modalities, including digital platforms. The Turkish OAS-6 is promising for use in future epidemiological and interdisciplinary studies, although further validation with diverse samples is encouraged.

Background

Individuals exhibit considerable variation in their ability to detect and interpret odor stimuli in their environments. While some people can immediately perceive, process, and integrate olfactory information to organize their behaviors and decisions, others may only become aware of a scent's presence when externally prompted or reminded. This perceptual awareness, considered a metacognitive function that varies among individuals, is referred to in the literature as “odor awareness” (Smeets et al., 2008). Numerous determinants may underlie this awareness, including genetic predispositions, personal experiences, gender, health status, and cultural factors, among others (Oleszkiewicz et al., 2020). Findings from scientific research generally indicate that females possess more developed perceptual

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sensitivity in olfaction compared to males. This heightened sensitivity is thought to be associated with hormonal levels, greater exposure to odors, and more robust odor recognition capabilities (Doty and Cameron, 2009; Nováková et al., 2014; Sorokowski et al., 2019). Furthermore, many studies support that women demonstrate higher personal interest in odors and attach greater importance to them compared to men (Croy et al., 2010; Havlicek et al., 2008; Herz and Inzlicht, 2002; Sorokowska et al., 2018).

It is well-established that odor components transported through air can exert both positive and negative effects on human health. Recent studies demonstrate that certain airborne compounds may cause temporary or permanent impairments in olfactory function (Arnold, 2019; Ekström et al., 2022; Mussalo et al., 2023). These adverse effects are not limited to the sense of smell but may also lead to more extensive damage to vital bodily functions, including respiratory, cardiovascular, and nervous systems (Duan et al., 2020; Ha, 2021; Hahad et al., 2020; Kühn et al., 2020). Alongside these negative effects, odor components also exhibit beneficial properties. For instance, inhalation of certain aromatic stimuli has been shown to produce therapeutic effects in humans (Oleszkiewicz et al., 2021). Various epidemiological studies have examined odor from multiple perspectives, focusing on the human-odor-health relationship, including research on body odors in relation to depression, anxiety, bipolar disorders, and other conditions (Dal Bo et al., 2022; Kamath et al., 2018; Li et al., 2022). Odor awareness is not merely a measure of olfactory sensitivity; it is a psychologically meaningful construct reflecting individual differences in attention, metacognition, and emotional processing. Individuals with high odor awareness actively monitor their olfactory environment and integrate this information into daily decisions and behaviors. This construct is linked to metacognitive processes and has been associated with enhanced autobiographical memory, as odors are potent triggers of emotional memories. Odors can also evoke strong affective reactions, and individuals differ in their sensitivity to these emotional signals. These emotional responses can shape social interactions and mood states (Dal Bo et al., 2022). These findings highlight the need for reliable and valid tools to assess individual differences in odor awareness for both research in the humanities and social sciences and clinical practice.

The impact of odor perception on daily life and the perceptual differences among individuals scientifically necessitate the development of valid and reliable measurement methods. In line with this scientific requirement, various scales have been developed to examine the connection between the sense of smell and cognitive processes (Cupchik et al., 2005; Dal Bo et al., 2021; Ferdenzi et al., 2008; Li et al., 2022; Martin et al., 2001; Smeets et al., 2008; Wrzesniewski et al., 1999). For example, Affective Impact of Odor developed by Wrzesniewski et al. (1999) aims to measure individuals' emotional responses to odors and associated memories (Wrzesniewski et al., 1999). Similarly, the Odors in Everyday Life Questionnaire by Cupchik et al. (2005) addresses the role of odors in social relationships, spatial perception, and personal habits (Cupchik et al., 2005). There is an additional tool developed specifically for children that measures how they react emotionally and behaviorally to smells coming from food, people, and the surrounding environment (Ferdenzi et al., 2008). Among these assessment tools is the Odor Awareness Scale (OAS) developed by Smeets et al. (2008) to measure odor awareness (Smeets et al., 2008). This scale, demonstrating high validity and reliability, has been adapted into Chinese with comparable performance (Zhang et al., 2023). Subsequently, a short version derived from OAS was developed: the Odor Awareness Scale Short Form (OAS-6). This six-item, unidimensional scale was created by Rokosz et al. (2024) in Poland and has been reported to maintain high validity and reliability, similar to its full version (Rokosz et al., 2024). Short-form scales are generally recognized as highly practical for studies involving large sample sizes and cross-cultural adaptations. Odor awareness also has social and cultural dimensions. Cultural norms shape which odors are noticed or ignored. Therefore, adapting a scale to a new culture is not just translation; it reveals how culture shapes sensory awareness. Despite this cultural relevance, the OAS-6 has not yet been adapted for Turkish-speaking populations. Türkiye offers a unique context for examining odor awareness. Turkish culture includes aromatic cuisine, hamam tradition, and rituals using incense and rose water. These practices may shape odor awareness differently than in Western cultures. Given its psychological and cultural importance, a valid Turkish measure is needed. Therefore, to promote olfactory research in Türkiye and to provide a brief, reliable tool for assessing odor awareness, we aimed to adapt the OAS-6 into Turkish and test its validity and reliability.

Methods

Study design

This cross-sectional study was conducted across two distinct provinces in Türkiye, namely Aydın and Burdur, to obtain a geographically diverse and representative participant sample. The data collection phase was rigorously planned and executed over a continuous 2-month period, precisely spanning from the beginning of 19 September to the end of October 2025.

Sampling method and sample size

In psychometric research, establishing an appropriate sample size is vital for structural validation. A widely recognized guideline suggests that the participant-to-estimated-parameter ratio ($N:q$) should ideally fall between 10:1 and 20:1 (Kline, 2023). For a brief instrument such as the OAS-6, this approach dictates a baseline of at least 120 respondents. However, to avoid cross-validation biases, this study designed a split-sample methodology involving both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). To minimize the risk of non-convergence and to secure parameter stability across both analytical steps, methodological literature strongly advocates for an absolute threshold of more than 200 individuals ($N > 200$) independently for the EFA stage and $N > 200$ for the CFA stage (Kline, 2016, 2023), resulting in a core requirement of 400 participants. Furthermore, anticipating a potential 10% data attrition rate due to careless responding, incomplete protocols, or multivariate outliers during preliminary screening, the initial recruitment goal was set at approximately 440 individuals to preserve adequate statistical power.

In parallel, for the specific purpose of evaluating the temporal stability of the scale through test–retest reliability analysis a procedure conducted with a 2-week interval a separate subsample was recruited. The size of this retest group was determined by adhering to the same foundational guideline (Kline, 2016, 2023), ensuring it met or exceeded the 20:1 participant-to-item ratio, thus comprising at least 120 individuals. A random subsample of participants was selected from the main sample for this purpose. To assess whether this subsample would be representative of the main sample, demographic characteristics (age, gender, education level) were planned to be compared between the two groups.

Inclusion and exclusion criteria

Participant eligibility was determined by inclusion and exclusion criteria. To be included, individuals were required to be adults aged between 18 and 65 years, possess literacy skills, be able to speak and understand Turkish, reside in Türkiye, and have access to the necessary digital technology (e.g., smartphone, computer, or tablet) to complete the online questionnaire. Conversely, potential participants were excluded based on several health-related factors to control for conditions that could directly influence olfactory perception or self-report accuracy. These exclusions encompassed: (1) a current or chronic history of significant respiratory tract issues; (2) a history of surgical procedures involving key olfactory and gustatory structures, such as the mouth, tongue, lips, or nasal cavity; (3) a diagnosed neurological or psychiatric disorder; and (4) a reported or diagnosed condition of anosmia (loss of smell) or parosmia (distorted smell perception).

Turkish adaptation process of the Odor Awareness Scale Short Version (OAS-6)

Permission for the adaptation was secured from Anna Oleszkiewicz, a corresponding author of the original OAS-6. Following the methodological framework outlined in previous cross-cultural adaptation studies (Ostovar et al., 2017), the scale was then adapted into Turkish using internationally recognized guidelines for cross-cultural instrument validation. Two native Turkish translators with strong English proficiency independently translated the original items

into Turkish. The research team reviewed both translations, resolved discrepancies, and created a single preliminary Turkish version. Two additional bilingual translators, who had not seen the original scale, performed a back-translation of this preliminary version into English. The back-translated version was then compared with the original English scale to verify conceptual consistency. A panel of seven experts from psychology, psychiatry, nursing, public health, and otorhinolaryngology assessed the preliminary Turkish version for clarity, cultural relevance, and content appropriateness. This step served as the content validity evaluation.

Content validity

The OAS-6 was translated into Turkish by two independent bilingual translators (forward translation). After synthesizing their translations, two different bilingual translators unaware of the original version back-translated the preliminary Turkish version into English. This back-translated version was then checked against the original scale for conceptual equivalence. A panel of seven domain experts then assessed content validity using the Lawshe technique. The scale-level content validity index was 0.976, the universal agreement value was 0.833, and item-level values ranged from 0.857 to 1, all above the recommended threshold of 0.75 (Lawshe, 1975). The final Turkish version was finalized based on expert and translator feedback.

A pilot study with 30 participants tested item comprehensibility and fluency. No suggestions for changes were received from the participants, so the scale remained unchanged. Data from this pilot phase were not included in the main study findings.

Data collection instruments

The questionnaire that was given to participants had three main parts. The first part included a form for collecting sociodemographic data, which the researchers developed by examining relevant published work. This form also drew key questions about demographics and past olfactory experiences from well-known studies on how people perceive and notice odors (Rokosz et al., 2024; Smeets et al., 2008; Zhang et al., 2023).

The second section presented the Turkish adaptation of the Odor Awareness Scale-Short Form (OAS-6), the core instrument under investigation. The final section included the widely used Toronto Alexithymia Scale (TAS-20) to assess emotional awareness for potential correlational analyses. For efficient and broad data collection, the complete questionnaire battery was digitized using the Google Forms platform. The resulting web link was subsequently disseminated to potential participants across various social media networks, including WhatsApp and Instagram, to facilitate remote access and participation.

Odor Awareness Scale Short Version (OAS-6)

The Odor Awareness Scale (OAS) originated from the seminal work of Smeets et al. (2008), who introduced the comprehensive 32-item instrument to assess individual variability in the perception and cognitive prominence of everyday smells (Smeets et al., 2008). To create a more efficient yet psychometrically sound tool, Rokosz et al. (2024) conducted a rigorous item-reduction analysis, resulting in the concise 6-item short form known as the OAS-6. This abbreviated scale maintains a unidimensional structure and employs a classic Likert-type response format. Specifically, respondents rate each item on a symmetric five-point ordinal scale designed to capture frequency or agreement. The scale's anchors are precisely defined: the lowest point (1) corresponds to "never," indicating a complete absence of the described experience or behavior. This is followed by (2) "rarely," (3) "sometimes," (4) "often", and culminates at the highest point (5) "always", signifying a constant or near-constant presence of the experience. The total score is derived from the sum of all item responses, providing a single composite metric. As per the scale's validation, this total score serves as a direct operationalization of olfactory awareness, where a higher numerical value reflects a greater degree of subjective odor sensitivity and attentiveness to olfactory cues in one's surroundings (Rokosz et al., 2024).

Table 1 Distribution of sociodemographic characteristics in the study sample ($n = 450$).

Characteristics		<i>n</i>	%
Gender	Male	180	40
	Female	270	60
Marital Status	Single	357	79.3
	Married	93	20.7
Economic Status	Income = Expenses	309	68.7
	Income < Expenses	102	22.7
	Income > Expenses	39	8.6
Tobacco and Tobacco Products Use	Quit	11	2.4
	Current user	90	20
	Never used	349	77.6
Has your sense of smell returned to normal after COVID-19?	Did not have COVID-19	189	42
	Yes, fully recovered	138	30.7
	Did not experience smell loss	123	27.3
Are you exposed to odors, gases, or dust?	Yes	272	60.4
	No	178	39.6

n number of participants, % percentage.

Toronto Alexithymia Scale (TAS-20)

The Toronto Alexithymia Scale-20 (TAS-20) is a well-established self-report measure originally developed by Bagby, Parker, and Taylor (1994) to capture the multifaceted nature of alexithymia, which involves difficulties in emotional processing (Bagby et al., 1994). The scale consists of 20 items; each answered on a five-point Likert-type frequency scale. The response options range from 1 = “strongly disagree” to 5 = “strongly agree,” with intermediate anchors including “disagree,” “neither agree nor disagree,” and “agree.”

The scale’s theoretical framework includes three empirically derived subdimensions that reflect the core features of alexithymia: Difficulty Identifying Feelings (DIF), which captures confusion in distinguishing between specific emotions and physical sensations; Difficulty Describing Feelings (DDF), which measures trouble putting emotional states into words for others; and Externally Oriented Thinking (EOT), which describes a cognitive tendency focused on external events rather than internal emotional experiences. Adding up the answers to all items gives the total score, where a higher overall number indicates stronger alexithymic traits. This scoring method has been supported by later research, including the version adapted for Turkish speakers (Güleç et al., 2009).

Statistical analysis

All statistical computations were performed using JASP 0.96.0.0 software. In adapting and validating the factor structure of the Turkish OAS-6, we drew upon contemporary psychometric practices commonly employed in scale adaptation and validation studies (Roohani et al., 2024). The analytical procedures, including both exploratory and confirmatory factor analyses, were designed to be consistent with the methodological rigor demonstrated in recent instrument validation research. The total sample was randomly divided into two subsamples: Subsample 1 (S1) for Exploratory Factor Analysis (EFA) and Subsample 2 (S2) for Confirmatory Factor Analysis (CFA). For S1, we conducted EFA using Principal Axis Factoring (PAF) with Varimax rotation. The number of factors retained was determined by two criteria: eigenvalues greater than 1.0 and visual inspection of the scree plot. Data suitability for factor analysis was evaluated using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett’s test of sphericity.

CFA was then performed on S2 to test the unidimensional factor structure identified in the EFA. Given the ordinal nature of the Likert-type items, we used the Weighted Least Squares Mean and Variance Adjusted (WLSMV)

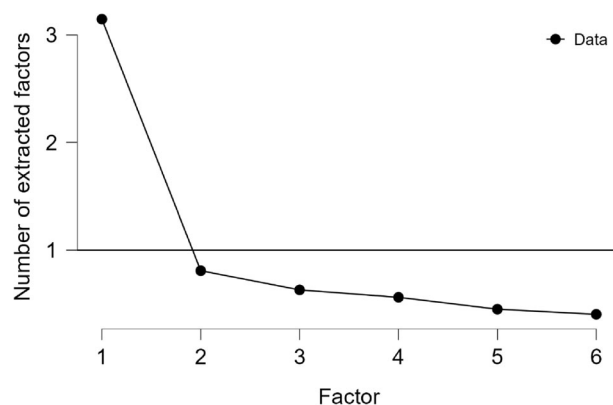


Fig. 1 The scree plot image of OAS-6 in EFA.

estimator. Model fit was assessed using the chi-square (χ^2), chi-square to degrees of freedom ratio (χ^2/df), Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), and Incremental Fit Index (IFI). Validity evidence was examined using Average Variance Extracted (AVE), and Composite Reliability (CR) was derived from the CFA results.

Internal consistency reliability was estimated with Cronbach's alpha and McDonald's omega (ω) using the total sample. A subsample of participants completed the OAS-6 again after a 2-week interval. Test-retest reliability was evaluated using the intraclass correlation coefficient (ICC) with a two-way mixed-effects model for absolute agreement. The significance level set at $p < 0.05$.

Results

A total of 481 individuals initially responded to the survey, representing a 64% response rate from the total solicited sample. Following the application of predefined exclusion criteria, which primarily targeted conditions such as self-reported odor and taste disorders, 31 respondents were deemed ineligible for the final analysis. Consequently, the study proceeded with a final validated sample of 450 participants. The sample composition reflected a gender distribution of 270 females (60%) and 180 males (40%). Ages ranged from 18 to 63 years ($M = 26.2$, $SD = 11.4$). Table 1 summarizes the sample's sociodemographic characteristics.

Sociodemographic analysis of the final sample ($n = 450$) revealed several prominent characteristics, as detailed in Table 1. The participant pool was predominantly female, with women constituting 60% of the sample. A significant majority (79.3%) reported their marital status as single. Economic status was assessed by asking participants to compare their income and expenses. Participants were asked to choose one of three statements: Income = Expenses, Income < Expenses, or Income > Expenses. In terms of economic perception, most participants (68.7%) described their financial situation as one where income equals expenses. Regarding health-related behaviors, a substantial proportion (77.6%) indicated they had never used tobacco or tobacco products. In relation to COVID-19 history, the largest subgroup (42%) reported not having contracted the virus. Among those who had COVID-19, a combined 58% either fully recovered their sense of smell or did not experience smell loss. Furthermore, a majority of participants (60.4%) reported regular exposure to odors, gases, or dust in their daily environment.

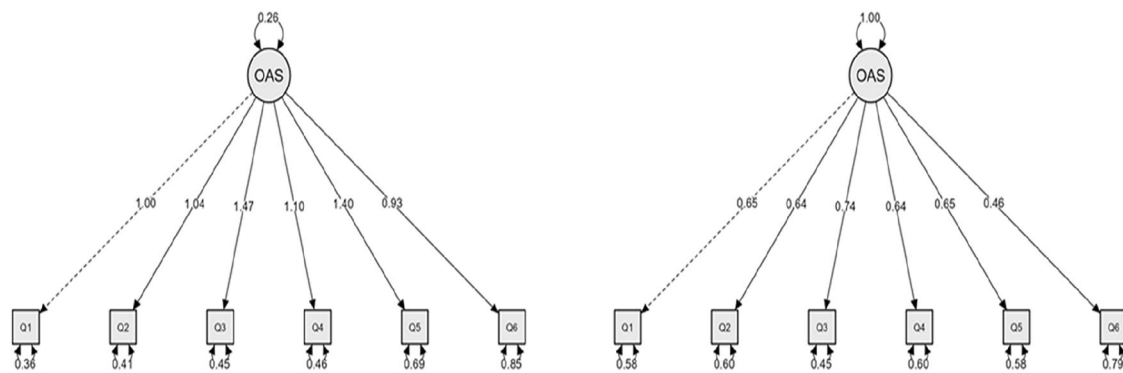
Exploratory factor analysis (EFA)

EFA was performed on Subsample 1 (S1, $n = 225$) using Principal Axis Factoring (PAF) with Varimax rotation. Although Varimax (orthogonal rotation) was used, the unidimensional solution remained identical under oblique rotation (e.g., Promax), which is expected for a single-factor structure. Therefore, the choice of rotation method did not affect the interpretation of the factor solution. The KMO measure was 0.862, and Bartlett's test was significant

Table 2 Factor loadings (S1, $n = 225$).

Questions	English item	Turkish item	Factor loadings
1	<i>When someone is busy in the kitchen, do you notice the odor of the food being prepared?</i>	Birisi mutfakta yemek hazırlarken, hazırlanan yemeğin kokusunu fark eder misiniz?	0.708
2	<i>When you visit someone else's house, do you notice how it smells?</i>	Başka birinin evini ziyaret ettiğinizde evin kokusunu fark eder misiniz?	0.743
3	<i>When an acquaintance smells differently from normal, for example, because of a new perfume, do you immediately notice?</i>	Tanıdığınız biri normalden farklı koktuğunda (örneğin yeni bir parfüm kullandığında) bunu hemen fark eder misiniz?	0.795
4	<i>Do you notice the smell of people's breath or sweat?</i>	İnsanların nefeslerinin veya terlerinin kokusunu fark eder misiniz?	0.723
5	<i>Are you the first one to smell spoiled food in the fridge?</i>	Buzdolabındaki bozulmuş yiyeceklerin kokusunu ilk siz mi fark edersiniz?	0.661
6	<i>Do odors revive strong or vivid memories in you?</i>	Kokular sizde güçlü ya da canlı anıları yeniden canlandırır mı?	0.420

Analyses: Principal Axis Factoring (PAF) with Varimax.


Fig. 2 Unstandardized estimates (left) and standardized estimates (right).

$[\chi^2(15) = 473.638, p < 0.001]$, confirming data suitability for EFA. Individual KMO values ranged from 0.845 to 0.900, all above 0.80 (Kaiser, 1970).

Eigenvalues greater than 1.0 and visual inspection of the scree plot were used to determine the number of factors to retain (Watkins, 2018). A single factor emerged with an eigenvalue of 2.823, exceeding the Kaiser criterion of 1.0 and explaining 47.1% of the variance. The scree plot showed a clear elbow after the first factor, supporting a single-factor solution (Fig. 1). Factor loadings are presented in Table 2.

As shown in Table 2, all factor loadings were above the suggested cutoff value of 0.40. These indices are fundamental for assessing item discrimination and the strength of the association between each item and the extracted factor (Clark and Watson, 2016). The EFA results indicated a unidimensional structure, which was tested with CFA.

Confirmatory factor analysis (CFA)

CFA was performed on Subsample 2 (S2, $n = 225$) using the WLSMV estimator. The model showed acceptable fit: $\chi^2(9) = 14.011, p = 0.122, \chi^2/df = 1.56, CFI = 0.975, RMSEA = 0.027$ [90% CI: 0.000–0.083], SRMR = 0.041. TLI = 0.958, IFI = 0.975. These findings support the unidimensional structure of the OAS-6, as all fit indices met the recommended thresholds (Bentler, 1990; Hair et al., 2019; Hu and Bentler, 1999; Kline, 2023; Schermelleh-Engel et al., 2023; Steiger, 2007; Tucker and Lewis, 1973). The final model solution is displayed in Fig. 2.

Table 3 Correlations between OAS-6 and TAS-20 ($n = 450$).

Correlations		OAS-6	TAS-20 total	DIF	DDF	EOT
OAS-6	r_s	-	-0.125	-0.106	-0.120	-0.086
	p		0.008	0.024	0.011	0.067
TAS-20 total	r_s		-	0.880	0.826	0.477
	p			<0.001	<0.001	<0.001
DIF	r_s			-	0.664	0.146
	p				<0.001	0.002
DDF	r_s				-	0.167
	p					<0.001
EOT	r_s					-
	p					

OAS-6 Odor Awareness Scale-Short Form, TAS-20 Toronto Alexithymia Scale, DIF Difficulty Identifying Feelings, DDF Difficulty Describing Feelings, EOT Externally Oriented Thinking, r_s Spearman correlations, $p < 0.05$.

Validity evidence

The construct validity of the OAS-6 was evaluated by examining both its internal structure through convergent validity and its external associations via criterion-related validity.

Convergent validity was assessed using composite reliability (CR) and average variance extracted (AVE). The CR value was 0.820, which exceeds the commonly accepted threshold of 0.70. The AVE value was 0.40, falling below the conventional benchmark of 0.50. However, convergent validity can still be considered adequate when CR is above 0.60, even if AVE falls short of 0.50 (Fornell and Larcker, 1981; Hair et al., 2019). Thus, despite the lower AVE, the scale demonstrated acceptable convergent validity based on these criteria.

For the purpose of evaluating criterion-related validity, Spearman correlations (r_s) were used to account for the ordinal nature of the Likert-type data. In the present sample, the TAS-20 demonstrated acceptable reliability (Cronbach's $\alpha = 0.778$). The TAS-20 yielded the following descriptive results: overall score averaged 48.6 (SD = 10.9), with subdimension means of 15.2 (SD = 6.4) for DIF, 11.9 (SD = 4.1) for DDF, and 21.5 (SD = 3.8) for EOT. As shown in Table 3, the OAS-6 exhibited statistically significant, negative, and weak correlations with the total TAS-20 score ($r_s = -0.125$, $p = 0.008$) and with its DIF ($r_s = -0.106$, $p = 0.024$) and DDF ($r_s = -0.120$, $p = 0.011$) subdimensions. A negative relationship was also observed with EOT, although it was not statistically significant ($r_s = -0.086$, $p = 0.067$).

Given the number of correlations ($n = 4$), a Bonferroni correction was applied (adjusted $\alpha = 0.0125$). After correction, the correlations with total TAS-20 ($r_s = -0.125$, $p = 0.008$) and DDF ($r_s = -0.120$, $p = 0.011$) remained statistically significant, whereas the correlations with DIF ($r_s = -0.106$, $p = 0.024$) and EOT ($r_s = -0.086$, $p = 0.067$) were not.

Reliability

All analyses were performed on the full dataset ($n = 450$). Internal consistency reliability was evaluated by calculating both McDonald's ω and Cronbach's α . McDonald's ω was 0.811 (95% CI: 0.784–0.838), and Cronbach's α was 0.807 (95% CI: 0.776–0.838). Both coefficients exceeded the recommended threshold of 0.70, supporting the reliability of the Turkish version of the scale (Cortina, 1993). Table 4 displays the corrected item total correlations along with the Cronbach's α values when each item is removed (Table 4).

Table 4 Reliability statistics ($n = 450$).

Item	English item	Turkish item	α (if dropped)	IRC
1	"When someone is busy in the kitchen, do you notice the odor of the food being prepared?"	Birisi mutfakta yemek hazırlarken, hazırlanan yemeğin kokusunu fark eder misiniz?	0.773	0.599
2	"When you visit someone else's house, do you notice how it smells?"	Başka birinin evini ziyaret ettiğinizde evin kokusunu fark eder misiniz?	0.771	0.597
3	"When an acquaintance smells differently from normal, for example, because of a new perfume, do you immediately notice?"	Tandığınız biri normalden farklı koktuğunda (örneğin yeni bir parfüm kullandığında) bunu hemen fark eder misiniz?	0.752	0.667
4	"Do you notice the smell of people's breath or sweat?"	İnsanların nefeslerinin veya terlerinin kokusunu fark eder misiniz?	0.770	0.603
5	"Are you the first one to smell spoiled food in the fridge?"	Buzdolabındaki bozulmuş yiyeceklerin kokusunu ilk siz mi fark edersiniz?	0.774	0.584
6	"Do odors revive strong or vivid memories in you?"	Kokular sizde güçlü ya da canlı anıları yeniden canlandırır mı?	0.818	0.400

α Cronbach's alpha, IRC Item-rest correlations.

Test–retest

For test–retest reliability, a random subsample of 122 participants was selected from the main sample ($N = 450$). The two measurements were administered 2 weeks apart, and responses were matched using assigned ID numbers. To assess whether this subsample represented the main sample, demographic characteristics (age, gender, economic level) were compared between the two groups. No significant differences were found ($p > 0.05$ for all comparisons), indicating that the test–retest subsample was representative of the main sample.

The Spearman correlation between the two administrations was 0.894 ($p < 0.001$), and a paired-samples t-test revealed no significant mean difference ($t = 0.959$, $p = 0.340$), indicating that scores remained stable over time.

For single measurements, the intraclass correlation coefficient (ICC) stood at 0.818 (95% CI: 0.749–0.869, $F = 9970$, $p < 0.001$), while for average measurements it was 0.900 (95% CI: 0.857–0.930, $F = 9970$, $p < 0.001$). According to Koo and Li (2016), the average ICC of 0.90 falls within the 0.75–0.90 range, indicating good reliability (Koo and Li, 2016).

Gender and OAS-6

Gender differences were examined using two independent samples t tests. On the OAS-6, women scored slightly higher on average ($M = 24.16$, $SD = 3.81$) compared to men ($M = 23.76$, $SD = 4.22$); however, the difference was not statistically significant ($t = 1.04$, $p = 0.299$). Regarding the TAS-20, the average scores were comparable between females ($M = 48.47$, $SD = 10.37$) and males ($M = 48.82$, $SD = 11.82$), again showing no significant group difference ($t = -0.33$, $p = 0.739$).

Discussion

The findings of this study provide evidence for the validity and reliability of the Turkish version of the OAS-6.

The EFA results supported a unidimensional solution. The single factor explained a substantial proportion of the total variance, which is considered acceptable in social science research. Five of the six items showed adequate factor loadings and satisfactory IRC. These findings align with established benchmarks for item discrimination, scale homogeneity, and factorial strength (Clark and Watson, 2016; Cortina, 1993). However, the sixth item (*Do odors revive strong or vivid memories in you?*) displayed a somewhat lower factor loading and a relatively lower IRC. This item contributed less to the internal consistency of the scale compared to the other items. Several possible explanations for this discrepancy exist. In the original OAS-6 study, the same item had a markedly higher factor loading (Rokosz et al., 2024). This finding may be partly related to item characteristics or sample composition; cultural factors might also have contributed. In the culture where the original study was conducted, the importance attributed to the memory-evoking power of odors could differ from that in the Turkish sample. Furthermore, although no issues regarding the comprehensibility of the item were reported by participants during pilot testing, the possibility that the Turkish translation did not fully capture the original meaning cannot be entirely ruled out. Cross-cultural differences in sample characteristics (e.g., age, education) may have also contributed to this finding. Despite this, removing the item was not deemed necessary. The IRC exceeds the commonly accepted threshold of 0.30, and the increase in alpha if the item were dropped is modest. Moreover, the original scale developers retained this item under similar circumstances (Rokosz et al., 2024).

CFA was performed to test the unidimensional structure identified in the EFA, and all fit indices were within acceptable limits according to the methodological literature (Hair et al., 2019; Kline, 2023; Schermelleh-Engel et al., 2003). The consistency between the EFA and CFA results provides support for the structural validity of the Turkish OAS-6. The findings are broadly consistent with the unidimensional factor structure originally reported by the scale's developers (Rokosz et al., 2024). The AVE value was below the commonly suggested threshold. However, an AVE below this threshold may be considered acceptable if the CR is higher than 0.60 (Fornell and Larcker, 1981). In this

study, the CR was 0.82, suggesting that the scale maintains a sufficient level of internal consistency despite the lower variance extracted. Furthermore, as suggested by Hair et al. (2019), items with loadings between 0.40 and 0.70 should be retained if their removal does not substantially improve the model, particularly to preserve content validity in short scales (Hair et al., 2019). Given the brevity of the measure and the exploratory nature of this adaptation, these values appear to provide adequate support for convergent validity, though future studies might benefit from further examining these properties in different contexts. The fit indices obtained in the present study are comparable to those reported in other scale adaptation research. For example, AlHammadi et al. (2024) validated the Arabic version of the Relationship Flourishing Scale and reported similar fit indices, further supporting the adequacy of the Turkish OAS-6 factor structure (AlHammadi et al., 2024).

The relationship between the OAS-6 and the TAS-20 was examined. Results revealed statistically significant, though weak and negative, relationships between the OAS-6 and both the overall TAS-20 score and its DIF and DDF components. The correlation with the EOT subdimension was also negative and weak but did not reach statistical significance. These findings are broadly consistent with those reported in the Chinese adaptation study of the OAS (Zhang et al., 2023), where similar negative and weak correlations with the TAS-20 and its subscales were observed. Thus, cross-cultural consistency of this inverse relationship between odor awareness and alexithymic traits is suggested.

Test–retest reliability analysis was conducted on a subsample over a 2-week interval. A positive correlation was found. The ICC value indicated good reliability according to the guidelines proposed by Koo and Li (2016) (Koo and Li, 2016). A paired-samples *t*-test revealed no significant mean difference between the two time points, suggesting score stability over time and minimal practice effects. In the original OAS-6 validation study (Rokosz et al., 2024), test–retest reliability was assessed over a 6-week interval with a smaller subsample, yielding a correlation of $r = 0.89$. The stability coefficient in the present study is somewhat lower but still comparable, although the retest interval was shorter (2 weeks vs. 6 weeks). The slightly lower correlation may reflect the shorter time frame, which typically increases the risk of practice effects, yet the paired-samples *t*-test did not indicate significant mean differences. Overall, both studies suggest that the OAS-6 scores are relatively stable over time, though the Turkish adaptation would benefit from a longer retest interval in future research to allow direct comparison with the original findings.

Although the average OAS-6 score was higher for females compared to males, the difference did not reach statistical significance. In contrast, the original study reported a significant gender difference (Rokosz et al., 2024). This inconsistency between the two findings may be due to differences in sample composition, statistical power, or cultural factors. Nevertheless, the higher mean score in females is consistent with previous research linking heightened odor awareness in females to biological, cognitive, and sociocultural factors (Doty and Cameron, 2009; Nováková et al., 2014; Sorokowski et al., 2019).

Overall, the cumulative evidence from content validity, EFA, CFA, internal consistency, and test–retest reliability suggests that the Turkish OAS-6 is a unidimensional instrument with acceptable psychometric properties. It appears to be culturally appropriate and may be useful for measuring odor awareness in Turkish-speaking populations for research and applied purposes. Beyond its psychometric properties, the Turkish OAS-6 offers broader contributions to research in the humanities and social sciences. It provides a tool for examining how odor awareness relates to cognitive processes such as attention and metacognition in everyday life. It also allows researchers to investigate the emotional and behavioral consequences of odor awareness, including its role in mood regulation, food selection, and social avoidance. Moreover, it enables cross-cultural comparisons of how cultural norms and social practices shape sensory awareness, particularly between Turkish and Western populations. Future studies could use this instrument to explore questions such as whether odor awareness predicts social anxiety in crowded environments, how it influences consumer behavior related to scented products, and whether cultural differences exist in the emotional significance attributed to odors. By addressing such questions, the Turkish OAS-6 can contribute to a deeper understanding of human cognition, emotion, social interaction, and cultural variation in sensory awareness.

Study limitations

1 - Data were collected from two provincial centers. This geographical concentration may limit generalizability to the broader Turkish population.

2 - The average variance extracted value was below the commonly recommended threshold, suggesting somewhat limited convergent validity.

3 - While the other five items showed adequate factor loadings, the sixth item had a somewhat lower loading.

Conclusion

This study suggests that the Turkish version of the OAS-6 has acceptable validity and reliability as a unidimensional instrument within the Turkish cultural context. The scale may be useful for research and clinical settings where subjective odor perception is relevant (e.g., psychology, neurology, psychiatry, otorhinolaryngology, public health). Beyond clinical applications, the scale offers potential for humanities and social sciences research, including studies on attention, emotion, social interaction, and cultural differences in sensory awareness. Its concise six-item format reduces respondent burden and administrative time, making it adaptable to various data collection modalities, including digital platforms. The Turkish OAS-6 is promising for use in future epidemiological and interdisciplinary studies, although further validation with diverse samples is encouraged.

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Author contributions SK: conceptualization, methodology, formal analysis, data curation, writing—original draft preparation, writing—review and editing, project administration. BC: permission of scale, conceptualization, methodology, investigation, writing—original draft preparation, writing—review and editing. All authors have read and approved the final version of the manuscript.

Competing interests The authors declare no competing interests.

Ethical approval This study was reviewed and approved by the Burdur Mehmet Akif Ersoy University Non-Interventional Research Ethics Committee (Approval No: 2025 - 1951 and Date of Approval: 17.09.2025). Data collection commenced after ethical approval, starting on 19 September 2025. All research procedures involving human participants were conducted in strict accordance with the ethical standards outlined in the Declaration of Helsinki and its later amendments, as well as applicable national and institutional guidelines.

Informed consent Informed consent to participate in the study was obtained from all participants. The informed consent procedure was applied during the online data collection period, from 19 September to the end of October 2025. The consent form was included on the first page of the online questionnaire. This form detailed the study's purpose, procedures, potential risks and benefits, confidentiality assurances, and the voluntary nature of participation, including the right to withdraw at any time without penalty. Participants could access the study questions only after selecting the "I consent" option. This electronic confirmation was recorded by the survey system and is considered the participant's written informed consent.

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