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A comprehensive examination of the psychometric properties of the Appearance Anxiety Inventory and its adaptation into Turkish

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Título: Un examen exhaustivo de las propiedades psicométricas del Inventario de Ansiedad por la Apariencia y su adaptación al turco.
Resumen: La ansiedad por la apariencia, caracterizada por la percepción negativa que tiene una persona de su imagen corporal y el estrés causado por la posibilidad de que su apariencia sea evaluada por otros, puede tener efectos negativos en la vida de los adultos emergentes. El objetivo de este estudio es adaptar el Inventario de Ansiedad por Apariencia (AAI) al turco y también examinar las propiedades psicométricas de la escala de manera exhaustiva utilizando la teoría clásica de pruebas y algunos enfoques de medición modernos. Para ello, se examinaron las propiedades psicométricas del AAI en la cultura turca en una muestra de adultos emergentes (N = 520). El análisis factorial confirmatorio respaldó la estructura unifactorial del AAI. El análisis de la teoría de respuesta al ítem reveló que los ítems de la escala tenían suficientes parámetros de discriminación para los niveles de ansiedad por la apariencia. El análisis de redes determinó que el elemento con mayor centralidad era el relativo a que el individuo ocultara o cambiara su apariencia. Los hallazgos del estudio indican que el AAI tiene sólidas propiedades psicométricas que pueden utilizarse en la evaluación de la ansiedad por la apariencia en adultos emergentes de la población turca.
Palabras clave: Propiedades psicométricas. Ansiedad por la apariencia. Inventario de ansiedad por la apariencia. Validez. Confiabilidad.

Abstract: Appearance anxiety, characterized by an individual's negative perception of their body image and stress caused by the possibility of their appearance being evaluated by others, can have negative effects on the lives of emerging adults. The aim of this study is to adapt the Appearance Anxiety Inventory (AAI) to Turkish, and also to examine the psychometric properties of the scale comprehensively using classical test theory and some modern measurement approaches. For this purpose, the psychometric properties of the AAI in Turkish culture were examined in a sample of emerging adults (N = 520). Confirmatory factor analysis supported the single-factor structure of the AAI. Item response theory analysis revealed that the scale items had sufficient discrimination parameters for levels of appearance anxiety. Network analysis determined that the item with the highest centrality was that regarding the individual hiding or changing his or her appearance. The findings of the study indicate that the AAI has sound psychometric properties that can be used in the assessment of appearance anxiety in emerging adults in the Turkish population.
Keywords: Psychometric properties. Appearance anxiety. Appearance Anxiety Inventory. Validity. Reliability.

Introduction

Today's ideals regarding physical appearance cause individuals to feel pressured (Hatun et al., 2025). Individuals in emerging adulthood, in particular, may develop excessive interest in their appearance due to increased exposure to social comparison due to their intensive use of social media (Fardouly & Vartanian, 2016). As a result, individuals may become more sensitive to body dissatisfaction (Czubaj et al., 2025), which can lead to appearance anxiety. Appearance anxiety can be defined as the individual's constant preoccupation with their physical flaws and their efforts to hide them, frequently checking their appearance, and therefore trying to escape from social environments (Zimmer-Gembeck et al., 2020). In this scenario, a person experiences intense anxiety and restlessness when they receive criticism from others (Volkan et al., 2024).

The literature indicates that appearance anxiety is becoming increasingly prevalent (Ekinci & Akat, 2023). In fact, a study conducted by Claes et al. (2012) revealed that individuals in late adolescence and early adulthood experienced higher levels of appearance anxiety than individuals in early adolescence. Similarly, Perloff (2021) states that body dissatisfaction gradually increases from adolescence to adulthood. In parallel, a study by Samari et al. (2025) involving participants between the ages of 15 and 35 found that 20.2% of individuals experienced moderate to severe body anxiety.

The results of other studies revealing statistics on body dissatisfaction are also noteworthy. For example, Jiménez-Limas et al. (2022) found that body dissatisfaction among Mexican university students ranged from 63.5% to 71.7%. Alharballeh and Dodeen (2023) found that 36.7% of young people in the United Arab Emirates were dissatisfied with their bodies, and Asil and Canbolat (2022) found that 27% of young people in Turkey were dissatisfied with their bodies. Al Riyami et al. (2024) found that body image dissatisfaction among Omani university students was 37.7% among women and 24% among men. A study conducted by Singh and Gadiraju (2020) with Indian youth found that 60% of women and 51% of men experienced serious body image concerns. Furthermore, recent large studies have found that 38.5% of participants are at risk for body dysmorphic disorder according to AAI scores, showing that anxiety about appearance is becoming a bigger public health issue linked to self-esteem and body dissatisfaction (Corazza et al., 2019; Hakim et al., 2021).

In addition, it is stated in the literature that appearance anxiety can have various consequences on an individual's life. High levels of appearance anxiety can negatively affect an individual's functionality over time (Veale et al., 2014). It can negatively affect an individual's mental health (Kovan et

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al., 2025) and cause them to feel worthless and lonely (Altınel et al., 2024). In addition, an individual who is worried about their appearance may attach importance to and internalize other people's evaluations of it, which can weaken their psychological well-being (Tang et al., 2025). The results of correlational studies conducted in the literature are also parallel with these statements. When studies conducted with adolescents are examined, appearance anxiety is positively associated with maladaptive coping strategies (Antonietti et al., 2020), social media addiction (Caner et al., 2022), disordered eating (Alcaraz-Ibáñez et al., 2020), eating disorder symptoms (Dakanalis et al., 2016), negative physical self-image (Wang et al., 2023), and loneliness (Doğan & Çolak, 2016), while it is negatively associated with life satisfaction (Doğan & Keskinkiliç, 2024; Erçevik, 2021; Meyer et al., 2023), subjective well-being (Seki & Dilmaç, 2015), resilience (Celen et al., 2022), and self-esteem (Antonietti et al., 2020; Şahin et al., 2014).

The results of correlational studies conducted with adolescents are generally consistent with studies conducted with adults. In adults, appearance anxiety has been found to be positively correlated with body dysmorphic disorder (Jordan et al., 2022), eating disorders (Jin et al., 2022), binge eating (Brosof & Levinson, 2017), social anxiety (Gao et al., 2023; Jin et al., 2022; Liao et al., 2023), depression (Karaoglan Yilmaz et al., 2024; Ryding et al., 2025; Wang et al., 2025; Xian et al., 2024), loneliness (Papapanou et al., 2023), and problematic social networking site use (Ryding et al., 2025). Again, in the same age group, appearance anxiety has negative relationships with self-esteem (Behera & Khuntia, 2025; Göbel et al., 2023; Liao et al., 2023; Yıldırım & Özgökçe, 2023), self-efficacy (Liao et al., 2023), self-compassion (Gao et al., 2023), social support (Xian et al., 2024), resilience (Behera & Khuntia, 2025), psychological well-being (Aslan & Tolan, 2022; Hatun et al., 2025), and life satisfaction (Kovan et al., 2025; Yıldırım & Özgökçe, 2023). Additionally, the AAI has been associated with contemporary psychological themes such as social media use, exposure to "fitspiration" content, and self-perception (Cataldo et al., 2022; Hawes et al., 2020). Considering these variables, which have been linked to appearance anxiety, particularly clinical disorders, research suggests that appearance anxiety may be a critical risk factor.

Appearance anxiety is centered on distorted body image and shame, encompassing various cognitive processes and behaviors (Veale et al., 2014). These cognitive processes include focusing on oneself, reflecting on and considering cosmetic procedures, and making plans. Behaviors include checking one's appearance on reflective surfaces, avoiding other people, concealing perceived flaws, and asking others questions about one's appearance (Veale et al., 2014). In this context, the characteristics of appearance anxiety can evoke those of social anxiety. Social anxiety involves an individual's concern about how they will be evaluated by others in various situations (Morrison & Heimberg, 2013). Individuals experiencing social anxiety direct their attention to themselves, hold negative attitudes toward social situations, exaggerate the negative consequences of social interactions, and exhibit maladaptive coping behaviors such as avoidance to avoid social failure (Hofmann, 2007). Therefore, considering the characteristics of both appearance anxiety and social anxiety, it can be argued that they are quite similar concepts. Indeed, Hart et al. (2008) state that appearance anxiety can be addressed under social anxiety.

Additionally, various theoretical models that can contribute to a better understanding of appearance anxiety are presented in the literature. For example, according to objectification theory, individuals internalize evaluating their physical self from another person's perspective, which can lead to constant body monitoring and anxiety (Fredrickson & Roberts, 1997). According to social comparison theory, individuals evaluate their abilities by comparing themselves with others (Festinger, 1954). This constant comparison can increase body dissatisfaction (Myers & Crowther, 2009) and appearance anxiety (Tian et al., 2025). According to the cognitive and affective model, individuals cognitively internalize attractiveness standards through platforms such as social media, then compare their appearance with others, believe themselves to be insufficiently attractive, and become anxious about their appearance (Yang et al., 2020). In this context, it can be said that theoretical models offer different perspectives on appearance anxiety.

A tool developed to measure appearance anxiety could enable empirical studies. The Appearance Anxiety Inventory (AAI), developed by Veale et al. (2014), is a self-report scale developed to assess appearance anxiety. The AAI aims to assess both cognitive and behavioral dimensions of appearance anxiety. It also functions as both a tool to monitor change during the therapy process and a screening tool to identify individuals at risk. The AAI consists of 10 items, each evaluated on a 5-point Likert-type scale (0 = never, 4 = always). The total score obtained from the scale ranges from 0 to 40, with higher scores indicating higher levels of appearance anxiety. In the development study, it was confirmed that the scale has a unidimensional factor structure, and its internal consistency was shown to be quite high (Cronbach's alpha = .91). Since its development, the AAI has been widely used in both clinical and non-clinical samples (Veale et al., 2014; Veale et al., 2016).

First of all, when examining the studies that have used the AAI in clinical contexts, Gumpert et al. (2024) evaluated its psychometric properties in adolescents with body dysmorphic disorder. Exploratory factor analysis conducted on 182 diagnosed adolescent participants revealed that the scale consisted of three factors (threat monitoring, camouflage, and avoidance), which accounted for 48.15% of the total variance. Additionally, the scale demonstrated high internal consistency (McDonald's ω = .83). Furthermore, the relationship between changes in AAI scores and changes in body dysmorphic disorder symptom severity was found to be positive and significant. Mastro et al. (2016) used the AAI as an indicator of body dysmorphic symptoms in a study

conducted with 387 adolescents aged 10-13. Similarly, Flygare et al. (2021) used the AAI to describe how well treatment is working and whether patients with body dysmorphic disorder are improving.

Additionally, studies adapting the AAI to different cultures are also noteworthy. For example, Roberts et al. (2018) adapted the AAI to Australian culture, Yurtsever et al. (2022) to Polish culture, and Rajabi et al. (2025) to Iranian culture. Roberts et al. (2018) examined its psychometric properties among Australian university students and adolescents. In Study 1 of this study, 730 university students (mean age: 21) from Australia participated. Exploratory factor analysis and confirmatory factor analysis (CFA) conducted in this study revealed that the nine AAI items were gathered under a single factor. Furthermore, both the 9- and 10-item versions demonstrated high internal consistency. In Study 2, the 9-item structure of the AAI was validated in a sample of 862 Australian adolescents and compared with the 10-item version. Both studies found highly significant correlations between the 9-item AAI version and body dysmorphic disorder and appearance-based rejection sensitivity. Similarly, Yurtsever et al. (2022) confirmed the single-factor structure of the scale in a Polish adult sample through CFA. Further analyses showed that the Polish version of the scale demonstrated high internal consistency (Cronbach's α = .91) and test-retest reliability of .78.

Rajabi et al. (2025) examine the psychometric qualities of the Persian version of the AAI in patients who visit clinics for cosmetic surgery. CFA results indicated that the fit indices for both the one- and two-factor forms (avoidance and threat monitoring) of the scale indicated good fit. Cronbach's alpha coefficients were .81 for the entire scale, .77 for the avoidance subscale, and .63 for the threat monitoring subscale. Test-retest reliability of the scale was .89, .91, and .78, respectively. These findings were interpreted by the researchers as indicating that the AAI is a valid and reliable measurement tool for individuals seeking cosmetic surgery and is suitable for cross-cultural use.

Both the prevalence and potential negative consequences of appearance anxiety among emerging adults are striking. Therefore, the AAI, with its robust psychometric properties, can contribute to the assessment of appearance anxiety. In parallel, the AAI has become one of the most widely used instruments to measure appearance anxiety. There is evidence demonstrating its reliability and validity across diverse populations, as well as supporting evidence that it can be used for clinical assessment. However, current studies reveal the psychometric properties of the AAI using more familiar methods such as classical test theory (CTT). Considering that appearance anxiety has become increasingly important among adults in recent years, it is necessary to examine the psychometric properties of the widely used AAI in a comprehensive manner using newer approaches. Indeed, it is emphasized that item response theory (IRT) analysis, which is more recently accepted in the literature, contributes to a better examination of the structures of scales (Sartes & de Souza-Formigoni, 2013), while network analysis is also noted to be beneficial in examining psychological mechanisms by visualizing the relationships between scale items (Lecuona et al., 2024). Based on this, one of the objectives of this study is to adapt the AAI to Turkish culture on a sample of emerging adults, while another objective is to reveal the psychometric properties of the AAI using more current analysis methods such as IRT analysis and network analysis, in addition to classical methods.

Method

Participants

The sample of the current study consisted of 520 individuals (M_{age} = 20.65, SD = 1.74) in their emerging adulthood period (ages between 18-29) who participated from two different state universities in Turkey. Of the 520 individuals, 371 (71.3%) were female and 149 (28.7%) were male. All of the individuals in the study were studying at the undergraduate level in education faculties, and the participant group included students from seven different departments. These departments of the participants were psychological counseling and guidance, social studies education, classroom teaching, special education, preschool education, elementary mathematics education, and Turkish language teaching. 86 of the participants (16.5%) were first-year students, 136 (26.2%) were second-year students, 223 (42.9%) were third-year students, and 75 (14.4%) were fourth-year students. The sample for the second application, which was conducted to reveal the test-retest reliability of the AAI, consisted of 46 participants (M_{age} = 21.00, SD = 1.67) out of 520 participants. Of the 46 participants, 35 were female (76.1%) and 11 were male (23.9%).

The inclusion criterion for the study was that participants were in emerging adulthood (18-29 age range). Consistent with this inclusion criterion, those outside the emerging adulthood age range were excluded. These inclusion and exclusion criteria were followed for various reasons. One reason for this is that the literature shows that emerging adulthood is a risky period for appearance anxiety (Alharballeh & Dodeen, 2023; Bucchianeri et al., 2013; Ferrari et al., 2013; Jiménez-Limas et al., 2022; Radwan et al., 2019; Samari et al., 2025). Therefore, it was aimed to examine the characteristics of appearance anxiety, especially in the emerging adult sample. Another reason is to enrich the limited literature on appearance anxiety scales used in the emerging adult sample in Turkey (Doğan, 2010).

Instruments

Demographic Information Form. It was used to obtain information about the participants' age, gender, university, department, and grade level.

The AAI. The AAI, developed by Veale et al. (2014) for use in therapy processes and research on body dysmorphic

disorder, measures individuals' appearance anxiety. Veale et al. (2014) examined the psychometric properties of the scale on two different sample groups. One sample group was a clinical participant group diagnosed with body dysmorphic disorder, while the other sample group was a participant group that did not receive a diagnosis and was called the community sample. The scale showed a two-factor structure (avoidance and threat monitoring) in the clinical participant group, while it showed a single-factor structure in the community sample. The AAI, consisting of 10 items, is a 5-point Likert-type scale (0 = *Not at all*, 1 = *A little*, 2 = *Often*, 3 = *A lot*, 4 = *All the time*). There are no reverse-scored items in the scale. In this study, McDonald's ω coefficient of AAI was found to be .90, and Cronbach's α coefficient was found to be .89.

A short version of the Intolerance of Uncertainty Scale (IUS-12). The IUS-12, developed by Carleton et al. (2007) and adapted to Turkish culture by Sarıçam et al. (2014), was used to measure the participants' intolerance of uncertainty. The scale, which consists of 12 items in total, is a 5-point Likert-type scale (1 = *Not at all characteristic of me*, 5 = *Entirely characteristic of me*). A total score can be obtained from the entire scale, which has two sub-dimensions called prospective anxiety (e.g., "Unforeseen events upset me greatly") and inhibitory anxiety (e.g., "Uncertainty keeps me from living a full life"). In this study, the total score obtained from the entire scale was used, and McDonald's ω and Cronbach's α internal consistency coefficients were calculated as .89.

The Psychological Vulnerability Scale (PVS). The PVS, developed by Sinclair and Wallston (1999) and adapted to Turkish culture by Akın and Eker (2011), was used to measure the psychological vulnerabilities of the participants. The single-dimensional scale consists of 6 items (e.g., "If I don't achieve my goals, I feel like a failure as a person") and is a 5-point Likert-type scale (1 = *Does not describe me at all*, 5 = *Describes me very well*). In this study, the McDonald's ω and Cronbach's α internal consistency coefficients of the PVS were found to be .70.

Procedure

In the study, firstly, David Veale, the developer of the scale, was contacted, and permission was obtained to adapt the scale. After the permission, the research was approved by applying to the Akdeniz University Social and Human Sciences Scientific Research and Publication Ethics Board. After receiving approval from the ethics committee dated 03.04.2024 and numbered 892039, the scale items were translated from English to Turkish by the researchers. The translated versions of the scale were examined by four academicians working in the field of guidance and psychological counseling and two experts working in the field of English, and expert opinions were received. In the final stage of the translation process, a reverse translation was also made. After the translation processes were completed, the Turkish-adapted version of the scale was ready for implementation.

The convenience sampling method was used to reach participants during the data collection process. As part of the recruitment process, participants were recruited from among university students. The researchers conducted in-class briefings with students from various departments at the universities, and individuals were invited to participate in the study. Participants contacted through this method were informed about the study, explained that participation in the study was voluntary, and consent was obtained from the individuals who volunteered to participate. Following informed consent, participants completed the demographic information form and the scales. Completing the forms and scales took approximately 15 minutes. Participants were informed that the data would be used only for scientific purposes and that they could discontinue completing the scales at any time. Data were collected face-to-face by the researchers, who handed each participant a form. Four weeks after the data collection, 46 people in the sample were contacted again to determine the test-retest reliability of the AAI, and the AAI was re-administered, and the data collection process was completed. All data collected within the scope of the research were obtained between September and December 2024.

Data Analysis

Before beginning the research analysis, the dataset was examined for missing data. The analysis revealed a very small number of missing data (0.22%). Therefore, missing data imputation was performed using the linear trend at point method in IBM SPSS Statistics 26. The AAI items' normality assumptions were examined, verifying the assumption of univariate normality. In examining normality, the criterion that kurtosis and skewness values should be between -1.5 and +1.5 was taken as reference (Tabachnick & Fidell, 2013). The construct validity of the scale's single-factor model was examined using CFA, applying a maximum-likelihood procedure with IBM SPSS Amos 23.

The ratio of the chi-square (χ^2) value to the degree of freedom (df) was computed to analyse the AAI structural model. For a well-fitting model, a chi-square value divided by the number of degrees of freedom is less than 2, while a value between 2 and 5 suggests an adequate fit. The Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI), Tucker-Lewis Index (TLI), Standardised Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA) were chosen as fit indices to assess how well the models fit. A model is considered to have an acceptable fit if CFI and TLI are $\geq .95$, GFI is $\geq .90$, RMSEA is $\leq .08$, and SRMR is $\leq .10$ (Schermelleh-Engel et al., 2003).

The measurement invariance of the suggested model across gender groups was assessed using multi-group SEM as a prerequisite study for doing cross-group comparisons (Vandenberg & Lance, 2000). Researchers frequently use multiple-group CFA to establish measurement invariance. This approach incorporates four forms of invariance testing: configural, metric, scalar, and strict invariance (Hair et al.,

2019; Putnick & Bornstein, 2016; Schmitt & Kuljanin, 2008). Configural invariance shows that the same factor structure works for all groups. Metric invariance makes sure that the factor loadings are the same. Scalar invariance checks whether the intercepts of the items are the same. Strict invariance is important for finding measurement differences that are caused by the same underlying factors because it makes sure that residual variances are equal (Hair et al., 2019; Putnick & Bornstein, 2016; Schmitt & Kuljanin, 2008). The criteria suggested by Chen (2007) for determining measurement invariance are $\Delta RMSEA \leqslant .015$, $\Delta SRMR \leqslant .03$, and $\Delta CFI \leqslant .01$. This analysis was performed using IBM SPSS Amos (Version 23).

Hierarchical regression analysis was conducted to determine the predictive validity of the AAI. Prior to the hierarchical regression analysis, descriptive statistics and correlations of the AAI, IUS-12, and PVS variables included in the analysis were examined. Then, a two-step hierarchical regression analysis was performed. In this analysis, IUS-12 was added to the analysis in the first step, and the AAI was added to the analysis in the second step. The dependent variable of the analysis was PVS. Lim (2024) states that in predictive validity analysis, relationships with a *p*-value of less than .01, a high regression coefficient, a |t| value greater than 1.96 (two-tailed) at a 95% confidence interval, and a confidence interval that does not include zero and is narrow are stronger. The high coefficient of determination (R^2) obtained as a result of the regression also shows that the regression equation has a large explanatory power (Hair et al., 2019). Analysis was performed using IBM SPSS Statistics 26.

In order to demonstrate the reliability of the scale, internal consistency coefficients and corrected item-total correlations were calculated. In addition, the intraclass correlation coefficient ($ICC_{2,1}$) was revealed to determine the test-retest reliability. Cronbach's α and composite reliability values of .7 and above are stated to be sufficient (Hair et al., 2019). McDonald's ω values between .7 and .8 are considered respectable, and McDonald's ω values above .8 are considered excellent (Zinbarg et al., 2005). It is stated that corrected item-total correlations should be above .30 (Crocker & Algina, 1986; McDonald, 1999). According to Koo and Li (2016), $ICC_{2,1}$ values above .90 are excellent, and $ICC_{2,1}$ values between .75 and .90 are good. Additionally, by determining the percentage of participants who scored at the lowest and maximum possible scale scores, floor and ceiling effects were investigated. A possible floor or ceiling effect was indicated by a threshold of greater than 15% (McHorney & Tarlov, 1995). Analyses within the scope of reliability were performed using JASP (Version 0.19.3.0), Jamovi (Version 2.3.28.0), and IBM SPSS Statistics 26.

IRT has unidimensionality and local independence assumptions (Baghaei & Effatpanah, 2024). The unidimensionality assumption was evaluated in the current study using CFA. Whether the local independence assumption was met was examined through Q3 values (Yen, 1984). Q3 values of .20 and below indicate local independence (Chen & Thissen, 1997). Different models to determine the appropriate IRT model were compared using the Akaike information criterion (AIC) and Bayesian information criterion (BIC). These models were the rating scale model (RSM), graded response model (GRM) with fixed a and free b parameters, GRM with free a and b parameters, and the 2-dimensional GRM. Better model fit is indicated by lower AIC and BIC values (Huang, 2017). The GRM was used for IRT analysis (Samejima, 1969). In the GRM model, the discrimination parameter, difficulty parameters, and various graphs are estimated for each item. The discrimination parameter shows how discriminatory an item is among participants with different levels of latent traits (Nguyen et al., 2014). When examining the discrimination parameters of the items, the values suggested by Baker (2001) were taken into account (very low between .01 and .34, low between .35 and .64, moderate between .65 and 1.34, high between 1.35 and 1.69, and very high above 1.69). The difficulty parameter shows where an item works best on the scale (Nguyen et al., 2014). Category characteristic curves are defined as curves that show the probability of selecting a category at different latent trait levels (Hambleton & Swaminathan, 2013). Item information curves are curves that show the information provided by an item depending on the level of the latent trait (Thomas, 2011). The test information function reflects the cumulative information provided by the scale items (Baker, 2001; Lord, 1980). The test characteristic curve shows the expected total scores at different latent trait levels (Raykov & Marcouloides, 2018). StataNow (Version 18.5) was used for IRT analysis, Mplus (Version 8.3) was used to estimate the models in the analysis, and R software's *mirt* (Chalmers, 2012) and *EFA.dimensions* packages (O'Connor, 2024) were used to test the assumptions of the analysis.

Differential item functioning (DIF) was examined using the ordinal logistic regression method (Zumbo, 1999). According to this method, Model 3 and Model 1 are compared to determine DIF. As a result of the comparison, if the *p*-value of the two-degree-of-freedom Chi-square test is $\leq .01$ and the R^2 effect size is $\geq .13$, it indicates that an item exhibits DIF. In Model 3, the dependent variable is the item responses; the independent variables are the conditional variable (total score), group variable (gender in the current study), and interaction variable (group variable × total score). In Model 1, the dependent variable is the item responses, while the independent variable is only the total score. This study examines whether the items exhibit DIF according to gender. McFadden's *pseudo*-R square was used for the R^2 effect size in this analysis. DIF analysis was performed using StataNow (Version 18.5).

Network analysis was performed to determine the relationships between the scale items. Extended Bayesian Information Criterion (EBIC) and Graphical Least Absolute Shrinkage and Selection Operator (LASSO) were used to estimate the network structure based on the regularized partial correlations (Epskamp et al., 2018). LASSO reduces small correlations to zero and improves network comprehensibility (Epskamp et al., 2018; Epskamp & Fried, 2018). The EBIC

hyperparameter determines how much EBIC prefers simple models with fewer edges (Chen & Chen, 2008; Foygel & Drton, 2010). After estimating the network structure, centrality indices (betweenness, closeness, and strength) in the network were examined (Opsahl et al., 2010; Robinaugh et al., 2016). Strength evaluates how well a node has direct connections to other nodes; closeness evaluates how well a node has indirect connections to other nodes; betweenness evaluates how important a node is in the path between any two nodes (Epskamp et al., 2018). Finally, considering the suggestions of Epskamp et al. (2018), the accuracy of the edge weights and the stability of the centrality indices were demonstrated. To determine the accuracy of the edge weights, 95% confidence intervals of the edge weights were estimated using a non-parametric bootstrap with 1000 samples. To determine the stability of the centrality indices, the case-dropping bootstrap (number of replicates = 2500) was used. Narrow confidence intervals indicate that the edge weights are correct; the preservation of correlations between the centrality indices of the original sample and the centrality indices of the sample after the case-dropping bootstrap indicates that the centrality indices are correct (Epskamp et al., 2018). Network analysis was performed with JASP (Version 0.18.0.0).

Results

Construct Validity

Firstly, the construct validity of the AAI examined with CFA analysis. CFA analyses showed that the single factor of the AAI has acceptable fit indices [χ^2 = 179.54, df = 35, χ^2/df = 5.13, p < .001, CFI = .95, GFI = .94, TLI = .93, SRMR = .05, RMSEA = .09]. In this context, in line with the one-factor structure obtained from the sample group defined as the community sample in Veale et al.'s (2014) study is confirmed in the emerging adult sample ofthe current study. Table 1 shows the standardized factor loadings (λ) for the AAI items. The factor loadings of the AAI ranged from .30 to .88. All scale items meet the minimum threshold of .30 accepted by various psychometric authorities (Costello & Osborne, 2005; Hair et al., 2019; McDonald, 1999).

Table 1
Descriptive statistics, normality analysis, and factor loadings for the AAI.

Items	Mean	*SD*	g_1	g_2	λ
1. I compare aspects of my appearance to others	1.51	1.06	.80	- .03	.73
2. I check my appearance (e.g., in mirrors, by touching with my fingers, or by taking photos of myself)	2.47	1.15	- .26	- .90	.30
3. I avoid situations or people because of my appearance	.86	1.11	1.30	.87	.82
4. I brood about past events or reasons to explain why I look the way I do	.90	1.13	1.28	.83	.69
5. I think about how to camouflage or alter my appearance	1.01	1.19	1.07	.15	.86
6. I am focussed on how I feel I look, rather than on my surroundings	1.52	1.21	.60	- .52	.45
7. I avoid reflective surfaces, photos, or videos of myself	.80	1.08	1.36	1.05	.61
8. I discuss my appearance with others or question them about it	1.04	1.10	1.06	.51	.57
9. I try to camouflage or alter aspects of my appearance	1.17	1.17	.88	-.12	.88
10. I try to prevent people from seeing aspects of my appearance within particular situations (e.g. by changing my posture, avoiding bright lights)	1.05	1.10	1.08	.53	.78

Note. SD = standard deviation, g_1 = Skewness, g_2 = Kurtosis, λ = factor loadings

Measurement Invariance by Gender

Table 2 displays the results of the measurement invariance analysis for the AAI among different gender groups (female and male samples). In the current study, the configural invariance model aimed to test whether the one-factor structure could describe the AAI well across different groups. As for gender groups, all factor loadings reached the significant level (p < .001), which indicated that the configural invariance held across male-female groups. In summary, the results suggest that the AAI can be explained by a one-factor structure of appearance anxiety, regardless of gender.

When Table 2 is examined, it is seen that measurement invariance was provided by gender. The metric invariance values were "ΔCFI=.002; ΔRMSEA=-.004; ΔSRMR=.001," the scalar invariance values were "ΔCFI=-.010; ΔRMSEA=.002; ΔSRMR=-.001," and the strict invariance values were "ΔCFI=-.001; ΔRMSEA=-.003; ΔSRMR=.001".

Table 2
Measurement invariance testing results of the AAI across genders.

	Overall fit indices				Comparative fit indices		
Model	χ^2 /df	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Configural	206.50/54**	.947	.061	.051			
Metric	211.10/79**	.949	.057	.052	.002	-.004	.001
Scalar	248.00/89**	.939	.059	.051	-.010	.002	-.001
Strict	260.83/100**	.938	.056	.052	-.001	-.003	.001

Predictive Validity

Within the scope of predictive validity, firstly, the internal consistency coefficients of the scores obtained from the variables included in the hierarchical regression analysis were revealed, and correlation analyses were performed. As seen in Table 3, it was determined that there was a significant and positive relationship between all variables.

Table 3
Descriptive statistics and correlation among study variables (n=520).

Variable Number	Variable	*M*	*SD*	g_1	g_2	α	ω	1	2
1	AAI	12.33	8.02	1.14	1.10	.89	.90	-	
2	IUS-12	37.57	9.70	.12	-.50	.89	.89	.37**	-
3	PVS	17.27	4.54	-.01	-.23	.70	.70	.51**	.46**

Note. **p<.01, *M*=mean, *SD*=standard deviation, g_1=Skewness, g_2=Kurtosis, ω=McDonald's Omega, α=Cronbach's Alphaa, IUS-12=Intolerance of Uncertainty Scale, PVS=Psychological Vulnerability Scale

Following the correlation analysis, hierarchical regression analysis was conducted. The dependent variable of analysis was PVS. The independent variable in the first step of the analysis was IUS-12, and the independent variables in the second step were IUS-12 and AAI. The results of the hierarchical regression analysis are given in Table 4.

The IUS-12 was added to the analysis in the first step and explained 21% of the variance related to PVS, $F(1, 518) = 140.287$, $p < .001$. In the second step, the AAI was added to the analysis. The AAI also contributed 13% of the previously explained variance, $F(2, 517) = 137.019$, $p < .001$. As a result, the predictor variables explained 35% of the variance of the PVS.

Table 4
The results of hierarchical regression analysis.

Model	*B*	*SE*	β	*t*	*p*	95% CI
Step 1						
IUS-12	.22	.02	.46	11.84	< .001	[.18, .25]
Step 2						
IUS-12	.15	.02	.32	8.28	< .001	[.11, .18]
AAI	.22	.02	.39	10.27	< .001	[.18, .27]

Note. IUS-12 = Intolerance of Uncertainty Scale

Reliability Analysis

To determine the internal consistency of the AAI, McDonald's ω, Cronbach's α, and composite reliability were calculated. The McDonald's ω internal consistency coefficient of the AAI is .90, and the Cronbach's α internal consistency coefficient is .89. The composite reliability was determined as 0.90. The corrected item-total correlations of the AAI ranged between .31 and .80 (see Table 5). Within the scope of test-retest reliability, data were collected from the participants at four-week intervals, and the $ICC_{2,1}$ was calculated. Test-retest reliability of .88 [.79 – .93] was obtained for the AAI.

Finally, floor and ceiling effects were also evaluated. The minimum possible score on the AAI is 0, and the maximum is 40. In the study sample (n = 520), .4% (n = 2) scored 0 and .6% (n = 3) scored 40. In the test-retest study sample (n=46), the lowest observed total score was 2 (4.3%), and the highest was 37 (2.2%). These proportions are well below the 15% criterion, indicating no floor or ceiling effects.

IRT Analysis

Within the scope of IRT analysis, the AAI was first checked to see if it met the necessary assumptions for IRT. CFA conducted in the current study revealed that the AAI met the unidimensionality assumption of IRT. The Q3 test (Yen, 1984) was applied to check the local independence assumption, another assumption of IRT. Chen and Thissen (1997) state that local independence is achieved when the values between item pairs are ≤ .20 as a result of the Q3 test. These values are presented in Table 6.

Table 5
Reliability analyses for AAI.

		If item dropped		
Item	CICs	α	ω	$ICC_{2,1}$ [IC 95%]
AAI1	.69	.88	.88	.76 [.57 – .86]
AAI2	.31	.90	.91	.70 [.51 – .82]
AAI3	.75	.87	.88	.55 [.32 – .72]
AAI4	.65	.88	.88	.68 [.49 – .81]
AAI5	.78	.87	.88	.77 [.62 – .87]
AAI6	.46	.89	.90	.65 [.44 – .79]
AAI7	.55	.88	.89	.60 [.38 – .76]
AAI8	.58	.88	.89	.76 [.60 – .86]
AAI9	.80	.87	.87	.76 [.60 – .86]
AAI10	.75	.87	.88	.72 [.55 – .83]

Note. CIC = corrected item-total correlations; ω = McDonald's Omega; a = Cronbach's Alpha (n=520); $ICC_{2,1}$ = intraclass correlation coefficient (n=46)

Table 6
Q3 values and Pearson's correlations of items of the AAI.

Item	AAI1	AAI2	AAI3	AAI4	AAI5	AAI6	AAI7	AAI8	AAI9	AAI10
AAI1	-	.09	-.04	-.04	-.20	-.18	-.10	.06	-.17	-.15
AAI2	.30	-	-.09	-.02	-.07	.20	-.23	.12	-.10	.03
AAI3	.62	.21	-	-.09	-.22	-.12	-.01	-.15	-.27	-.09
AAI4	.52	.20	.57	-	-.06	.02	-.07	-.01	-.27	-.11
AAI5	.61	.25	.70	.61	-	-.10	-.23	-.19	-.09	-.31
AAI6	.25	.31	.34	.34	.37	-	.02	.12	-.15	.04
AAI7	.42	.03	.53	.42	.48	.31	-	-.10	-.07	.10
AAI8	.49	.28	.44	.43	.45	.37	.32	-	-.12	-.06
AAI9	.63	.24	.70	.56	.79	.36	.54	.49	-	-.19
AAI10	.55	.27	.66	.54	.64	.40	.55	.46	.68	-

Note. Below the diagonal are Pearson's correlations, and all $p < .001$, except for the Item 2 and Item 7 pair. The Q3 values are located above the diagonal.

After testing the assumptions, RSM, GRM with fixed a and free b parameters, GRM with free a and b parameters, and the 2-dimensional GRM were compared using AIC and adjusted BIC to determine the appropriate IRT model. The model comparison results are shown in Table 7. The GRM (with free a parameters) had the lowest AIC and adjusted BIC values. Therefore, the GRM demonstrated the better fit, and the IRT analysis was continued with the GRM.

Table 7
Model fit comparisons for the unidimensional RSM, GRM with fixed discrimination parameters, GRM, and 2-dimensional GRMs.

Model number	Model	Overall fit indices			
		# Free Par.	Neg. Log. L	AIC	Adj. BIC
1	RSM	13	7128	14283	14297
2	GRM with fixed *a* and free *b* parameters	40	6221	12522	12566
3	*GRM with free a and b parameters*	*50*	*5913*	*11925*	*11979*
4	2D GRM*	50	5964	12028	12082

Note. *The model uses a two-factor structure described as avoidance (Items 1, 3, 5, 7, 9, and 10) and threat monitoring (Items 2, 4, 6, and 8) in a clinical sample by Veale et al. (2014). The trait correlation of factors is .51 (Roberts et al., 2018).

Table 8 shows the discrimination parameters of the items of the AAI. The discrimination parameters are between 0.63 and 3.81. Six items (Items 1, 3, 4, 5, 9, and 10) have very high discrimination. Two items (Items 7 and 8) have high discrimination. Finally, one item (Item 6) has moderate discrimination, and one item (Item 2) has low discrimination. In the classification of discrimination parameters, the value ranges suggested by Baker (2001) were taken as reference.

Table 8 indicates the difficulty parameters of the AAI in addition to the discrimination parameters. The first, second, third, and fourth difficulty parameters ranged from -5.29 to 0.06, -2.05 to 1.25, -0.05 to 1.85, and 1.81 to 3.01, respectively. All parameters except item 7 for the first difficulty parameter are negative, indicating that these items have a high probability of being selected. In addition, the fact that these items have lower difficulty parameters indicates lower appearance anxiety. For the fourth difficulty parameter, items 7, 8, and 6, respectively, have the highest difficulty parameters; these items are less likely to be selected, but they indicate higher appearance anxiety.

Table 8
Parameter estimates of item discrimination and difficulty by AAI item and severity score.

Item	*a (SE)*	b_1 *(SE)*	b_2 *(SE)*	b_3 *(SE)*	b_4 *(SE)*
AAI1	2.15 (.17)	-1.46 (.11)	.37 (.07)	1.08 (.09)	2.02 (.15)
AAI2	.63 (.09)	-5.29 (.81)	-2.05 (.33)	- .05 (.15)	2.15 (.33)
AAI3	2.95 (.24)	- .05 (.06)	.89 (.08)	1.37 (.09)	2.14 (.15)
AAI4	1.91 (.16)	- .06 (.07)	.95 (.09)	1.63 (.13)	2.30 (.18)
AAI5	3.66 (.31)	- .17 (.06)	.66 (.07)	1.14 (.08)	1.85 (.12)
AAI6	1.00 (.10)	-1.56 (.18)	.42 (.11)	1.58 (.18)	2.68 (.28)
AAI7	1.51 (.14)	.06 (.08)	1.25 (.12)	1.85 (.16)	3.01 (.26)
AAI8	1.42 (.13)	- .49 (.09)	.94 (.11)	1.84 (.17)	2.77 (.25)
AAI9	3.81 (.33)	- .44 (.06)	.48 (.06)	1.08 (.08)	1.81 (.11)
AAI10	2.50 (.20)	- .43 (.07)	.76 (.08)	1.36 (.10)	2.12 (.15)

Note. *a* = discrimination parameter; SE = standard error; *b* = difficulty parameter

The category characteristic curves for each item of the AAI can be found in Figure 1. Accordingly, it can be seen that the peaks of the items are generally distinct, except for items 2 and 6. In addition, when the curves are examined, it is observed that categories 0 and 1 are more likely to be selected at low theta levels, and categories 3 and 4 are more likely to be selected at high theta levels.

Figure 2 displays the item information curves of the AAI items. Accordingly, items provide the most information in the range of 0 to 2 theta. Items 9, 5, 3, and 10, respectively, are the items that provide the most psychometric information. The items providing the least psychometric information are items 2, 6, 8, and 7. More informative items contribute significantly to the accuracy of score estimation.

Figure 3 shows the test information function and test characteristic curve obtained for the AAI. The peak in the test information function is between the 0 and 2 theta levels. Therefore, the AAI provides the most information between these levels. According to the test characteristic curve, the expected appearance anxiety score increases monotonically. This result obtained from the test characteristic curve displays that the psychometric properties of the AAI are qualified.

Figure 1

Category characteristic curves.

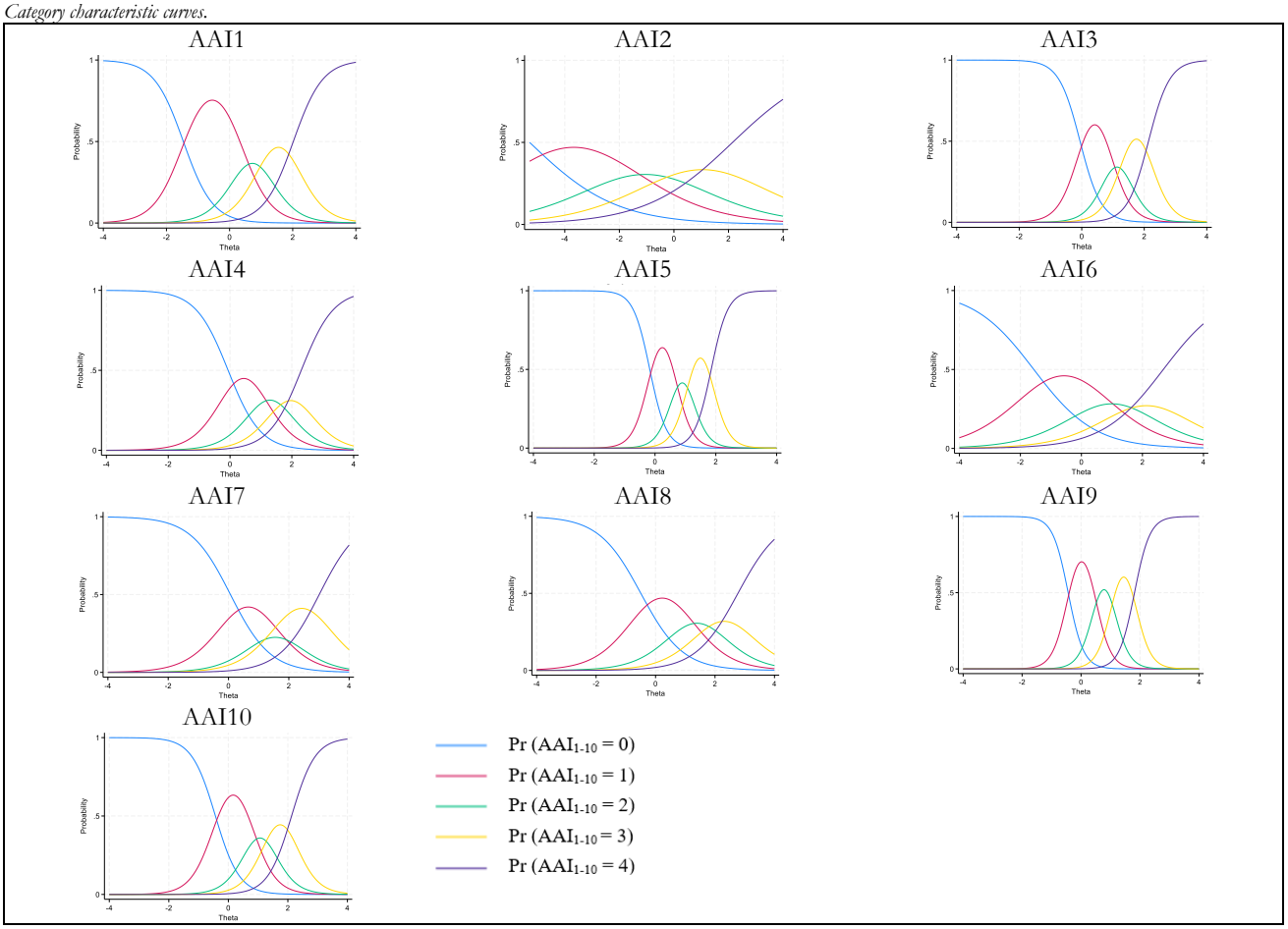


Figure 2
Item information curves.

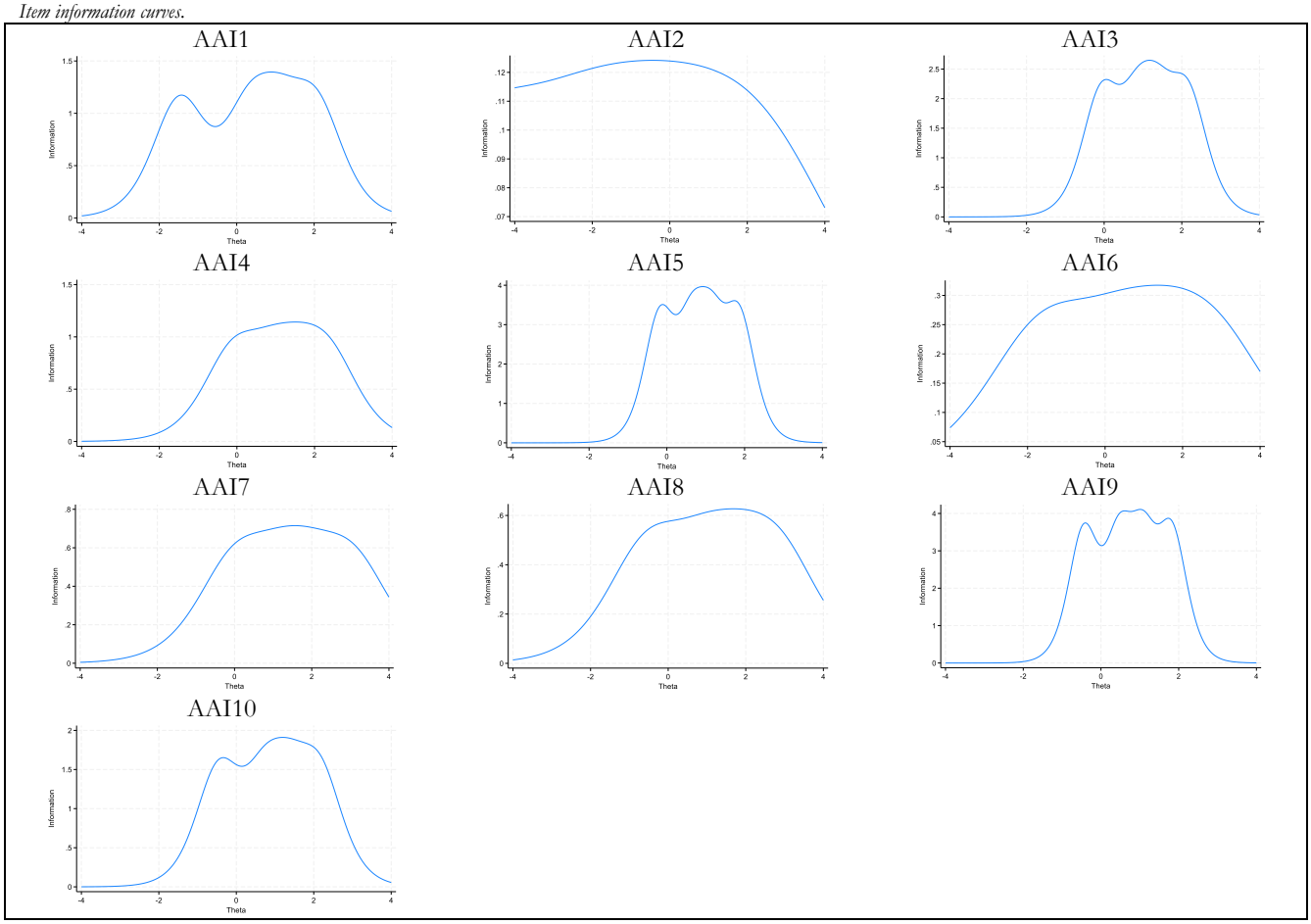
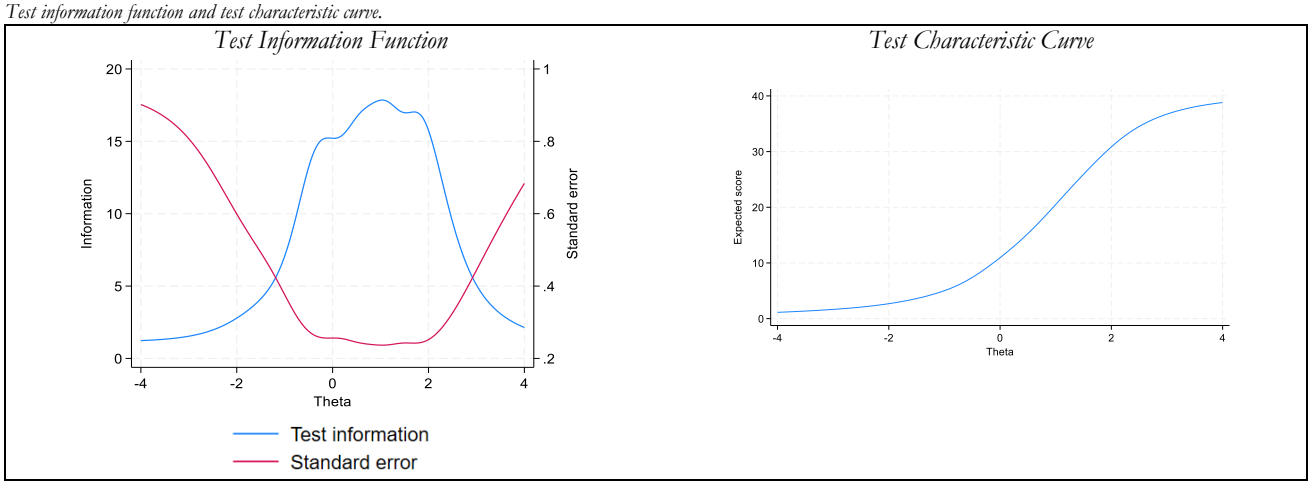


Figure 3
Test information function and test characteristic curve.



DIF Analysis

Ordinal logistic regression was used to examine whether the items of the AAI showed DIF according to gender. For an item to show DIF, the two-degree-of-freedom chi-square test should have a *p*-value of ≤ .01 and an R^2 effect size of ≥ 0.13 (Zumbo, 1999). Table 9 presents the DIF results. Accordingly, since the *p*-value of Item 2 and Item 7 is ≤ .01, although these items show DIF, when the R^2 effect size is evaluated, it is seen that the DIF is negligible.

Table 9
Ordinal logistic regression results for DIF regarding gender.

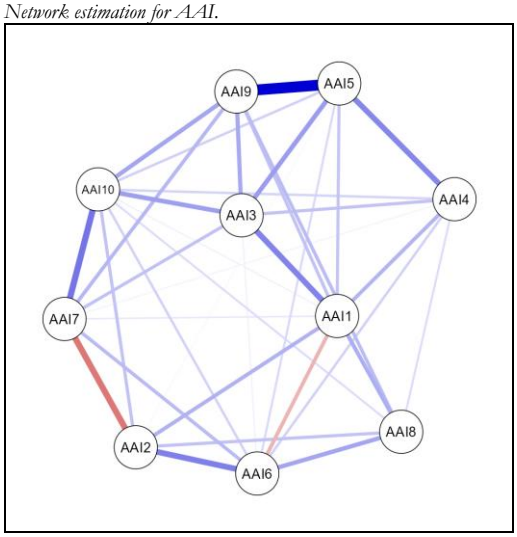
Item	χ^2 (2)	*p*-value	R^2 Δ Effect size
AAI1	.660	.719	.001
AAI2	19.550	< .001	.013
AAI3	.650	.723	.001
AAI4	.830	.660	.001
AAI5	.520	.771	.000
AAI6	.700	.705	.001
AAI7	11.800	.003	.009
AAI8	1.620	.445	.001
AAI9	.690	.708	.001
AAI10	2.950	.229	.002

Network Analysis

Network Estimation and Centrality Indices

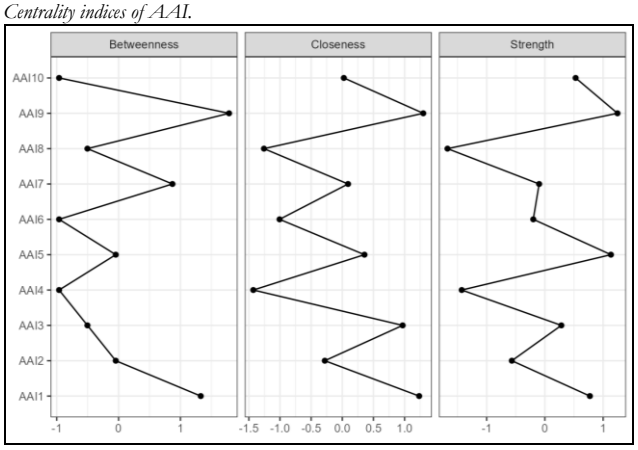
In the network analysis, it was determined that 37 out of 45 edges were non-zero edges, and the sparsity of the network was .178. The network plot of the AAI is shown in Figure 4. The strongest connection is between items 9 and 5. This connection is followed by the connection between items 7 and 10, the connection between items 1 and 3, the connection between items 2 and 6, and the connection between items 4 and 5. There are only two negative connections in the network, namely the connection between Item 2 and Item 7 and the connection between Item 1 and Item 6, respectively. The centrality indices of the AAI are given in Figure 5. An examination of the indices reveals that item 9 has the highest strength, closeness, and betweenness. Following this item, the items with the highest strength are item 5 and item 1; the items with the highest closeness are item 1 and item 3; and the items with the highest betweenness are item 1 and item 7.

Figure 4
Network estimation for AAI.



Note. The white nodes were items of AAI. Blue edges indicate positive associations, and red edges indicate negative associations. Thicker and more saturated edges mean that the association is stronger.

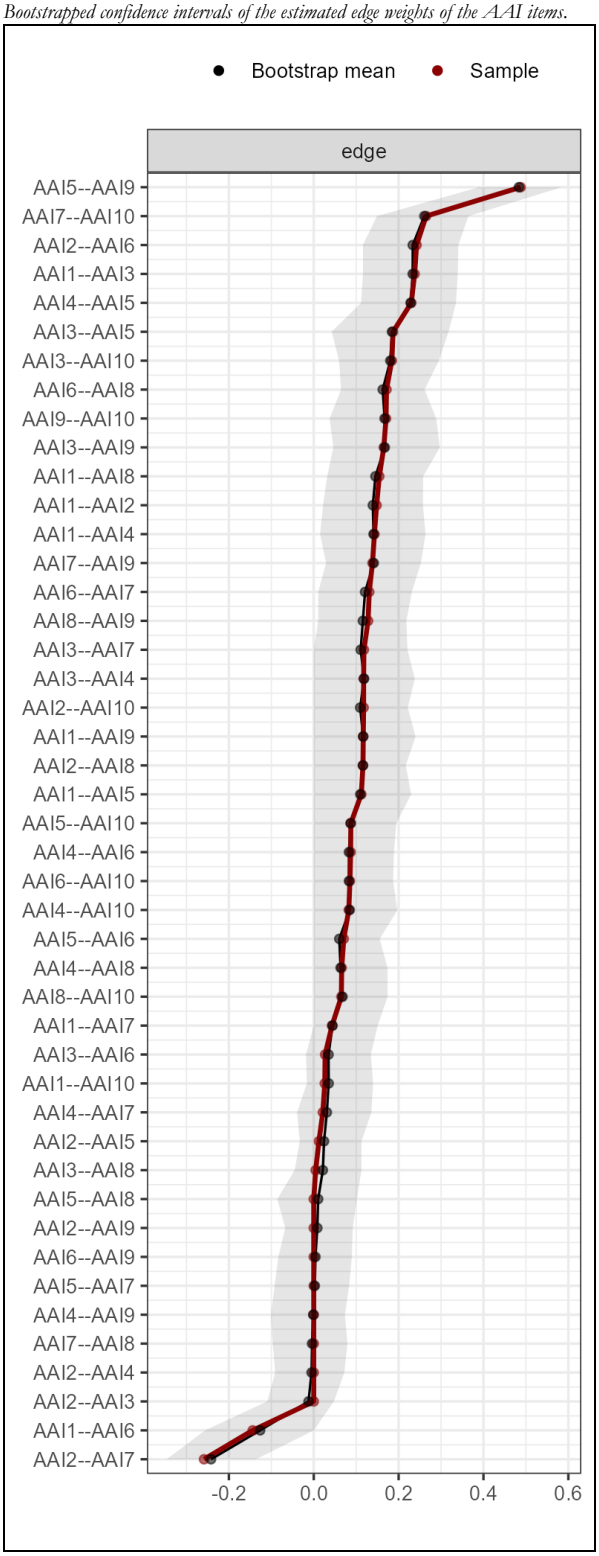
Figure 5
Centrality indices of AAI.



Edge Weights Accuracy and Centrality Stability

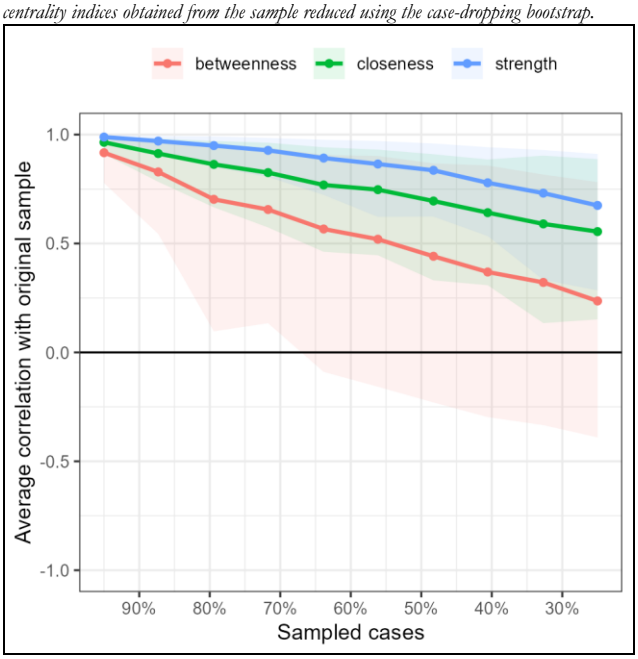
To demonstrate the accuracy of the edge weights, a non-parametric bootstrap was performed, and sampling variability was examined. Figure 6 shows the bootstrapped confidence intervals of the estimated edge weights. Accordingly, more caution should be exercised when interpreting edge weights with wide confidence intervals compared to interpreting edge weights with narrow confidence intervals. Case-dropping bootstrap was used to determine the stability of the centrality indices. The graph showing the stability of the centrality indices is found in Figure 7. The graph shows that even when the sample size is reduced, the stability of the strength and closeness indices in particular is significantly preserved.

Figure 6
Bootstrapped confidence intervals of the estimated edge weights of the AAI items.



Note. The grey area shows the bootstrapped confidence intervals; the red line shows the sample values; and the black line shows estimated edge weights.

Figure 7
Average correlations between centrality indices obtained from the original sample and the centrality indices obtained from the sample reduced using the case-dropping bootstrap.



Note. Lines represent means and areas represent the interval between the 2.5% and 97.5% quantiles.

Discussion

The aim of this study is to adapt the AAI to Turkish culture and to reveal its psychometric properties in a sample of emerging adults. In line with this purpose, CFA was first conducted in the study. Afterwards, the measurement invariance of the scale between women and men, predictive validity and reliability were examined. In addition, IRT analysis and network analysis were also performed.

The International Test Commission (2018) states that in scale adaptations, the factor structure of the adapted scale should be equivalent to the original version of the scale. The AAI, developed by Veale et al. (2014), has a single-factor structure in the community sample in its original version. In line with the original version of the scale, it was determined that the single-factor structure showed acceptable fit in this study. A single-factor structure was also obtained in the study where AAI was adapted to Australian culture (Roberts et al., 2018). Examining the factor loading values revealed that Items 9 and 5 exhibited the highest factor loading values. The item with the lowest factor loading value was Item 2. Similarly, in the adaptation study conducted by Roberts et al. (2018), items 9 and 5 had the highest factor loadings, and item 2 was removed because it showed a low factor loading. In the study in which the original version of the scale was developed, item 2 had the lowest factor loading (.37). This item pertains to the individual's overall control over their appearance. In daily life, individuals control their appearance and attach importance to it because they interact with society. However, appearance anxiety is characterised by a person

constantly checking their appearance (Veale et al., 2014). Due to this situation, it is thought that item 2 may have a low factor loading. It can be suggested that this item be structured on the person constantly checking their appearance to strengthen the factor structure of the AAI.

The measurement invariance of the AAI across genders was examined, and invariance was supported, indicating that the items are interpreted similarly by individuals. Strict invariance was also achieved. It is stated in the literature that strict invariance is difficult to provide and is generally not examined (Putnick & Bornstein, 2016). The finding obtained from the measurement invariance analysis is also consistent with the findings obtained from the DIF analysis. DIF is defined as any item showing different statistical properties for different groups (De Ayala et al., 2002). Accordingly, items in the measurement tool should not show DIF between different groups (Hagquist & Andrich, 2017). Even if the p-value (p-value ≤ 0.01) is significant in the finding obtained for two items (Item 2 and Item 7) in the DIF analysis, when this p-value is evaluated together with the effect size, these items do not show DIF. Measurement equivalence, which can be determined by DIF, is important to prevent misinterpretations in research (Teresi & Fleishman, 2007).

Correlation analysis and hierarchical regression analysis were conducted to evaluate the predictive validity of the AAI. In the correlation analysis, it was determined that appearance anxiety was positively correlated with intolerance of uncertainty and psychological vulnerability; in the regression analysis, it was determined that appearance anxiety predicted psychological vulnerability. These findings are consistent with the literature. Appearance anxiety occurs when a person becomes excessively concerned about aspects of their body that other people see as normal but that they consider as flaws (Davis et al., 1993) and is defined by characteristics such as constantly checking their appearance, trying to hide aspects of their body that they consider as flaws, and avoiding people (Veale et al., 2014). These characteristics of appearance anxiety also indicate social anxiety. Social anxiety is defined as a person's concern about how they will be evaluated by others in real or fictional social situations (Morrison & Heimberg, 2013). Individuals with appearance anxiety worry about how they will be perceived by other people (Hart et al., 1989). There are very limited studies in the literature examining the relationship between appearance anxiety and intolerance of uncertainty and psychological vulnerability. However, social anxiety, which is a concept very close to appearance anxiety, appears to be associated with intolerance of uncertainty (Bijsterbosch et al., 2020; Boelen & Reijntjes, 2009; Brown & Medcalf-Bell, 2022; Counsell et al., 2017; Li et al., 2020; Shen et al., 2024). Social anxiety is also associated with certain psychological vulnerabilities, such as fear of negative evaluation (Rodebaugh et al., 2017). Past studies have shown that body dissatisfaction is also positively associated with intolerance of uncertainty (Bijsterbosch et al., 2020; Bijsterbosch et al., 2023).

Nowadays, it is seen that IRT analyses are being performed more frequently in psychometric studies (Gao & Liu, 2024; Lu et al., 2024; Natesan Batley et al., 2022; Sepehrinia et al., 2024; Stănculescu, 2023). In IRT, each item is examined separately, and the result of the analysis is created depending on each item (Bortolotti et al., 2013). In this context, IRT allows for a more detailed determination of the psychometric properties of the scale. In the IRT analysis, it was determined that all items except item 6 and item 2 had high or very high discrimination. Items 9 and 5 had the highest discrimination, followed by Items 3 and 10. These items also provided the most information according to the item information curves, and this was also consistent with the category characteristic curves. In category characteristic curves, it is expected that the peaks of the categories are clear (Nguyen et al., 2014; Toland, 2014). When the category characteristic curves of the items are examined, the peaks of all items except two (Item 2 and Item 6) are clearly visible. At the same time, the items with the clearest peaks are Items 9, 5, and 3. Therefore, these items exhibit superior performance compared to the other items. Being able to see the peaks in this way allows a better prediction of which category the individual filling out the scale will choose for that item (Nguyen et al., 2014).

Another noteworthy point in the IRT analysis is that Items 2 and 6 had lower discrimination than the other items. Considering that an item's discrimination parameter reveals whether it can adequately distinguish individuals with different levels of latent traits (Nguyen et al., 2014), it can be argued that these items' discrimination of individuals with different levels of appearance anxiety is limited. Furthermore, the results of the current study suggest that the same items provide less information. In line with Toland's (2014) IRT study, if these less informative items are considered similar to other items or if a shorter version of the scale is desired, they can be removed from the scale in a future revised version of the AAI.

Another parameter determined for each item with IRT analysis is the difficulty parameters. The difficulty parameters of all items of AAI increase monotonically. This finding reveals that the items are of sufficient difficulty. Finally, the analysis yielded the test information function and test characteristic curve. The test information function revealed that between 0 and 2 latent trait levels, AAI provides the highest test information. Therefore, between latent trait levels 0 and 2, AAI is more reliable. According to the test characteristic curve, the expected appearance anxiety score increases monotonously. In this context, it can be stated that the expected total score is lower at low latent trait levels, and the expected total score is higher at high latent trait levels. In other words, AAI can distinguish between low and high levels of appearance anxiety. IRT analysis has not been performed in any other study in which the validity and reliability of AAI were demonstrated. The detailed findings revealed as a result of the IRT analysis may contribute to researchers' deeper understanding of the AAI.

Network analysis allows for a deeper understanding of the structure of the scale and the relationships between its items. The analysis revealed that the AAI items formed a cluster within the network structure. This finding is consistent with the single-factor structure obtained from the CFA. It was determined that all connections in the network graph were positive except for two connections. The strongest connection is between Items 9 and 5. This strong connection may be due to the fact that both items focus on hiding or changing appearance. In addition, determining which items exhibit higher centrality can help identify items that contribute more to the AAI. Item 9 is the item with the highest strength, betweenness, and closeness. Therefore, Item 9 was the most central node. Item 9 is followed by Item 5, Item 1, and Item 3. The items with the lowest centrality values are Items 8 and 4. These findings obtained from the network analysis are consistent with the findings obtained from the CFA and IRT analyses. Items with higher centrality showed higher factor loadings in CFA, had greater discrimination, and provided more information in IRT.

All these analyses show that Items 9 and 5 in particular stand out on the scale. Items 9 and 5 pertain to camouflaging or altering one's appearance. Based on the findings of the research, it can be stated that camouflaging or changing the appearance of the individual is critical in determining appearance anxiety. Today, standards are being created every day through commercial elements regarding how the ideal body should be (Holland & Tiggemann, 2016; Jin et al., 2024). Individuals who think that they do not meet these standards resort to procedures that go as far as aesthetic surgeries (Jin et al., 2024; Zheng, 2025). The widespread use of social media also plays a significant role in this increase in body dissatisfaction and social appearance anxiety (Huang & Gong, 2025; Putri et al., 2025). Indeed, Ryding et al. (2025) also revealed in their research that there is a positive relationship between problematic social networking site use and appearance anxiety.

Finally, when the findings obtained from the reliability analysis of the scale were evaluated, internal consistency coefficients of .90 and above indicated high internal consistency. These coefficients obtained are consistent with the internal consistency coefficients obtained in other studies demonstrating the psychometric properties of the AAI (Roberts et al., 2018; Veale et al., 2014; Yurtsever et al., 2022). It can be stated that the $ICC_{2,1}$ of .88 calculated within the scope of test-retest reliability is also good (Koo & Li, 2016).

Based on the analyses conducted within the scope of the study, it is believed that these findings may offer a new perspective on AAI and appearance anxiety. The study encompasses both more familiar approaches, such as CTT, and less familiar approaches, such as IRT and network analysis. An examination of the results reveals that the findings of the different analyses complement each other. For example, CFA revealed the structure of the scale, IRT analysis revealed the discrimination power of the items and the level of information they provided, and network analysis revealed the relationships between the items and which items played the most significant roles in the scale. Therefore, these analyses, as a whole, allowed for a comprehensive examination of the AAI and contributed to a better understanding of the scale's validity and reliability. Furthermore, it has been noted in the current literature that there is a trend towards the combined use of CTT and IRT (Hu et al., 2021) and that different analyses can improve the quality of scales (Bean & Bowen, 2021). In this regard, it is seen that different methodological approaches have been used in recent scale development and adaptation studies (e.g., Akyıl et al., 2025; Fuochi et al., 2025; Meng et al., 2023).

Limitations and Future Directions

This study has several limitations as well as strengths. First, the participant group of the study consisted only of emerging adults. This situation may make it difficult to generalise the findings from the study to individuals in different age groups. In this context, the validity and reliability properties of the AAI can be examined across different developmental periods, such as adolescence, middle adulthood, and late adulthood. Diversifying comparative studies across age groups could increase the generalizability of the findings.

Second, the study's participants were taken from the community sample, and their psychiatric diagnoses are unknown. The AAI is also widely used to measure the appearance anxiety of individuals diagnosed with body dysmorphic disorder in addition to individuals in the community sample. Future studies are needed to understand the validity and reliability of the AAI in individuals diagnosed with body dysmorphic disorder in the Turkish population. In this regard, AAI adaptation studies based on clinical samples may provide supportive evidence for the use of the scale in the clinical context.

Third, the convenience sampling approach was used in creating the sample of the study. In future studies, examining the psychometric properties of the AAI with randomly formed samples may allow the psychometric properties of the AAI to be better determined. In addition, the construct validity of the AAI can be evaluated in studies conducted with samples from different regions and socioeconomic levels, and the psychometric structure of the scale in different contexts can be compared.

Fourth, although the predictive validity of the AAI has been examined, the fact that its relationship with a scale that directly measures appearance anxiety has not been evaluated can be considered a limitation. In this context, examining the concurrent validity of the AAI with a scale that directly measures the same construct may better demonstrate the validity of the AAI.

Conclusion

In this study, the findings presented with advanced analysis methods, such as CFA, IRT, DIF, and network analysis, show that AAI is a valid and reliable tool for assessing the appearance anxiety of emerging adults in the Turkish population. The single-factor structure and brevity of AAI may facilitate its use in studies examining appearance anxiety. In addition, AAI can be used by psychological counsellors, psychologists and psychiatrists working with emerging adults experiencing appearance anxiety in assessing the appearance anxiety levels of clients in individual and group counselling processes. In summary, AAI can be a measurement tool that can contribute to the literature in the study of appearance anxiety in emerging adults.

Complementary information

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