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Reliability and Validity of the Turkish Version of the Acceptance and Action Questionnaire-Substance Abuse (AAQ-SA) on a Clinical Sample

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Abstract

Background: In this study, it is aimed to examine the validity and reliability of the Turkish version of the Acceptance and Action Questionnaire-Substance Abuse (AAQ-SA) which is developed for assessing psychological flexibility levels of individuals with alcohol and/or substance misuse.

Methods: The research sample consisted of a total of 191 participants diagnosed with alcohol and substance use disorder. For reliability analysis, Cronbach alpha coefficient, test-retest correlation, and item-total correlation methods were used. The construct validity of the scale was carried out by exploratory factor analysis and confirmatory factor analysis methods. For assessing the criterion-related validity were used Self Concealment Scale (SCS), Addiction Profile Index (BAPI), Beck Depression Inventory (BDI), Internalized Stigma of Mental Illness Scale (ISMIS), Multidimensional Scale of Perceived Social Support (MSPSS) and Rosenberg Self-Esteem Scale (RSES).

Results: Principal component analysis with varimax rotation and confirmatory factor analysis were applied to examine the factor structure of the Turkish AAQ-SA and the two-factor structure was obtained similar to the original scale. In the construct validity analysis conducted by confirmatory factor analysis method, it was determined that the regression load of one item was not at the level of significance and the item was excluded from the scale. The Cronbach alpha coefficient of the 17-item final version was 0.736 and the Cronbach alpha coefficients of the sub-scales were 0.700-0.766. The item-total score correlation coefficients ranged from 0.100 to 0.523 ($p < 0.01$). Test-retest reliability analysis at three weeks also showed good temporal stability ($r=0.83$). In terms of criterion-related validity, the total score of the scale was significantly correlated with BAPI, SCS, BDI, MSPSS, ISMIS, RSES scores in the expected direction. In addition, the AAQ-SA scores were compared according to the severity of addiction which is obtained from BAPI scores and results indicated significant difference

Conclusions: Our results of the study indicated that the Turkish version of the AAQ-SA can be used as a satisfactory reliable and valid scale.

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KEYWORDS: acceptance and action questionnaire, substance abuse, psychological flexibility, reliability, validity

INTRODUCTION

Psychological flexibility is a relatively new construct which is defined as the ability to contact the present moment, the open acceptance of unpleasant sensations, thoughts, and feelings, and moving in a pattern of behavior in the service of chosen values [1]. In contrast to psychological flexibility, psychological inflexibility refers to a model of behavior in which actions are rigidly guided by internal experiences (i.e., thoughts, feelings, and urges) rather than personal values [2]. This model consists of six interrelated processes: experiential avoidance, cognitive fusion, dominance of conceptualized past or/and future, attachment to conceptualized self, disruption of values, and inaction or impulsivity [3]. Experiential avoidance is the most focused one and defined as trying to avoid or get rid of unwanted private experiences even when these avoidance cause behavioral harm [4]. It is associated with a broad range of psychological and behavioral health problems including substance use disorders [5]. Consistent with an experiential avoidance perspective, some individuals engage in substance use in an attempt to avoid a wide range of unpleasant internal states including unwanted thoughts, emotions, sensations (e.g., cravings or urges) [6].

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Problematic substance use may initially function to reduce psychological pain at the moment, but over time, that rigid patterns of avoidance can lead to paradoxical increases in unpleasant experiences and substance use itself becomes a trigger in dealing with craving and withdrawal symptoms [7]. Furthermore, a lifestyle persisting in substance use restricts engagement in personally important life activities, which results in loneliness, self-concealment, depression, self-stigmatization, decreased self-esteem and lack of social support, that all associated with psychological inflexibility [8,9].

Acceptance and Commitment Therapy (ACT) is a transdiagnostic cognitive-behavioral intervention that targets to improve psychological flexibility [10]. There is good empirical evidence that targeting psychological flexibility with an ACT protocol is beneficial for a range of clinical disorders [11]. ACT helps patients with substance use disorders to cope with challenges without using substances, to develop strategies to tolerate emotionally difficult or painful experiences (cravings, urges, bodily sensations, etc.) [7].

Psychological flexibility/inflexibility levels are typically measured by The Acceptance and Action Questionnaire-II (AAQ-II) [2]. While AAQ-II has demonstrated inadequate psychometric properties in specific clinical samples, it has been developed specific variants of the AAQ in such areas as weight control, workplace stress, social phobia, body image, trichotillomania, stigma, and auditory hallucinations [12-18]. Due to content-specific variants of the AAQ have been effective in other treatment areas, Luoma et al. [19] have developed a substance abuse focused version of the AAQ: Acceptance and Action Questionnaire-Substance Abuse (AAQ-SA). In this study, we aimed to examine the psychometric properties and factor structure of the Turkish AAQ-SA in a clinical sample, suggesting that it may be useful in mediating treatment outcomes in addiction.

METHODS

Participants

The study includes participants, who were receiving treatment in outpatient or inpatient clinics at Konya Training and Research Hospital, Alcohol and Drug Research, Treatment and Training Center. Exclusion criteria included being diagnosed with any acute psychotic or mood disorder, mental retardation or cognitive impairment, at that moment being under the influence of substance or alcohol. After a psychiatric interview, all participants were informed about the study and their written consent was obtained. The study was conducted on a total of 191 patients. To examine the test-retest reliability, Turkish AAQ-SA was re-administered to randomly selected 26 patients three weeks after the initial survey.

Procedure

Ethics committee approval was obtained from Selçuk University Non-invasive Clinical Researches Ethics Committee (Date: 29.06.2016, Approval Number: 2016/200). The study was conducted between July 2016/January 2017. Jason B. Luoma, who developed the original form of the scale, was contacted by e-mail and the required permission was obtained to be adapted to Turkish. The scale items were translated from English into Turkish independently by five psychiatrists who were talented in English grammar. The obtained translations are reviewed and the statements which are thought to represent the best of each item are adopted by the translation team. The translated English version was back-translated into Turkish by three experts in linguistics who was blinded to the research. Then the final version of the scale was compared and checked for discrepancies between the Turkish and English translations by an associate professor who specializes in the ACT.

Measurement Tools

Sociodemographic Data Form

It is a semi-structured form prepared by researchers to determine age, gender, education, place of residence, medical/psychiatric history and substance use characteristics of the sample.

The Acceptance and Action Questionnaire-Substance Abuse (AAQ-SA)

AAQ-SA is a self-report scale to evaluate psychological flexibility/inflexibility levels in alcohol and substance use disorder samples [19]. The scale consists of 18 items rated on a 7-point Likert-type scale ranging from 1 (never true) to 7 (always true). High scores represent high psychological flexibility, which consists of two subscales under the heading of "values commitment" and "defused acceptance". The defused acceptance subscale is scored inversely because it represents psychological inflexibility. In the original study, the Cronbach alpha values for values commitment and defused acceptance were 0.82 and 0.84. The internal consistency of the overall scale was 0.85.

Self-Concealment Scale (SCS)

The original form was developed by Larson and Chastain (20) and consists of 10 items rated on a 5-point Likert scale. SCS refers to the tendency of a person to hide his/her personal information from others, which he perceives as distress or negative. Turkish version of the scale was conducted by Terzi et al. [21].

Rosenberg Self-Esteem Scale (RSES)

The Rosenberg Self-Esteem Scale is a common tool for assessing global self-esteem consisting of ten items which are rated on a 4-point Likert the scale [22]. Higher scores reflect higher levels of self-esteem. The validity and reliability of the Turkish version of scale was carried out by Fusun Cuhadaroglu [23].

The Internalized Stigma of Mental Illness Scale (ISMIS)

ISMIS, which is developed by Ritsher et al. [24], evaluates self-stigma that reflects the inner experiences related to stigmatization among individuals with psychiatric disorders. The Turkish validity and reliability study of the scale was conducted by Ersoy and Varan [25].

Multidimensional Scale of Perceived Social Support (MSPSS)

MSPSS is a 12-item, five-point Likert-type scale assessing one's perception of social support from family, friends, and significant others (26). The reliability and validity of the Turkish version of the scale was performed by Eker and Arkar [27].

Beck Depression Inventory (BDI)

The BDI is a 21-item self-report questionnaire rated on a 4-point Likert scale. It was developed to assess the severity of depressive symptoms. Higher scores indicate an increase in the depressive mood [28]. Turkish validity and reliability study of the BDI was conducted by Hisli [29].

Addiction Profile Index (BAPI)

Addiction Profile Index (BAPI) was developed by Ögel et al. (30). The scale is a self-report questionnaire that consists of 37 items and five subscales. The subscales measure the characteristics of substance use, dependency diagnosis, the effect of substance use on the person's life, craving and the motivation for quitting using substances. Scores less than 12 indicates low levels of dependence, 12-14 medium and bigger than 12 points shows high severity of dependence levels. Cronbach alfa coefficient for the whole questionnaire is 0.89.

Statistical Analysis

SPSS (Statistical Package for the Social Sciences) 20.0 for Windows was used for all data analysis. Kolmogorov-Smirnov and Shapiro Wilk normality tests were performed to analyze the homogeneity of variables. For the reliability of the Turkish version of AAQ-SA were applied test-retest method, Cronbach alpha correlation coefficient, and item-total correlation by using Spearman's correlation coefficient. The construct validity of the scale was carried out by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) methods. The Kaiser-Meyer-Olkin coefficient (KMO) and Bartlett's sphericity test were used to verify the suitability of the data for factor analysis (31,32). The EFA was carried out by using varimax rotation based on the main compounds method. For assessing the criterion-related validity was examined the relationship between AAQ-SA, SCS, ISMIS, BDI, MSPSS, RSES, and BAPI by using Spearman's correlation analysis. The independent Kruskal-Wallis test and Bonferroni correction were used to compare AAQ-SA scores with the severity of addiction which was obtained from BAPI.

CFA was performed using SPSS AMOS 23 version for testing our factor structure obtained from EFA. The quality of models can also be evaluated by its goodness of fit to data [33]. Chi-square (x2) is very sensitive to sample size, therefore it is used relative chi-square, which is the chi-square fit index divided by the degree of freedom (x2/df), so makes x2 less dependent on sample size [34]. The other fit indices we used in our study are the Comparative Fit Index (CFI) [35], the General Fit Index (GFI), the Incremental Fit Index (IFI), and the root-mean-square error of approximation (RMSEA) [36]. Values of CFI, GFI, IFI> 0.900, x2 / df<5 and RMSEA <0.0854 are used as criteria for indicating a good fit [37,38].

RESULTS

Descriptive Statistics

The mean age of the participants was 25.6 (± 6.4), and 174 were male (91.1%). The marital status of the patients was 24.1% married and 75.9% was single / divorced / widow. In terms of education, 74.9% were primary school graduates, 19.3% were high school graduates and 5.8% were university graduates.

Construct validity

First, to control the suitability of the sample adequacy for the EFA, the Kaiser-Meier-Olkin (KMO) and the Bartlett Tests were used. KMO coefficient of 0.60 and Barlett sphericity test calculated in the chi-square value should be statistically significant (39). In our study, KMO sample adequacy r = 0.737 (p <0.001) and Bartlett Chi-square test value sphericity 788.65 (p <0.001) showed that data were suitable for factor analysis. So 18 items were analyzed through exploratory factor analysis (EFA) using Principal Component Analysis (PCA) and Varimax rotation. As a result of PCA was obtained six factors (eigenvalues >1 as a criterion) (40) accounted for 60.92% (n = 191) of the total variance in contrast with the original scale. Since the original scale consists of a two-factor structure, it was decided to test the two-factor solution by varimax rotation method. As a result of the Varimax rotation of AAQ-SA were obtained two factors (F1 = 3.60 and F2 = 2.75) in which eigenvalues were extracted over 1, and explained 35.27% of the total variance. Also, the scree plot supported a two-factor solution (Figure 1). Different from the original scale, item 12 was included in the second factor, and 18 was not loaded on any factors (Table 1).

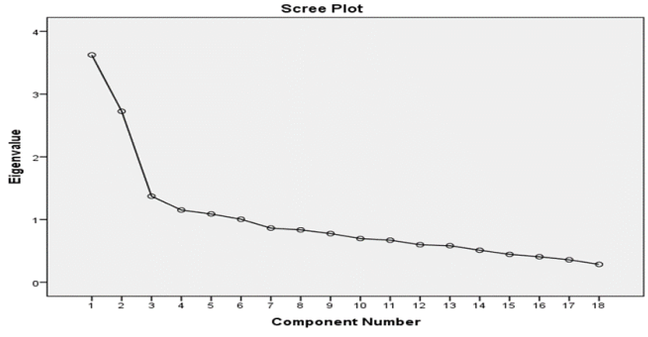

Figure 1. Screen-plot graph of the factor analysis

Table 1. Factor structure of principal components analysis with varimax rotation of Turkish AAQ-SA.

Items	Factor 1: Values commitment	Factor 2: Defused acceptance
1. I can do things that are important to me even when I'm feeling urges to use substances	0.600	
2. My urges and cravings to use get in the way of my success *(r)*		0.686
3. If I have urges to use substances, then I am a substance abuser *(r)*		0.676
4. I try to achieve my sobriety goals, even if I am uncertain that I can	0.624	
5. I work towards things I value, even though at times I feel cravings to use substances	0.565	
6. I am not very aware of what occurs around me when I am thinking of using substances *(r)*		0.517
7. I can set a course in my life and stick to it, even if I have doubts about my sobriety	0.503	
8. Memories of my substance use history make it difficult for me to live a life that I would value *(r)*		0.675
9. If I get bored working toward my recovery, I can still take the steps necessary to succeed	0.675	
10. If I feel uncertain about my recovery, I can still make a choice and take action	0.693	
11. If I promised to do something, I'll do it, even if I later don't feel like it	0.381	
12. Having some worries about substance use will not prevent me from living a fulfilling life		0.587
13. I would rather achieve my goals than avoid thoughts and feelings about substances	0.502	
14. Urges and cravings cause problems in my life *(r)*		0.686
15. I'm afraid of my positive feelings about a substance I've abused *(r)*		0.369
16. When I think of substance use my mind is often on "automatic pilot", not fully involved in what I am doing in the moment *(r)*		0.715
17. I worry about not being able to control my urges and cravings *(r)*		0.395
18. Feeling sad or anxious makes me want to use substances *(r)*		

Note: Only loadings above 0.3 are presented in the table. *(r)*; reverse scored items.

In addition to EFA, we performed confirmatory factor analysis (CFA) to test the new two-factor model. According to the fit indices, it was determined that the 18-item version of Turkish AAQ-SA did not show adequate compliance. Also, it was decided to remove item 11 from the model due to the low regression weights ($p > 0.05$). Goodness-of-fit indices revealed a high covariance-related measurement error between items 9-10 and 17-18 (figure 2). According to the final corrected goodness-of-fit indices of revised model with 17 items was found to be better to the previous model (RMSEA = 0.084, CFI = 0.942, IFI = 0.880, GFI = 0.906 and x2 /df= 1.740) (Table 2). Estimated standardized factor loadings for Turkish AAQ-SA (ranged between 0.39 and 0.88, $p<0.001$) were displayed in Figure 2. Then, further analyses were carried out on 17 items.

Table 2. Model-fit results of confirmatory factor analysis for Turkish AAQ-SA

Model	RMSEA	CFI	GFI	IFI	x2 /df	p
Two-factor model with 18 items	0.077	0.771	0.856	0.778	2.115	<0.000
Two-factor model with 17 items (item 11 removed)	0.077	0.790	0.863	0.800	2.127	<0.000
Two-factor model with 17 items (Revised measurement error between items 9-10)	0.064	0.857	0.890	0.861	1.772	<0.000
Two-factor model with 17 items (Revised measurement error between items 17-18)	**0.060**	**0.870**	**0.900**	**0.880**	**1.668**	**<0.000**

RMSEA= Root Mean Square Error of Approximation; CFI= Comparative Fit Index; GFI= Goodness of Fit Index; IFI = Incremental Fit Index; x2/df= Normalized Chi-Square.

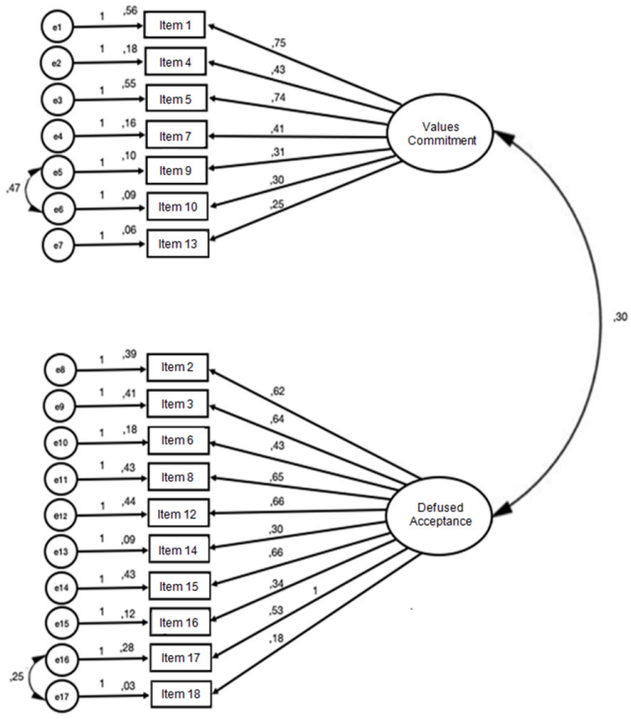

Figure 2. The revised 17-item two-factor model of Turkish AAQ-SA and standardized factor loadings

Reliability Analysis

Internal consistency, temporal stability, and item analyses were performed to evaluate the reliability of Turkish AAQ-SA. Firstly, Cronbach's alpha correlation analysis was used to calculate the internal consistency of Turkish AAQ-SA. Cronbach's alpha for 'values commitment' was 0.700 and the alpha for 'defused acceptance' was 0.766, the internal consistency of the overall scale was 0.736.

Table 3. Item-Total statistics for Turkish AAQ-SA

Items	Corrected Item-Total Correlations r	Cronbach's Alpha if Item Deleted α
Item 1	0.434	0.712
Item 2	0.435	0.714
Item 3	0.396	0.716
Item 4	0.237	0.732
Item 5	0.466	0.709
Item 6	0.302	0.725
Item 7	0.237	0.731
Item 8	0.433	0.713
Item 9	0.271	0.728
Item 10	0.161	0.738
Item 12	0.366	0.719
Item 13	0.100	0.744
Item 14	0.402	0.719
Item 15	0.173	0.737
Item 16	0.523	0.705
Item 17	0.347	0.721
Item 18	0.211	0.733

For the temporal stability of Turkish AAQ-SA was performed test-retest reliability analysis three weeks after the initial survey with 26 patient randomly selected. The test-retest correlation coefficient was calculated as r=0.830 (n=26; p<0.001). Besides, a t-test was conducted to compare the mean score between three weeks interval application. There was no significant difference for values commitment (t=1.061, p=0.299) and defused acceptance (t=-0.830, p=0.414) at three weeks. Results indicated that Turkish AAQ-SA has showed a good temporal stability between the two assessments.

For item analysis was used the corrected item-total correlation method. Item-total correlation scores ranged between 0.100 (item 13) and 0.523 (item 16) as shown in Table 3.

Criterion Validity

For assessing the criterion related validity was used concurrent validity [41]. The relationships between Self Concealment Scale (SCS), Addiction Profile Index (BAPI), Beck Depression Inventory (BDI), Internalized Stigma of Mental Illness Scale (ISMIS), Multidimensional Scale of Perceived Social Support (MSPSS), Rosenberg Self-Esteem Scale (RSES) with AAQ-SA (Table 4). In addition, the AAQ-SA scores were compared according to the severity of addiction and results indicated significant difference (Table 5).

Table 4. Concurrent validity between Turkish AAQ-SA with other scales (n=191)

	Values commitment r	Defused acceptance r	Full scale r
Self Concealment Scale	-0.140**	-0.229**	-0.245**
Rosenberg Self-Esteem Scale	-0.111**	-0.200*	-0.232**
Internalized Stigma of Mental Illness Scale	-0.177*	-0.437**	-0.453**
Multidimensional Scale of Perceived Social Support	0.154*	-0.111	0.184*
Beck Depression Inventory	-0.134*	-0.153*	-0.216**
Addiction Profile Index	-0.182**	-0.392**	-0.402**

*p<0.05; **p<0.01

Table 5. Comparisons of addiction severity to AAQ-SA mean scores

Addiction severity		AAQ-SA mean scores	Bonferroni	p
Low	(BAPI<12)	61.01	Low-medium	**<0,000**
Moderate	(BAPI:12-14)	52.45	Medium-high	0,049
High	(BAPI>14)	48.84	Low-high	**<0,000**

Note: Bonferroni correction on Kruskal Wallis test was used for multiple comparisons. It is seen that the low level is separated from the others when compared to Bonferroni Correction Table (0.05 / 3 = 0.0167).

DISCUSSION

In this study, it was aimed to examine the Turkish adaptation, validity and reliability analysis of the AAQ-SA, which was developed by Jason B. Luoma to measure the

level of psychological flexibility concerning specifically substance use related thoughts, feelings, and urges (19). Initially, Exploratory Factor Analysis (EFA) was performed. As a result of EFA with varimax rotation obtained two factors but different from the original scale item 12 was loaded on the second factor, and 18 was not loaded on any factors. To test the new two-factor model was performed an initial confirmatory factor analysis (CFA). When item 18 was placed on the defused acceptance subscale as in the original, it was compatible with the model. Also, it was determined that the 18-item version of Turkish AAQ-SA did not show adequate compliance according to the fit indices. Therefore, it was decided to remove item 11 (If I promised to do something, I'll do it, even if I later don't feel like it) from the model due to the low regression weights ($p > 0.05$). Following the removal of item 11, it was determined that the final corrected goodness-of-fit indices of a revised model with 17 items were found to be better.

Besides, it is considerable that, as a result of both CFA and EFA, item 12 was loaded on 'defused acceptance' subscale different from the original scale. Considering the content of item 12 ("Having some worries about substance use will not prevent me from living a fulfilling life"), it has seemed that emphasis both on value-oriented behaviors and on the attitudes that provide resistance towards the desired life, concerning internal experiences, such as anxiety. When unwanted inner experiences are decisive rather than impressive on one's behavior and presence of attitudes towards avoiding them indicate psychological inflexibility. Defused acceptance subscale assesses the weakness of these skills of reducing psychological inflexibility. Considering which are mentioned above, it is seen to be understandable that item 12 was located on defused acceptance subscale because emphasizing the concerns about substance use, rather than value-oriented behaviors.

In contrast to the exploratory factor analysis, CFA allows the detection of measurement errors caused by item similarities, content overlaps, demand characteristics, intricacy and methodological effects [42]. In our study, we found two correlated measurement errors mentioned specified by CFA. Similarly worded items as 'recovery' and overlapping of content which emphasize the existence of negative situations in the recovery process, being located on successive may explain the high correlation level and first method effect between items 9 and 10. Further, both items 17 and 18 focus on worrying about craving and the desire to use a substance, have similar contents and this similarity may explain the high level of correlation. After correcting the measurement errors, the final corrected goodness-of-fit indices of a revised model with 17 items were found to be acceptable. With these findings, we can say that the Turkish AAQ-SA shows an acceptable factorization structure in our study. Further analyses were carried out on 17 items.

Moreover, concurrent validity was tested with BAPI, SCS, BDI, MSPSS, ISMIS, and RSES. The relationships between Turkish AAQ-SA and other scales were significantly correlated in the expected direction. The highest correlation with full scale was found with the internalized stigma of mental illness scale ($r = -.453^{**}$). It is known that the people with alcohol and substance addiction are labeled as negative judgments such as low morality, personality weakness and crime tendency by society resulting in self-stigmatization [43]. Similar to other studies in the literature there was a significant negative correlation between the level of stigmatization and psychological flexibility in our study [8,44]. Likewise, it is expected that the use of a substance which is an approved or unaccepted behavior in the community may affect self-esteem and therefore self-esteem may be low in substance addicts [9]. Examining the correlations with addiction properties, the AAQ-SA scores were significantly different compared according to the severity of addiction. The results confirm the hypothesis that those with more severe and persistent addiction would score lower on the AAQ-SA, as substance use is considered to reflect a form of experiential avoidance [45]. Relationships with depression, social support, and self-concealment were also at a low label correlated.

The internal reliability coefficients of the Turkish AAQ-SA were satisfactory, the Cronbach alpha coefficient of the 17-item final version was 0.736 and for the subscales were 0.700-0.766. Test-retest reliability analysis at three weeks showed good temporal stability [46].

As a result of item-total correlation analysis were found that item-total correlations of items 10, 13 and 15 to be less than 0.20. In the literature, the cut-off values vary for the correlation of item-total analysis, some authors have stated that this value should be at least 0.20 [47]. In several studies, total item correlation serves as a criterion for initial assessment and purification, but for very small values, before removing from the scale; it is recommended to decide the importance of the item, checking how the scale will be modified if the item is deleted [46]. When these items reviewed, it was seen that their factors were loaded of medium size ($r=0.693$ for the item 10; $r=0.502$ for the item 13 and $r=0.369$ for the item 15) [40], they showed high regression weights in the CFA model, strengthened the meaning integrity of the factor on which they are, and provided a conceptually vital dimension to the scale. Therefore, it was considered they should not be excluded from the scale although the correlations of these items with the item-sum were not adequate.

Limitations of the present study are that the sample was consisted of a limited age and mostly the men. There is a need for future studies of homogeneous gender distribution and wider age range among substance use disorders patients.

In conclusion, our findings suggest that the Turkish version of the 17-item (item 11 removed) of AAQ-SA could be used as a satisfactory reliable and valid scale. In our study, we tried to make a scale that would contribute to the treatment goals in the psychosocial treatment of addiction. We think that Turkish AAQ-SA may provide useful information about processes of substance abuse treatment

and guide modifications to ongoing treatment strategies.

Declaration of interest: The authors reported no conflicts of interest related to this article.

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