ORIGINAL ARTICLE

Psychiatry and Clinical Psychopharmacology 2023;33(3):156-162
DOI:10.5152/pcp.2023.23671

Risk of Relapse Assessment Scale for Metamphetamine Abusers: Reliability and Validity Study of the Turkish Version

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ABSTRACT

Background: This study aims to investigate the validity and reliability of the Turkish adaptation of the 16-item Risk of Relapse Assessment Scale (RRAS) for methamphetamine abusers.

Methods: A total of 160 patients diagnosed with methamphetamine use disorder were included in this study to evaluate the validity and reliability of the scale. The comparison of the relationship between the Risk of Relapse Assessment Scale, the Substance Craving Scale, and the Relapse Prediction Scale was also carried out. The validity of the Risk of Relapse Assessment Scale was examined in the first step by exploratory factor analysis. The suitability of the data for exploratory factor analysis was evaluated by Kaiser–Meyer–Olkin test and Barlett's test. Cronbach's *a* coefficient and corrected item-total correlation value were used to test the reliability of the scale. The validity results of Risk of Relapse Assessment Scale were tested by confirmatory factor analysis. The significance level was set at $P < .05$ for all analyses.

Results: Considering the examination of the internal consistency values of the Risk of Relapse Assessment Scale, Cronbach's *a* value was detected to be 0.90, and Cronbach's *a* value of the subscales ranged from 0.72 to 0.90. The study determined that the goodness of fit values for RRAS were $x^2/df = 2.13$, $P < .001$, goodness of fit index = 0.88, comparative fit index = 0.92, normed fit index = 0.86, Trucker–Lewis index = 0.90, root mean square error of approximation = 0.08, and standardized root mean squared residual = 0.06.

Conclusion: Our findings demonstrate that Risk of Relapse Assessment Scale is a valid and reliable measurement tool for assessing the risk of methamphetamine relapse in Turkish.

ARTICLE HISTORY

Received: March 14, 2023
Accepted: June 10, 2023
Publication Date: August 25, 2023

INTRODUCTION

Methamphetamine (MA) is a synthetic substance derived from amphetamines. It has a longer half-life than amphetamine and is highly addictive due to its powerful psychostimulant effect.[1,2] According to the United Nations Office on Drug and Crime reports, the worldwide prevalence of amphetamine derivatives in 2020 is 0.6%. The USA have the highest prevalence rate at 2.30%, with North America having the highest prevalence rate at 3.87%.[3] The Turkish Monitoring Center for Drugs and Drug Addiction reported that 25.6% of substance users applying to treatment centers in Turkey in 2021 used MA, compared to 15.3% in the previous year. The report also indicated that 46.3% of the 270 deaths related to substance use in 2021 were caused by MA, and 28.1% were caused by heroin. The use of MA and the mortality rate associated with it have been increasing among substance users in Turkey. Therefore, the use of MA has become a significant public health issue.[4]

Methamphetamine exposure is known to lead to serious psychiatric disorders.[5] In individuals with methamphetamine use disorder (MUD), neuroinflammation and resulting treatment-resistant psychosis, neurodegeneration, and impaired cognitive functions are observed.[6,7] Moreover, individuals with MUD often have comorbid mood disorders, psychotic disorders, and anxiety disorders.[8] The risk of aggression and suicide is also significantly increased in MA users.[9]

Relapse in addiction refers to returning to substance use after a period of withdrawal. Craving and relapse rates are high among MA addicts.[10] In a study, 61% of patients

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Cite this article as: Turan Ç, Budak E, Şenormancı G, et al. Risk of relapse assessment scale for metamphetamine abusers: Reliability and validity study of the Turkish version. *Psychiatry Clin Psychopharmacol*. 2023;33(3):156-162.

treated for substance use relapsed within the first year, and half of these cases relapsed within the first 6 months.[11] While the withdrawal period for MA users lasts at least 5 weeks, users are particularly vulnerable to relapse during days 7-14 of withdrawal.[12] Due to the high relapse rates during the abstinence periods of MA, the continuity of the treatment cannot be ensured. As a result, the morbidity and mortality of patients exposed to the toxic effects of MA increase.[9,11]

The use of MA is an increasingly significant health problem worldwide. However, the number of measurement tools evaluating cases with MUD is limited. In China, Xu et al[13] developed the Risk of Relapse Assessment Scale (RRAS) for MA abusers by working with 438 voluntary MA users to determine the risk of relapse after their compulsory detoxifications. Xu et al[13] stated that the theoretical framework of the MA relapse risk should be better understood in order to prevent relapse in individuals with MUD and that they developed this measurement tool since they would be more successful in the treatment of cases using MUD. As a result of the research, the Cronbach alpha values of the RRAS were evaluated to be in the range of 0.71 to 0.88, and the measurement tool was a valid and reliable measurement tool consisting of 3 factors.

The RRAS is a short and practical measurement tool developed as a result of theoretical research that defines the relapse risk specific to MA use. The Turkish Relapse Prediction Scale (RPS) does not include an assessment specific to MA use. For instance, RPS[14] can be used to assess the craving process of any substance such as alcohol, sedatives, or stimulants. Methamphetamine use disorder is a common psychiatric problem in Turkey and the prevalence of MA use is increasing.[4] In addition, there is no measurement tool developed or tested for validity and reliability in Turkey to assess the risk of relapse during the withdrawal periods of MUD patients. The aim of this study is to investigate the validity and reliability of the Turkish adaptation of the RRAS developed by Xu et al.[13]

MAIN POINTS

- The use of methamphetamine (MA) is an increasingly significant health problem worldwide.
- Due to the high relapse rates during the abstinence periods of MA, the continuity of the treatment cannot be ensured. As a result, the morbidity and mortality of patients exposed to the toxic effects of MA increase
- Our findings demonstrate that the Risk of Relapse Assessment Scale (RRAS) is a valid and reliable measurement tool for assessing the risk of methamphetamine relapse in Turkey. (Cronbach's α=0.90, Cronbach's α value of the subscales= 0.72-0.90, x^2/df =2.13, P < .001, goodness of fit index=0.88, comparative fit index=0.92, NFI=0.86, Trucker-Lewis index=0.90, root mean square error of approximation=0.08, and SRMR=0.06).
- The RRAS can be an important measurement tool to evaluate and prevent early relapse in MA abusers.

MATERIAL AND METHODS

Study Sample and Procedure

This study was conducted between February 15, 2022, and December 15, 2022, in Psychiatry Clinic of Bursa Yüksek İhtisas Training and Research Hospital. The study group consisted of 160 male participants, aged 18-60, who were diagnosed with MUD according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria, and who were literate. Male cases were included in the study to control for the limited number of participants and the confounding effect of gender.

Exclusion criteria were as follows: (i) refusal to participate in the study, (ii) cognitive impairment, (iii) psychotic disorder due to MA use, (iv) severe mental and physical illness, and (v) mental retardation. The data of 26 cases showing symptoms of psychotic disorder and 6 cases with missing measurements were excluded from the study at the beginning of the study. In the study, cases diagnosed with MUD were evaluated by clinical interview, and cases with active psychotic symptoms according to DSM-5 criteria were excluded from the study from the beginning. Moreover, these excluded cases were referred to inpatient psychiatry clinics other than Alcohol and Drug Addiction Research, Treatment and Education Center for treatment. The illicit drug use (MA) of the patients was confirmed by measuring the urine samples with the Enzyme multiplied immunoassay technique method using a Siemens Advia 1800 chemistry analyzer. Urine samples were taken from the patients before detoxification and studied without waiting. The scales were carried out 2 weeks after the physiological symptoms of withdrawal disappeared during the detoxification period of the hospitalized patients. All participants reviewed the informed consent form and provided written consent. This study was designed in accordance with the 2013 Brazil version of the Helsinki Declaration and was approved by the Ethics Committee of Bursa Yüksek İhtisas Training and Research Hospital (2011-KAEK-25 2022/02-04).

The Substance Craving Scale (SCS) and the RPS were conducted to compare their relationship with RRAS. Permission was obtained from the original author of the scale, by e-mail for the use of the original scale in this study.

The 16-item RRAS for MA-abusers, developed by Xu et al,[13] was translated into Turkish by 3 psychiatrists and a clinical psychologist. An independent group formed a common text by reviewing 3 separate translations. This translation was then compared with the original by linguists. After eligibility was ensured, the scale was used in the study.

To evaluate the validity and reliability of the scale, a universe of at least 10 individuals was calculated for each item in the scale. A questionnaire form was administered to record the patients' substance use profile, questioning

whether they were in the process of quitting the substance or whether they had an active desire for the substance.

Assessment Tools

Sociodemographic Data Form

This form was created by the researchers to determine the general characteristics of the sample. The participants' demographic characteristics, past illnesses, and substance use history-related characteristics were evaluated in this form.

Risk of Relapse Assessment Scale for Methamphetamine Abusers

The RRAS was developed by Xu et al[13] in China to determine the relapse risk of 438 voluntary MA-dependent patients after their mandatory detoxification. The scale is a self-reported Likert-type scale consisting of 16 questions, with each question being scored between 1 and 5. Participants evaluate the questions by giving scores between 1 (totally disagree) and 5 (totally agree). The scale consists of 3 subscales: craving for MA, social recognition, and attitudes toward MA. The Cronbach's alpha value of the scale was found to be 0.92 for the total scale and between 0.71 and 0.88 for the subscales. With these results, RRAS was reported to be a valid and reliable scale to evaluate the probability of relapse among MA users in China.[13] Reverse-scored items were rearranged in the Turkish translation of the scale. High scores on the scale and all of its subscales indicate an increased risk of relapse.

Substance Craving Scale

The Penn Alcohol Craving Scale, consisting of 5 items on a 7-point Likert-type scale, was developed by Flannery et al.[15] Each item on the scale is evaluated between 0 and 6 points. The validity and reliability study of the Turkish adaptation of the scale for substance-dependent individuals was conducted by Evren et al.[16] In the original study, Cronbach's alpha coefficient for the scale was 0.84. For the Turkish adaptation study, Cronbach's alpha coefficient was calculated as 0.82. The corrected item-total correlation values for each item were between 0.75 and 0.82.

Relapse Prediction Scale

The scale was developed by Wright et al[17] and adapted into Turkish by Türkçapar for use in the evaluation of dependent individuals in the Turkish population.[14] The scale consists of 2 subscales, Desire and Probability, questioning the degree and probability of substance use desire in certain situations. It is a self-reported, Likert-type scale consisting of 50 items rated on a scale of 0-4. Participants give scores between 0 (none) and 4 (very strong) to the items. High scores indicate an increased risk of relapse. Cronbach's alpha values were not included in the Turkish adaptation of the RPS. Cronbach's alpha values were, therefore, calculated for this scale. In the present study, Cronbach's alpha values for the Desire and Probability subscales were found to be 0.96 and 0.97, respectively.

Statistical Analysis

Due to the scale's item count being 16, it was decided that at least 160 participants should be included in the study to ensure the validity and reliability of the measurement tool. The validity of the RRAS was examined using exploratory factor analysis (EFA) in the first step of the study. Direct Oblimin was used as the rotation method in EFA. The suitability of the data for EFA was tested using the Kaiser-Meyer-Olkin (KMO) test and Barlett's test. Cronbach's α coefficient and corrected item-total correlation value were used to test the reliability of the scale. The validity results of RRAS were tested using confirmatory factor analysis (CFA). In examining the goodness of fit values of the first-level CFA, chi-squared statistic divided by the degrees of freedom, root mean square error of approximation (RMSEA), comparative fit index (CFI), goodness of fit index (GFI), adjustment goodness of fit index (AGFI), and Trucker–Lewis index (TLI) values were used. Besides, the relationship between RRAS and other psychometric measurements was examined using Pearson correlation coefficient. The ability of RRAS to predict PRS and SCS scores was examined by simple linear regression analysis. The conformity of the data to the normal distribution was evaluated using the Shapiro–Wilk and Kolmogorov–Smirnov, kurtosis, and skewness tests. The RRAS total score, SCS total score, and RPS total score were found to be normally distributed. Furthermore, the RRAS item scores were evaluated not to be normally distributed, and the skewness (2) and kurtosis (7) values were acceptable for the EFA analysis. A significance level of $P < .05$ was accepted for all analyses. Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM SPSS Corp.; Armonk, NY, USA) software will be used for the analyses. Besides, CFA results were evaluated with Analysis of Moment Structuressoftware compatible with SPSS 26.0 program.

RESULTS

The study found that the mean age of the cases evaluated was 30.06 ± 7.21, the mean onset age of MA was 25.19 ± 7.45, and the mean onset age of substance use was 20.58 ± 7.45. Of the cases evaluated, 50% (n = 80) were single, 38.1% (n = 61) were married, and 11.9% (n = 19) were divorced. Of those with MUD, 41.3% (n = 66) were unemployed, 13.8% (n = 22) had completed primary school, 40.6% (n = 65) had completed middle school, 39.4% (n = 63) had completed high school, and 6.3% (n = 10) had completed university education. Moreover, 18.8% (n = 30) of the cases evaluated were found to attempted suicide in the past, and 11.9% (n = 19) had a physical illness. Furthermore, 16.3% (n = 26)

of the cases had been treated in a psychiatric clinic in the past, 66.3% (n = 106) had used another substance before using MA, 1.9% (n = 3) had bipolar affective disorder, 2.5% (n = 4) had anxiety disorders, 0.6% (n = 1) had depression, and 1.9% (n = 3) had a history of psychotic attack.

The KMO value of RRAS was found to be 0.88, and Barlett's test result was statistically significant (x^2 = 1077.46, P < .001). In the first step of the model, it was found that the scale consisted of 3 factors and 2 items were excluded from the study due to their similar loading on multiple factors. According to EFA, the measurement tool consisted of 3 sub-factors, with the first factor explaining 43.49% of the total variance, the second factor explaining 10.95%, and the third factor explaining 8.53% of the total variance, while RRAS explained 62.97% of the total variance. The Cronbach's *a* value of RRAS was found to be 0.90, and the Cronbach's *a* value of the sub-scales ranged from 0.72 to 0.90. The common variance values of RRAS items ranged from 0.440 to 0.799, after the rotation, items with a factor load (Direct Oblimin) ranged from 0.588 to 0.929, and the item total correlation values ranged from 0.288 to 0.756 (Table 1).

In Pearson correlation coefficient, a statistically significant positive correlation (P < .001) was found between RRAS total scores and subscale scores in the range of 0.673-0.938. Another statistically significant positive correlation (P < .001) was also found between subscale scores of RRAS in the range of 0.414-0.541. Pearson correlation coefficient showed a statistically significant negative correlation (P < .001) between RRAS total scores and scores of RPS—Desire (r = 0.714), RPS—Probability (r = 0.685), and SCS (r = 0.596). Besides, a statistically significant negative correlation was found (P < .001) between the first factor subscale scores of RRAS and scores of RPS—Desire (r = 0.746), RPS—Probability (r = 0.722), and SCS (r = 0.614). Furthermore, there was a statistically significant negative correlation between the second factor subscale scores of RRAS and scores of RPS—Desire (r = 0.402), RPS—Probability (r = 0.361), and SCS (r = 0.377) (P < .001). Lastly, the third-factor subscale scores of RRAS were significantly negatively correlated with scores of RPS—Desire (r = 0.454), RPS—Probability (r = 0.461), and SCS (r = 0.329) (P < .001) (Table 2).

In the study, it was found that the chi-square test of the CFA model of RRAS was statistically significant (x^2/df = 2.13, P < .001). The GFI value of RRAS was found to be 0.88, AGFI value 0.85, CFI value 0.92, NFI value 0.86, TLI value 0.90, RMSEA value 0.08, and SRMR value 0.06 (Table 3). The factor load results of the confirmed factors in the CFA are shown in Figure 1.

According to linear regression analysis, desire subscale scores (R^2 = 0.51, P < .001, B = 2.61, CI: 2.21-3.02), probability subscale scores (R^2 = 0.47, P < .001, B = 2.56, CI: 2.13-2.99), and SCS scores (R^2 = 0.36, P < .001, B = 0.37, CI: 0.29-0.45) were found to be explained by RRAS total scores.

DISCUSSION

The aim of the study is to adapt the RRAS to Turkish and to test the reliability and validity of the measurement tool. The study found that RRAS was suitable for EFA analysis, adequately explained the total variance, and had a high Cronbach *a* value. According to EFA, RRAS consists of 3 sub-factors, and RRAS total and sub-scale scores show a

Table 1. RRAS Validity and Reliability Results

	Mean	SD	Communalities	Factor Loading Value Before the Rotation	Factor Loading Value After the Rotation	Item-Total Correlation	Cronbach's *a* When the Item is Deleted
s1	3.63	1.39	0.599	0.753	0.677	0.524	0.883
s3	3.58	1.34	0.767	0.743	0.932	0.715	0.884
s4	3.50	1.37	0.799	0.810	0.912	0.756	0.880
s5	3.51	1.42	0.761	0.758	0.929	0.671	0.883
s6	3.29	1.47	0.440	0.653	0.543	0.406	0.888
s7	3.69	1.43	0.641	0.795	0.629	0.641	0.880
s8	4.10	1.25	0.559	0.742	0.597	0.521	0.884
s9	4.25	1.10	0.457	0.520	0.709	0.288	0.896
s10	3.71	1.44	0.627	0.558	0.768	0.401	0.891
s11	3.66	1.43	0.539	0.632	0.588	0.444	0.888
s12	3.96	1.19	0.653	0.597	0.796	0.440	0.892
s14	4.62	0.74	0.570	0.576	0.662	0.385	0.892
s15	4.58	0.80	0.672	0.689	0.875	0.310	0.895
s16	4.55	0.87	0.733	0.674	0.755	0.526	0.889

Kaiser-Meyer-Olkin, 0.88; Barlett's test (x^2 = 1077.46, P < .001); Factor 1: explained variance = 43.49%, Cronbach's *a* = 0.90; eigenvalues value = 6.09. Factor 2: explained variance = 10.95%, Cronbach's *a* = 0.74, eigenvalues value = 1.54; Factor 3: explained variance = 8.53%, Cronbach's *a* = 0.72, eigenvalues value = 1.19; Total: explained variance = 62.97%, Cronbach's *a* = 0.90.

Table 2. Relationship Between RRAS-MA and RPS and SCS Scores

		RRAS-MA	F1	F2	F3	RPS—Desire	RPS—Probability
F1	*r*	0.938					
	P	<.001					
F2	*r*	0.757	0.516				
	P	<.001	<.001				
F3	*r*	0.673	0.541	0.414			
	P	<.001	<.001	<.001			
RPS—Desire	*r*	0.714	0.746	0.402	0.454		
	P	<.001	<.001	<.001	<.001		
RPS—Probability	*r*	0.685	0.722	0.361	0.461	0.949	
	P	<.001	<.001	<.001	<.001	<.001	
SCS	*r*	0.596	0.614	0.377	0.329	0.575	0.539
	P	<.001	<.001	<.001	<.001	<.001	<.001

Pearson correlation coefficient; F1, craving for methamphetamine; F2, social recognition; F3, attitude toward methamphetamine; RRAS-MA, Risk of Relapse Assessment Scale for methamphetamine; RPS, Relapse Prediction Scale; SCS, Substance Craving Scale.

Table 3. CFA Results

	Results
CMIN (x^2 = 157.42, *df* = 74)	*P* < .001
CMIN/*df*	2.13
AGFI	0.85
GFI	0.88
CFI	0.92
NFI-TLI	0.86-0.90
RMSEA	0.08
SRMR	0.06

AGFI, adjustment goodness of fit index; CFA, confirmatory factor analysis; CFI, comparative fit index; CMIN, chi-squared statistic; *df*, degrees of freedom, GFI, goodness of fit index; NFI, normed fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean squared residual; TLI, Trucker-Lewis index.

significant correlation with measurement tools assessing similar properties. Based on CFA results, RRAS was concluded to have acceptable goodness-of-fit values.

A KMO value of above 0.80 and a significant Bartlett's test indicate that the measurement tool is well-suited for factor analysis.[18] The RRAS explains 62.97% of the total variance. Explaining more than 50% of the total variance is known to indicate that the property to be evaluated is measured correctly, and explaining more than 5% of the total variance in sub-factors is important.[19] It can be, therefore, said that RRAS measures relapse risk at a good level in MA use. In the study conducted by Xu et al,[13] the scale was found to explain 50.6% of the total variance.

In the study, when the factor structure of RRAS was examined according to EFA, Items 2 and 13 were evaluated

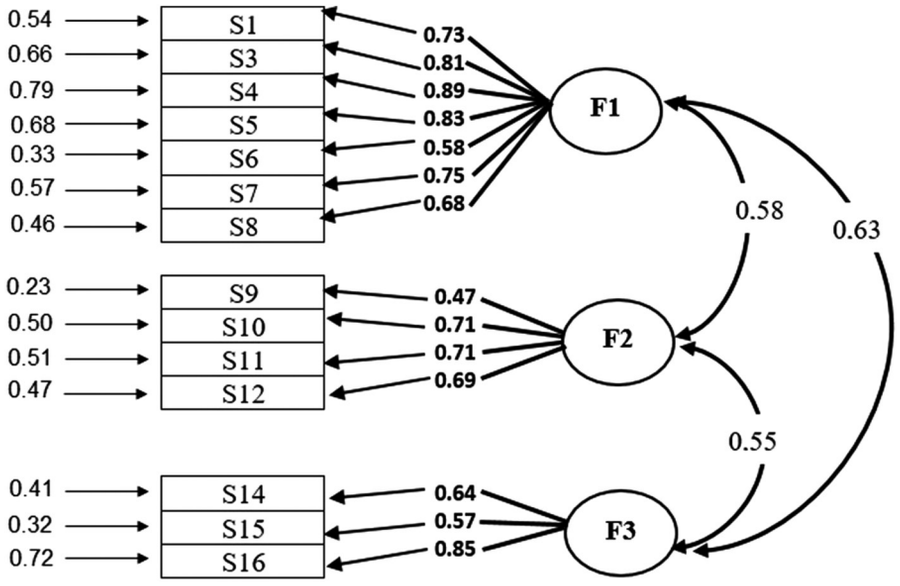

Figure 1. CFA results. CFA, confirmatory factor analysis; F1, craving for methamphetamine; F2, social recognition; F3, attitude toward methamphetamine.

to load onto multiple factors. Therefore, these 2 items ("I prefer using drugs when I am happy" and "Drugs help me to get rid of trouble") were removed from the measurement tool, and the analyses continued. These results demonstrate the importance of adapting measurement tools to different cultures. It should be kept in mind that these 2 items, which are compatible with EFA and CFA in the study by Xu et al,[13] do not represent a single factor in the Turkish adaptation. Furthermore, RRAS is a newly developed measurement tool, and there are limited studies in the literature.

The researchers stated that a valid and reliable measurement tool should have factor load values above 0.50 and item-total correlation coefficients above 0.30.[18-20] Therefore, it was decided that the item-total correlation in 1 item of the RRAS was lower than expected, and besides, it was not necessary to exclude it from the measurement tool as the factor load value was sufficient.

In the study by Xu et al,[13], Cronbach's *a* value of RRAS was found to be in the range of 0.71-0.88. Researchers have reported that a reliable measurement tool should have a Cronbach's *a* value above 0.70.[21,22] Thus, Cronbach's *a* value obtained in the research can be said to be sufficient, and a measurement tool is a reliable tool for assessing the risk of relapse in MA use according to RRAS.

In the study by Xu et al,[13] it was determined that RRAS consists of 3 factors, and when the factor items were examined, the factors were named craving for MA, social recognition, and attitude toward MA. In the Turkish adaptation of the scale, the same factor naming method was used due to the similarity of the factor structures obtained to the original study. Therefore, it was reconfirmed that the psychological structure that includes substance relapse risk associated with overconsumption of the substance, social recognition, and attitudes toward MA exists in individuals who use MA. Therefore, it was reconfirmed that the risk of substance relapse in persons with MA use is a psychological construct that includes craving for MA, social recognition, and attitudes toward MA.

The RRAS is a measurement tool that predicts the risk of relapse in substance use, while SCS evaluates substance cravings.[15,17] The study found that RRAS and its subscales showed correlations with RPS and SCS ranging from 0.33 to 0.76. A correlation coefficient in the range of 0.30-0.50 indicates a low level of correlation, 0.50-0.70 indicates a moderate level, and above 0.70 indicates a high level of relationship.[23] Therefore, it can be said that RRAS shows correlations with measurement tools assessing similar properties at different levels, and these results support the validity and reliability of the measurement tool. The RRAS is a measurement tool developed specifically for individuals with MUD.[13] Besides, RPS[17] and SCS[15] are used to evaluate individuals who abuse any substance. The psychopharmacological treatments of individuals who abuse sedative or stimulant substances are different, and the craving process differs according to the characteristics of the substances used. Therefore, different correlation coefficients obtained from the relationship between RRAS and RPS and SCS in this study may be related to this situation. Examining the relationships of RRAS with other measurement tools in different and larger samples will, thus, contribute to the literature.

In CFA, it is known that goodness of fit values (RMSEA < 0.08, x^2/df < 2.5, GFI > 0.90, CFI-NFI-TLI > 0.95) and acceptable fit values (RMSEA ≤ 0.08, x^2/df ≤ 5, GFI ≥ 0.80, CFI ≥ 0.85, NFI-TLI ≥ 0.85)[18,24,25] vary according to the number of observable variables, the number of participants evaluated in the research, and the good factor load values.[18,24,25] In the Turkish adaptation of RRAS, the validity and reliability of a 14-item measurement tool were examined on 160 participants using EFA. In the study by Xu et al,[13] the goodness of fit values of RRAS (P < .001, GFI = 0.92, CFI = 0.92, NFI = 0.86, TLI = 0.94, RMSEA = 0.05, and SRMR = 0.06) were observed to be better than those obtained from this study. Hence, it can be said that some of the goodness of fit values of RRAS are not at a good level, but they are acceptable.

The male MUD cases receiving inpatient detoxification treatment were evaluated in the study. The results of this study can be, thus, generalized to male cases seeking treatment in general. It was not possible to control the doses of MA used by the MUD cases evaluated in the study. The region where the study was conducted is a large metropolis, and individuals who obtained drugs from different regions were analyzed in the study. For this reason, it may be another limitation of the study.

Two items were excluded from the study due to common factor load (<0.10) values. This shows the importance of adapting measurement tools to different cultures. Factorization is a significant step for the validity of a measurement tool, and the fact that the items that make up the scale are included in the appropriate factors indicates the accuracy of the feature desiring to be measured.[18,19] Hence, the results obtained from this study were found to differ from the study of Xu et al.[13] Besides, the items of the 3 factors obtained were found in similar sub-dimensions among these 2 studies. The results obtained from the EFA in the present study can be stated to show a similar performance to the study of Xu et al,[13] whereas the results obtained from the CFA show a slightly lower performance compared to the original validity and reliability study. Furthermore, it should be kept in mind that since RRAS is a new measurement tool, the relevant literature is limited, so the results of comparisons related to different adaptation studies cannot be adequately discussed.

The RRAS is a newly developed measurement tool and it is one of the first studies to adapt this measurement tool to a different culture. Considering the literature examination, there is no study in which the measurement tool was adapted

to a different culture. In this study, the EFA results of RRAS were found to be good and CFA results were found to be sufficient. Future validity studies will show more clearly how valid and reliable the RRAS measures craving in individuals with MUD in terms of the theoretical framework. Consequently, the RRAS can be counted as a valid and reliable measurement tool for assessing the risk of MA relapse and it can be used reliably in the evaluation of MUD cases in Turkey. The scale is a measurement tool consisting of 3 subscales: craving for MA, social recognition, and attitude toward MA, which measures the risk of MA relapse in MUD-diagnosed cases.

Ethics Committee Approval: This study was approved by Ethics Committee of University of Health Sciences Bursa Yüksek İhtisas Training and Research Hospital (Approval No: 2011-KAEK-25 2022/02-04, Date: February 09, 2022).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – Ç.T., E.B., Ö.Ş.; Design – Ç.T., E.B., S.Ü.; Supervision – Ç.T., C.E., S.Ü.; Resources – Ç.T., E.B.; Materials – Ç.T., E.A.Y., G.Ş.; Data Collection and/or Processing – Ç.T., E.A.Y.; Analysis and/or Interpretation – Ç.T., E.B., G.Ş.; Literature Search – Ç.T., E.B., G.Ş.; Writing – Ç.T., E.B., C.E.; Critical Review – C.E., S.Ü., Ö.Ş.

Acknowledgment: We thank psychologists Burcu Çavuşoğlu, Pakize Nur Tosun and Hilal Başat for their contributions to this study.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

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