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RESEARCH ARTICLE

Validation and psychometric evaluation of the Turkish version of the Reward Deficiency Syndrome Questionnaire (RDSQ-29)

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ABSTRACT

Objective: This study aimed to assess the validity and reliability of the Turkish version of the Reward Deficiency Syndrome Questionnaire (RDSQ-29), a scale designed to measure characteristics associated with reward deficiency syndrome, including activity, risk-seeking behavior, lack of sexual dysfunction, and social concerns.

Method: A total of 481 participants completed the Turkish version of the RDSQ-29 along with related psychological scales. Confirmatory Factor Analysis was conducted to evaluate the scale's factor structure. A bifactor model, comprising one general factor and four specific factors, was tested for suitability. Model fit was assessed using χ^2, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR) indices. Internal consistency was measured with Cronbach's alpha, and test-retest reliability was evaluated at a two-week interval. Pearson correlation analyses were performed for criterion validity.

Results: The bifactor model demonstrated an acceptable fit ($\chi^2(362)=1396.31$, $p<0.001$, RMSEA=0.077, CFI=0.916, TLI=0.906, SRMR=0.072). Factor loadings for the general factor ranged between 0.044 and 0.851, while subscale loadings varied. Although some items (RDSQ-1, RDSQ-2, RDSQ-23, and RDSQ-27) showed low loadings, they were retained following consultation with the original developers. The total scale showed strong internal consistency ($\alpha=0.920$), with subscale values ranging from 0.671 to 0.813. Test-retest reliability was high for the total score ($r=0.884$) and subscales ($r=0.717$ to 0.887). Significant correlations with impulsivity and anxiety supported the scale's criterion validity. Gender differences were found, with women scoring lower on the total scale and the Lack of Sexual Satisfaction subscale, while men scored higher on the Social Concern and Risk-Seeking Behavior subscales.

Conclusion: The findings indicate that the Turkish RDSQ-29 is a valid and reliable tool for assessing reward deficiency syndrome and related traits, supporting its use in both clinical and research contexts.

Keywords: Validity, reliability, Reward Deficiency Syndrome Questionnaire-29

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INTRODUCTION

Reward Deficiency Syndrome (RDS) is a neurobiological framework proposing that various psychiatric disorders may arise from dysfunctions within the brain's reward circuitry, particularly disturbances in dopaminergic signaling pathways. RDS is characterized by reduced reward responsiveness and is frequently associated with genetic variations, such as the A1 allele of the dopamine D2 receptor (DRD2) gene, which is linked to diminished dopamine receptor density and impaired signaling efficiency (1–3). This neurobiological vulnerability may predispose individuals to impulsive, compulsive, and addictive behaviors, including substance use disorders, obesity, and other maladaptive reward-seeking tendencies (4, 5).

Psychiatric models of RDS emphasize the combined influence of genetic predispositions and environmental factors on neurobiological responses to reward stimuli. Individuals with dopamine-related polymorphisms may be more likely to engage in compensatory behaviors when faced with stress or reduced reward sensitivity, increasing the risk for psychiatric complications such as anxiety, depression, and post-traumatic stress disorder (6, 7). Neuroimaging research corroborates these associations by demonstrating reduced activation in reward-related brain regions—particularly the ventral striatum—during reward-cue and reward-anticipation tasks among individuals showing RDS-related characteristics (8, 9).

The significance of RDS lies in its broad interconnections with several psychiatric disorders. Conditions such as addiction, attention deficit hyperactivity disorder (ADHD), and mood disorders share symptom profiles that reflect underlying disruptions in reward processing. For instance, individuals with ADHD frequently display reward-related deficits that parallel those attributed to RDS, linking impulsivity and reward-seeking behaviors to common neurobiological mechanisms (10, 11). These conceptual overlaps have contributed to the development of related constructs—such as anhedonia, reward sensitivity, hedonic dysregulation, and impulsivity—while RDS remains distinct in its explicit emphasis on genetic and neurobiological pathways underlying reward dysfunction (9, 12, 13).

Although RDS intersects with these constructs, important conceptual distinctions persist. Anhedonia, defined as a diminished ability to experience pleasure, is commonly measured with tools such as the Snaith-Hamilton Pleasure Scale (SHAPS) (14). Reward sensitivity refers to the intensity of an individual's response to reward cues and is typically assessed with Behavioral Activation System (BAS) scales (15). Hedonic dysregulation captures fluctuating patterns of reward experience associated with maladaptive behavior (16). Impulsivity, characterized by a tendency to act without forethought, is frequently measured using instruments such as the Barratt Impulsiveness Scale (BIS-11) (17). While these constructs describe important facets of reward-related functioning, RDS uniquely highlights specific neurogenetic mechanisms—particularly dopamine receptor anomalies—that differentiate it from broader affective and behavioral traits (9, 12, 13, 18). This distinct neurobiological foundation has necessitated the development of assessment instruments tailored specifically to RDS.

Despite its increasing presence in psychiatric research, RDS remains a theoretically debated construct. It is not recognized as a formal diagnostic category in major classification systems such as the Diagnostic and Statistical Manual of Mental Disorders (DSM) or the International Classification of Diseases (ICD), and its conceptual boundaries overlap with several related dimensions, including anhedonia, impulsivity, and general deficits in reward processing. Rather than representing an established clinical disorder, RDS is better conceptualized as a theoretical neurobehavioral model that seeks to explain a cluster of motivational, affective, and behavioral tendencies associated with dopaminergic dysfunction. Accordingly, the present study approaches RDS as a conceptual framework rather than a diagnostic entity, acknowledging the ongoing discourse regarding its definition, validity, and clinical applicability.

To directly assess RDS, instruments such as the Reward Deficiency Syndrome Questionnaire (RDSQ-29) have been developed, offering a standardized measure of behavioral, emotional, and cognitive manifestations related to reward deficiency. Unlike assessment tools that examine reward dysfunction indirectly through related constructs, the RDSQ-29 specifically targets the multidimensional symptomatology of RDS. Accurate identification of RDS through measures like the RDSQ-29 may enhance clinical practice by facilitating early detection of at-risk individuals, informing personalized treatment strategies, and improving outcomes in disorders characterized by impulsivity and addiction (19).

Currently, no Turkish adaptation of the RDSQ-29 or any equivalent scale exists to assess RDS in Turkiye. Conducting a Turkish validity and reliability study of the RDSQ-29 is therefore essential for advancing psychiatric research in the region, evaluating the cross-cultural applicability of the RDS framework, and contributing culturally informed evidence to the international literature. The present study aims to translate, culturally adapt, and evaluate the psychometric properties of the RDSQ-29 in Turkiye, demonstrating that the Turkish version is a valid and reliable instrument for assessing reward deficiency and associated psychiatric symptoms.

METHODS

Ethics Approval and Consent to Participate

First, the necessary permissions were obtained from the corresponding author of the original development study of the RDSQ-29. Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Harran University on 27.05.2024, with decision number (HRÜ/24.07.17). The principles of the Declaration of Helsinki were adhered to in this research. As part of the study, participants were asked to complete an informed consent form and the study scales online.

Sample and Procedure

This study was conducted between June and July 2024. The Sociodemographic Data Form developed by the clinician, along with the Brief Sensation Seeking Scale (BSSS-8), the Barratt Impulsiveness Scale–11 Short Form (BIS-11), and the Reward Deficiency Syndrome Questionnaire (RDSQ-29), were prepared electronically and administered to participants online via SurveyMonkey. For factor-analytic procedures in scale adaptation studies, a sample size between 100 and 200 participants, or approximately 10 participants per item, is generally recommended (20). Accordingly, the minimum required sample size for the present study was determined based on the 29 items of the RDSQ-29, yielding a target of at least 290 participants (29×10). The study ultimately included 481 participants, exceeding the minimum recommended sample size. This larger sample strengthened the statistical power of the analyses and enhanced the generalizability of the findings. To assess test–retest reliability, the same set of scales was re-administered to a reachable subsample of 153 participants two weeks after the initial administration. Inclusion criteria consisted of being between 18 and 65 years of age and having sufficient educational and cognitive capacity to read, understand, and appropriately complete the study scales. Exclusion criteria included being younger than 18 or older than 65 years of age and lacking the necessary educational or cognitive ability to comprehend and complete the assessment forms.

Translation Process

To minimize differences in conceptualization and expression during the language adaptation of the RDSQ-29, the back-translation method was employed. The RDSQ-29 was independently translated into Turkish by two psychiatry specialists who were blinded to each other's translations. These translations were reviewed by the research team, combined into a single translation, and then back-translated into English by two other psychiatry specialists who had not participated in the initial translation process. The back-translation was evaluated by the research team and compared with the original RDSQ-29; it was found to be consistent with the original, and no modifications were deemed necessary. The Turkish version of the RDSQ-29 was then administered as a pilot test to 20 individuals of different genders, ages, and socioeconomic backgrounds. The responses were analyzed by the research team. Consequently, the research team concluded that the final Turkish translation was appropriate.

Assessment Tools

Sociodemographic Data Form

This form includes questions about participants' gender, age, marital status, occupation, and educational status.

Reward Deficiency Syndrome Questionnaire-29 (RDSQ-29)

The Reward Deficiency Syndrome Questionnaire-29 (RDSQ-29) is a psychometric tool developed to assess Reward Deficiency Syndrome, a condition characterized by an individual's inability to derive satisfaction from normal, everyday activities and a tendency to seek out novel and potentially risky behaviors to compensate for this deficiency. The RDSQ-29 was developed by Kenneth Blum et al. (18) as part of research efforts to better understand and measure this syndrome (19). The RDSQ-29 was formulated by generating 72 initial items based on existing literature and theories related to RDS, which were then refined through expert reviews and statistical analyses to arrive at the final 29-item version. The questionnaire

measures various dimensions of RDS, such as lack of sexual satisfaction, activity levels, social concerns, and risk-seeking behavior. Each item is rated on a 4-point Likert scale, ranging from 1 (totally disagree) to 4 (totally agree). The overall score is computed as the mean of all 29 items, with specific subscale scores calculated similarly for designated item groups. This instrument provides a comprehensive measure of the behavioral tendencies associated with RDS, facilitating both clinical assessment and research on the syndrome.

Barratt Impulsiveness Scale-11-Short Form (BIS-11-Sf)

The Barratt Impulsiveness Scale-11-Short Form is a scale developed to measure individuals' impulsivity. It was adapted into Turkish by Tamam et al. (2013) (21), who conducted a validity and reliability study. The scale consists of 15 items rated on a 4-point Likert scale and includes three subscales: attentional impulsiveness, motor impulsiveness, and non-planning. When calculating the scale score, item scores are summed; higher total scores indicate greater levels of impulsivity.

Brief Sensation Seeking Scale-8 (BSSS-8)

The Brief Sensation Seeking Scale-8, developed by Hoyle et al., was adapted to Turkish culture by Çelik and Turan (22). The Turkish version of the scale consists of eight items rated on a 5-point Likert scale (1=strongly disagree, 5=strongly agree). It is unidimensional and does not contain any reverse-coded items. High scores on the scale indicate a high level of sensation seeking, while low scores indicate a low level of sensation seeking. In the study in which the scale was adapted into Turkish, the reliability coefficient was found to be 0.79.

Statistical Analysis

The statistical methods used in this study focused on evaluating the psychometric properties of the scale through analyses of structural validity, reliability, and criterion validity.

To test the factor structure of the scale, Confirmatory Factor Analysis (CFA) was conducted. CFA was performed using the Weighted Least Squares Mean and Variance Adjusted (WLSMV) estimator. WLSMV is recommended for categorical data, as it provides a refined approach using weighted least squares to improve standard error estimates and chi-square statistics. Model fit was evaluated using fit indices, including the chi-square test (χ^2), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Standardized Root Mean Square Residual (SRMR). An RMSEA value below 0.05 indicates a good fit, while a value below 0.08 suggests an acceptable fit. For CFI and TLI, values above 0.90 are considered acceptable, and values above 0.95 indicate an excellent fit. An SRMR value below 0.08 is also regarded as evidence of good model fit.

The model specified one general factor (F) and four specific factors (F1: Lack of sexual satisfaction, F2: Activity, F3: Social concern, F4: Risk-seeking behavior), and the validity of the bifactor structure was tested. While the general factor accounted for all items, the specific factors were linked to particular subdomains. Factor loadings were examined to assess the relationships between each item and its corresponding factor. Factor loadings of 0.30 and above were considered acceptable, while those of 0.50 and above were considered strong.

In a bifactor model, each item simultaneously loads onto a general factor and four specific factors. The general factor reflects the overarching construct of reward deficiency, capturing the shared variance across all items. The four specific group factors represent distinct subdomains that explain additional variance not accounted for by the general factor. In this framework, the specific factors are modeled as orthogonal to each other and to the general factor, allowing a clear examination of whether the total score primarily reflects a unified construct or whether the subscales contribute meaningful unique information. This approach is particularly appropriate for the RDSQ, as the scale was theoretically designed to measure a global reward deficiency dimension while also capturing more narrowly defined behavioral and emotional expressions of the construct. The bifactor structure therefore provides a more nuanced evaluation of the scale's multidimensional nature and the relative contribution of general versus domain-specific factors.

In the bifactor model used in this study, all items were specified to load onto the general factor, while only some items additionally loaded onto the specific group factors. As a result, certain items that appear without a loading under any specific factor in Figure 1 are not excluded from the analysis; instead, they contribute solely through their loading on the general factor. This indicates that such items primarily reflect the overarching reward deficiency construct rather than a distinct subdimension, which is consistent with the theoretical assumptions and analytic structure of bifactor modeling.

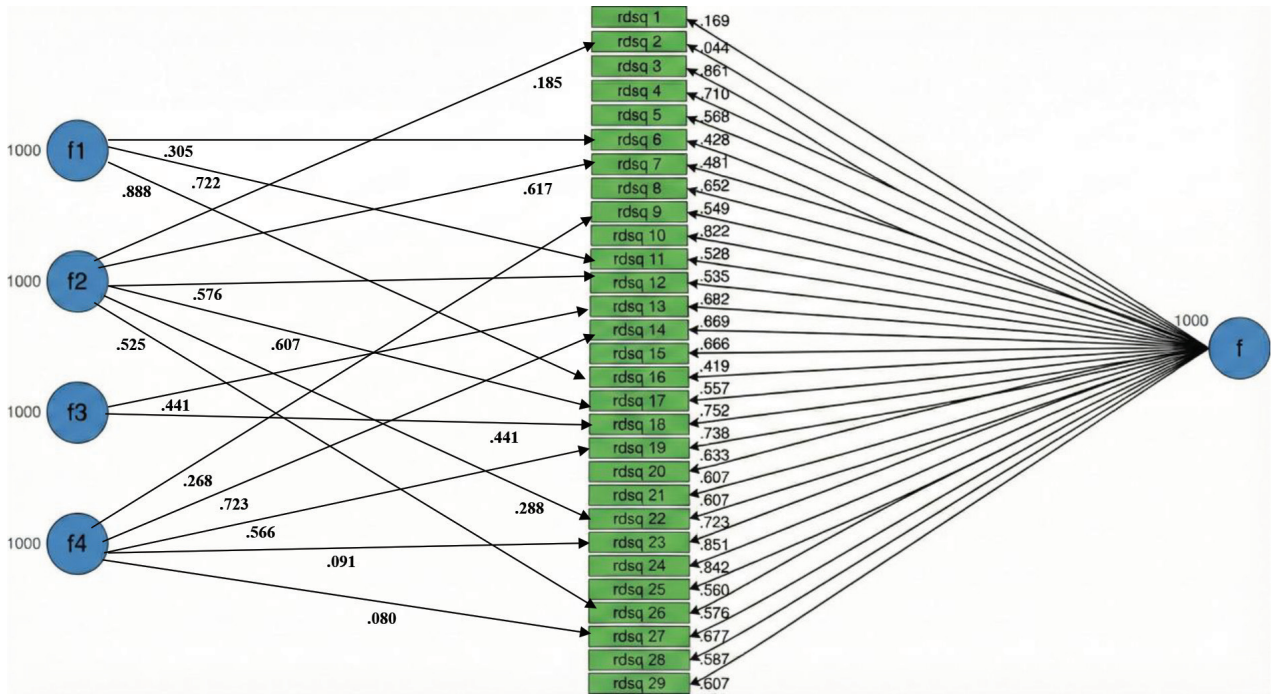

Figure 1. Confirmatory bifactor model of the Turkish Reward Deficiency Syndrome Questionnaire–29 (RDSQ-29) with standardized loadings.

The internal consistency of the scale was evaluated using Cronbach's alpha coefficient, which measures the consistency of items within a scale. Alpha values above 0.70 are deemed acceptable, values above 0.80 indicate good reliability, and values exceeding 0.90 suggest excellent internal consistency. Separate alpha coefficients were calculated for the total scale score and each subscale. Additionally, test-retest correlation was employed to assess the stability of the scale over time. The test-retest method involved administering the scale twice with a time interval between the two administrations, and correlation coefficients were calculated. A correlation coefficient of 0.70 or higher indicates that the scale demonstrates stability over time.

To assess the validity of the scale, Pearson correlation analysis was conducted within the scope of criterion-related validity. The Pearson correlation coefficient (r) was used to measure the linear relationship between two variables, with statistical significance levels (p-values) considered. Correlation analyses examined the relationships between the total scale score, subscale scores, and various psychometric variables (e.g., anxiety, impulsivity). Additionally, correlations between the scale scores and age were calculated to assess the scale's sensitivity to demographic variables.

To examine whether scale scores differed by gender, an independent-samples t-test was conducted. The independent-samples t-test is a parametric test used to compare the means of two independent groups. When the normality assumption was met, the t-test was employed to assess score differences between male and female participants. The significance level was set at $p<0.05$.

To ensure the applicability of all parametric tests, the assumption of normality was examined. The Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted to assess normality of the distribution. All statistical analyses were performed using Mplus 8.3 and IBM SPSS Statistics 26.0 software.

RESULTS

Descriptive Characteristics of the Sample

Descriptive analyses were first conducted to characterize the study sample. A total of 481 participants were included in the analysis. The mean age was 35.33±10.33 years. Of the participants, 64.6% were female, 34.9% were male, and 0.4% preferred not to disclose their gender. Regarding marital status, 52.6% of participants were single, 46.8% were married, and 0.6% were divorced. In terms of educational level, the majority of the sample had

Table 1: Correlations between impulsivity and sensation seeking levels and RDSQ-29 scores

	BIS-total	BIS-non planning	BIS-motor impulsiveness	BIS-attentional impulsiveness	BSSS-total	Age
RDSQ-29-Total						
r	0.336	0.207	0.393	0.262	0.664	-0.182
p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RDSQ-29-Lack of Sexual Satisfaction						
r	0.301	0.269	0.257	0.244	0.394	-0.052
p	<0.001	<0.001	<0.001	<0.001	<0.001	0.255
RDSQ-29-Activity						
r	0.083	-0.020	0.180	0.054	0.313	0.002
p	0.068	0.655	<0.001	0.234	<0.001	0.963
RDSQ-29-Social Concern						
r	0.335	0.270	0.330	0.260	0.448	-0.172
p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RDSQ-29- Risk-Seeking Behavior						
r	0.235	0.151	0.270	0.182	0.627	-0.271
p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

RDSQ-29: Reward Deficiency Syndrome Questionnaire-29; BIS: Barratt Impulsiveness Scale; BSSS: Brief Sensation Seeking Scale; p: p value; r: Correlation coefficient.

completed university education or higher (94.8%), while 5.2% had completed high school. Participants' occupational backgrounds included public sector employees (50.5%), private sector employees (20.8%), self-employed individuals (15.6%), students (10.1%), and unemployed individuals/housewives (2.9%). All participants reported no current psychiatric diagnosis. The survey link was disseminated via email, WhatsApp groups, and academic community networks, and participation was voluntary.

Age- and Gender-Related Differences

When examining the relationship between age and RDSQ scores, weak yet significant decreases were observed in RDSQ-Total scores as well as in the Social Concern and Risk-Seeking Behavior subscale scores (respectively; r=-0.182, p<0.001; r=-0.172, p<0.001; r=-0.271, p<0.001) (Table 1).

The Cronbach's alpha value for the RDSQ scale was calculated as 0.920. At the subscale level, Cronbach's alpha values were 0.671 for the Lack of Sexual Satisfaction subscale, 0.735 for the Activity subscale, 0.729 for the Social Concern subscale, and 0.813 for the Risk-Seeking Behavior subscale.

In the analysis examining the effect of gender on scale scores, women had significantly lower RDSQ-Total scores compared to men (p=0.001). At the subscale level, women scored significantly lower than men on the Lack of Sexual Satisfaction subscale (p<0.001), while no significant difference was found between genders in the Activity subscale (p=0.503). However, men scored significantly higher than women on the Social Concern subscale (p<0.001) and the Risk-Seeking Behavior subscale (p<0.001) (Table 2).

Structural Validity: Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) was conducted using Mplus (v8.3) software with the WLSMV estimator to evaluate the structural validity of the 29-item scale based on data from 481 participants. In this analysis, a general factor (F) accounting for all items and four theoretically based specific factors (F1–F4) were specified. The overall model fit indices were as follows: $\chi^2(362)=1396.31$, p<0.001, RMSEA=0.077 (90% confidence interval (CI) [0.073, 0.081]), CFI=0.916, TLI=0.906, and SRMR=0.072, indicating an acceptable model fit.

According to the analysis results, standardized loadings for the general factor (F) ranged from 0.044 to 0.851; for F1, loadings ranged from 0.305 to 0.888; for F2, loadings ranged from 0.185 to 0.617; and for F3, two items showed equal loadings of 0.441. For F4, loadings ranged from 0.080 to 0.723. Although RDSQ-1 loaded significantly on the general factor (p<0.001), its loading value was relatively low compared to other items (β=0.169). Similarly, item RDSQ-2 in the F2 subfactor (β=0.044) and items RDSQ-23 (β=0.091) and RDSQ-27 (β=0.080) in the F4 subfactor also showed low loadings (Fig. 1).

Table 2: Scale scores by gender

	Gender	Number	Mean	SD	p
RDSQ-29-Total	W	311	60.17	14.464	0.001
	M	170	64.66	14.840	
RDSQ-29-Lack of Sexual Satisfaction	W	311	4.06	1.552	<0.001
	M	170	5.54	2.122	
RDSQ-29-Activity	W	311	12.79	3.203	0.503
	M	170	12.59	3.182	
RDSQ-29-Social Concern	W	311	2.90	1.414	<0.001
	M	170	3.43	1.629	
RDSQ-29- Risk-Seeking Behavior	W	311	8.74	3.415	<0.001
	M	170	9.99	3.718	

RDSQ-29: Reward Deficiency Syndrome Questionnaire-29; SD: Standard deviation; W: Woman; M: Man; p: p value.

Convergent Validity

When examining correlations between RDSQ scores and impulsivity and anxiety levels, the RDSQ-Total score showed significant correlations with BIS-Total (r=0.336, p<0.001), BIS Non-Planning (r=0.207, p<0.001), BIS Motor Impulsiveness (r=0.393, p<0.001), BIS Attentional Impulsiveness (r=0.262, p<0.001), and BSSS-Total (r=0.664, p<0.001).

At the subscale level, the Lack of Sexual Satisfaction subscale showed significant correlations with all variables (r=0.244-0.394, p<0.001). The Activity subscale showed significant correlations only with Barratt Motor Impulsiveness (r=0.180, p<0.001) and BSSS-Total (r=0.313, p<0.001). The Social Concern subscale showed significant correlations with all variables (r=0.260-0.448, p<0.001). The Risk-Seeking Behavior subscale also showed significant correlations with all variables, with the highest correlation observed with BSSS-Total (r=0.627, p<0.001).

Reliability Analyses (Internal Consistency and Test–Retest Reliability)

The test-retest correlation for the RDSQ-Total score was found to be high and significant (r=0.884, p<0.001). Among the subscales, the highest test-retest correlation was observed for the Lack of Sexual Satisfaction subscale (r=0.887, p<0.001). The remaining subscales also showed significant test-retest correlations: Activity (r=0.787, p<0.001), Social Concern (r=0.717, p<0.001), and Risk-Seeking Behavior (r=0.880, p<0.001). These results demonstrate that the scale exhibits high reliability over time (Table 3).

The Cronbach's alpha coefficient for the RDSQ total scale was calculated as 0.920. At the subscale level, alpha values were 0.671 for Lack of Sexual Satisfaction, 0.735 for Activity, 0.729 for Social Concern, and 0.813 for Risk-Seeking Behavior. When Cronbach's alpha was recalculated after removing each item individually, an increase in the total reliability coefficient was observed only upon the removal of RDSQ-1 and RDSQ-2, for which alpha increased to 0.923. For all other items, removal resulted in either no meaningful change or a slight decrease in reliability, with alpha values remaining within the 0.915–0.920 range.

DISCUSSION

The present study aimed to evaluate the validity and reliability of the Turkish version of the Reward Deficiency Syndrome Questionnaire. The findings provide strong evidence supporting the psychometric robustness of the adapted scale. Confirmatory Factor Analysis results indicated an acceptable model fit, with fit indices aligning with recommended thresholds ($\chi^2(362)=1396.31$, p<0.001, RMSEA=0.077, CFI=0.916, TLI=0.906, SRMR=0.072), thereby supporting the structural validity of the Turkish version. Consistent with the original validation study (19), a bifactor structure comprising a general reward deficiency factor and four specific subfactors was replicated, indicating that the multidimensional framework of the RDSQ-29 was preserved in the Turkish adaptation.

Internal consistency analyses revealed high reliability for the total scale (Cronbach's α=0.920) and acceptable reliability levels for the subscales, although the Lack of Sexual Satisfaction subscale demonstrated a relatively lower Cronbach's alpha (α=0.671). This pattern mirrors findings from the original study (19), suggesting that while the general structure is robust, some subscales may require cautious interpretation. Furthermore, test-retest correlations over a two-week

Table 3: Test-retest correlation

	RDSQ-29-total (R)	RDSQ- 29-lack of sexual satisfaction (R)	RDSQ-29-activity (R)	RDSQ- 29-social concern (R)	RDSQ-29 risk-seeking behavior (R)
RDSQ-29-Total					
r	0.884	0.485	0.701	0.597	0.752
p	<0.001	<0.001	<0.001	<0.001	<0.001
RDSQ-29-Lack of Sexual Satisfaction					
r	0.465	0.887	0.198	0.377	0.198
p	<0.001	<0.001	0.017	<0.001	0.017
RDSQ-29-Activity					
r	0.598	0.121	0.787	0.277	0.457
p	<0.001	0.149	<0.001	0.001	<0.001
RDSQ-29-Social Concern					
r	0.603	0.457	0.386	0.717	0.515
p	<0.001	<0.001	<0.001	<0.001	<0.001
RDSQ-29- Risk-Seeking Behavior					
r	0.736	0.218	0.526	0.537	0.880
p	<0.001	0.009	<0.001	<0.001	<0.001

(R): Retest; RDSQ-29: Reward Deficiency Syndrome Questionnaire-29; p: p value; r: Correlation coefficient.

interval were high for the total score (r=0.884) and all subscales, confirming the temporal stability of the Turkish RDSQ-29.

Construct validity was further supported by significant correlations between RDSQ-29 scores and related constructs such as impulsivity and sensation seeking. Moderate to strong correlations were observed between the RDSQ-Total score and BIS-11 and BSSS scores, consistent with theoretical expectations linking reward deficiency with increased impulsivity and sensation-seeking traits (13, 19, 23, 24). These findings provide additional evidence of convergent validity for the Turkish version of the scale. Although the correlations between the RDSQ-29 and impulsivity measures were statistically significant, they were notably lower than those observed with sensation seeking. This discrepancy reflects the theoretical foundations of Reward Deficiency Syndrome, which emphasize heightened reward pursuit, novelty seeking, and risk-taking rather than cognitive or inhibitory components of impulsivity. Sensation seeking is conceptually closer to reward-driven motivation, and the stronger correlations observed in this study suggest that the RDSQ-29 more strongly captures motivational and behavioral aspects of reward processing. In contrast, impulsivity involves broader domains, including attentional and inhibitory control, which may not align as directly with the reward deficiency framework. Together, these findings provide important insight into the dimensions most prominently captured by the RDSQ-29 and clarify the differential relationships observed across external validity indicators. Although anhedonia is conceptually related to reward processing, the RDSQ-29 was designed to capture a broader reward deficiency framework that encompasses motivational, behavioral, and emotional components beyond hedonic capacity. Therefore, impulsivity- and sensation-seeking–based measures were deemed theoretically more appropriate indicators of concurrent validity. Moreover, significant negative correlations between age and RDSQ scores align with previous research suggesting that reward-seeking behaviors and impulsivity tend to decline with age (19).

Gender comparisons were conducted to determine whether reward deficiency–related traits manifest differently across demographic subgroups. Examining such subgroup variations is important for evaluating whether the scale functions equivalently across genders and for identifying potential differences in the behavioral and emotional expression of reward processing. These analyses help clarify whether certain components of reward deficiency—such as risk-taking, sensitivity to reinforcement, or social concern—may be more pronounced in one gender than the other, thereby providing meaningful insight into the differential

expression and clinical relevance of RDSQ-29 scores across populations. Gender differences observed in this study offer important insights into the manifestation of reward deficiency traits. Men scored higher than women on the RDSQ-Total score and the Social Concern and Risk-Seeking Behavior subscales, while women reported lower scores, particularly on the Lack of Sexual Satisfaction subscale. These results suggest that reward sensitivity and associated behaviors may vary between genders, a pattern also noted in previous studies addressing gender differences in impulsivity and sensation seeking (25–27). Given these considerations, it is essential that clinical assessment and intervention strategies account for gender-specific dynamics when addressing reward-related psychopathologies.

The use of a bifactor model provided an enhanced understanding of the scale's structure by allowing simultaneous modeling of a general RDS factor and specific dimensions. Although several items (RDSQ-1, RDSQ-2, RDSQ-23, and RDSQ-27) demonstrated lower-than-expected factor loadings, the decision to retain these items was based on theoretical considerations and consultation with the original scale developers. This approach highlights the need to preserve the theoretical integrity of the scale while also acknowledging the statistical complexities inherent in cross-cultural adaptation.

To further address item-level performance, it is important to note that several items (RDSQ-1, RDSQ-2, RDSQ-23, and RDSQ-27) demonstrated low standardized loadings in the bifactor model. Although these items contributed minimally to the specific factors, they still loaded significantly onto the general factor and were therefore retained in accordance with the original scale structure. Internal consistency analyses indicated that retaining these items did not substantially reduce reliability at the total-score level; however, their weak factor loadings suggest that item refinement or wording adjustments may be warranted in future Turkish adaptation studies. It is also possible that the relatively weak factor loadings observed for certain items—most notably RDSQ-2—are related to differences between our sample and the sample used in the original validation study. The behavioral and experiential characteristics captured by these items may not have been adequately represented in our non-clinical community sample, leading to restricted variance and, consequently, attenuated loadings. Limited representation of participants for whom these items are most relevant may therefore account for the reduced item–factor associations observed in the present analysis.

Despite the strengths of this study, several limitations must be acknowledged. First, data collection was conducted online, potentially limiting participation to individuals with internet access and introducing self-selection and sampling bias. Additionally, the use of a non-clinical community sample restricts the generalizability of the findings to psychiatric populations. Although this approach allows for efficient recruitment and broad participation, it limits the ability to evaluate the scale's performance in groups where reward-related pathology is more prominent. Future studies should examine the psychometric properties of the Turkish version of the RDSQ in clinical samples—such as individuals with substance use disorders, ADHD, or other conditions theoretically linked to reward deficiency. Furthermore, while convergent validity was examined through associations with impulsivity and sensation seeking, additional research involving external clinical criteria and discriminant validity assessments would strengthen the evidence base for the scale. Another important consideration concerns discriminant validity. In the present study, validation analyses focused primarily on constructs theoretically adjacent to reward deficiency, such as impulsivity and sensation seeking. Although these relationships supported convergent validity, discriminant validity could not be evaluated because non-RDS constructs (e.g., depression, anxiety, anhedonia) were not included. Future studies should incorporate such measures to determine the specificity of the Turkish RDSQ-29 and to more clearly differentiate reward deficiency from overlapping psychopathological dimensions. Despite these limitations, the present study provides an important initial step in adapting and validating the RDSQ for use in Turkish-speaking populations.

One of the primary strengths of this study lies in its use of a community-based sample rather than a purely university-based sample, thereby enhancing the generalizability of the findings. Furthermore, the large sample size (n=481 at the first step and n=153 at the second step) exceeded the minimum required for CFA, thereby increasing the study's statistical power and the reliability of parameter estimates. Notably, this study represents the first effort to validate the RDSQ-29 in a non-English-speaking context, contributing significantly to cross-cultural research on reward deficiency syndrome.

Future research should continue to explore the psychometric properties of the RDSQ-29 in diverse populations and languages. Particular attention should be paid to its ability to predict risk for addictive and compulsive behaviors over time, thereby expanding its utility as a preventive screening tool. Longitudinal designs assessing how changes in RDSQ-29 scores relate to clinical outcomes would offer valuable insights into the dynamic nature of reward deficiency phenomena. Ultimately, the Turkish version of the RDSQ-29 offers a reliable and valid tool for advancing research and clinical practice in the assessment of reward-related dysfunctions.

CONCLUSION

This study represents the first validity and reliability study of the original RDSQ-29 scale. The RDSQ-29 is a vital instrument in psychiatry and psychology, providing insights into reward processing that are essential for diagnosis, treatment, and education. The introduction of the RDSQ-29 creates an opportunity to explore the genetic, neurological, and psychological features associated with RDS and to examine its role in the development of psychiatric disorders.

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